

1972

## Back Matter 7 (4)

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## THE DIRECTOR'S REPORT

RANCHO SANTA ANA BOTANIC GARDEN

1971

It is a pleasure for me to present an account of the activities at the botanic garden for the year 1971. Except for the effects of the weather which are given elsewhere in this report, the year was one of steady and sound development. The building program of the previous year had been completed, and early in 1971 landscaping around the annex was finished and the grounds once again were quiet and serene, suitable for study and contemplation by the thousands of persons who visit the garden each year.

Among events which undoubtedly will mark this year in the garden's history are two, especially, which should be mentioned. The botanic garden is a member of the American Association of Museums and during the year we applied for accreditation by that organization. In August we were notified that we had been granted interim approval until an on-site evaluation of the institution could be made by the AAM Accreditation Visiting Committee. This visit is expected early in 1972. The second item of interest is that the botanic garden for the first time applied for a plant patent to cover a new hybrid which soon will be released to the horticultural trade. We believe that this hybrid, a *Mahonia*, is the finest horticultural production so far achieved at the garden, and preliminary estimates made by nurserymen who have seen the plant would seem to confirm this evaluation.

On the debit side would be the continued effects of air pollution. These were detailed at some length in the previous report and will not be repeated here except to say that there is no evidence that the situation has improved. For those true gardeners who delight in the appearance of healthy plants the sight of damage by air pollution is very depressing.

## ADMINISTRATION:

Two staff appointments were made during the year. Dr. Jean-Pierre Simon, Experimental Taxonomist at the botanic garden and Assistant Professor of botany at the Claremont Graduate School, resigned in order to accept a position with UNESCO. In July he and his family left for Paris for briefings prior to taking up his new duties in Havana, Cuba. Dr. Ronnie Scogin of Ohio University, Athens, has been appointed Experimental Taxonomist at the garden and Assistant Professor of botany in the graduate school. Dr. Scogin is a graduate of the University of Texas, Austin, and in 1970-71 was a National Science Foundation Post Doctoral Fellow at the University of Durham, England. Dr. Scogin will assume his new duties at the botanic garden in September, 1972.

In April Mrs. Coffeen resigned as Supervisor of the Youth Education Program and in September Kenneth Zakar was appointed Supervisor of the Education Department. Mr. Zakar is a native of Illinois and a graduate of California State College, Los Angeles, with a major in biology.

During the year, the Claremont Graduate School created a new endowed chair of botany and appointed Dr. Carlquist as the first Violetta L. Horton Professor of Botany. Dr. Carlquist has been a member of the graduate school faculty since 1956 and is the author of four books, the latest being *Hawaii, a Natural History* published in 1970.

After nearly 32 years of devoted service to the botanic garden our grounds foreman, Jesus Manjarrez, retired on July 1. We will all miss Jesus and wish him much happiness and good health in his retirement. Mr. Geerlof Steinhuisen was appointed to a newly created position, Maintenance Mechanic, and will be responsible for all mechanical equipment both in the buildings and on the grounds.

#### WEATHER:

Rainfall recorded during the 1970-71 season was 14.11 inches. This is 1.22 inches over the 1969-70 season and 3.6 inches below the seasonal average.

#### RAINFALL REPORT

	1969-70	1970-71	Average*
July	0.00	0.00	0.05
August	0.00	0.00	0.06
September	0.00	0.00	0.40
October	0.00	0.16	0.20
November	1.90	4.26	3.17
December	0.29	4.92	2.25
January	1.61	0.79	3.60
February	1.97	1.19	3.18
March	6.85	1.13	2.83
April	0.06	0.53	1.62
May	0.00	1.13	0.22
June	0.21	0.00	0.12

\*Average based on rainfall recorded for the past ten years.

The temperature high for the year was reached on September 12 when the hygrothermograph needle went off the chart to an estimated 114° F.

The temperature reached 100° F or more on 32 days during the summer season: one day in June, six days in July, 13 in August, eight in September and four in October. December was the only month that did not have one or more days with temperatures over 87°.

A low of 28° F was recorded on January 3, 4 and 7.

The humidity record shows 1971 with 25 days below 10% as compared with 44 days in 1970. The lowest humidity of the year was reached on April 1 when it dropped almost to 0% for a period of about four hours.

## AMOUNTS OF WATER USED DURING THE PAST FIVE YEARS

Year	Water used (cu. feet)	Rainfall for Calendar Year (inches)
1967	2,816,800	22.62
1968	3,148,900	10.00
1969	3,910,500	33.50
1970	4,524,700	20.03
1971	3,691,000	13.09

During 1971 we used 18.5% less water than in 1970; however, the cost was 3.5% more than it was for the previous year.

## SEEDS AND PLANTS:

Requests from our 1971 Seed Exchange List resulted in seed being sent to 28 foreign countries and numerous institutions within the United States. Altogether 436 packets were dispatched from the garden.

Many requests were made for seed that did not appear on the Seed Exchange List; these requests usually came from institutions and individuals requiring seed for research purposes. The University of New Zealand requested seed of *Garrya elliptica*, *G. fremontii*, *Ephedra trifurca* and *E. viridis* for graduate research on carbon fixation and seed germination. Stanford University requested seed of Onagraceae for germination studies, and seeds representing 11 genera and 14 species were sent. Seed of *Coreopsis gigantea*, *C. maritima* and *C. californica* was sent to the University of Arkansas for a biosystematic study of that genus. One packet of *Collinsia heterophylla* seed was sent to the University of Hong Kong. Seed of the following was sent to the National Center of Forest Research, Nancy, France: *Abies amabilis*, *A. bracteata*, *Arbutus menziesii*, *Arctostaphylos mewukka*, *A. pringlei* var. *drupacea*, *Calocedrus decurrens*, *Comarostaphylis diversifolia* var. *planifolia*, *Cupressus forbesii*, *C. sargentii*, *C. macnabiana*, *Fremontodendron californicum*, *Rhamnus californica*, *Rhus ovata*, *Prunus emarginata*, *P. virginiana* var. *melanocarpa*, *Sequoia sempervirens* and *Pinus sabiniana*.

Seed of 11 species of *Lupinus* went to the Commonwealth Scientific Industrial Research Organization (Plant Introduction Center), Canberra, Australia. To the Landbouwhogesschool, Wageningen, The Netherlands, went seed of *Franseria chamissonis*, *Franseria chenopodiifolia*, *Baeria chrysostoma* ssp. *gracilis*, *B. minor*, *Chaenactis glabriuscula*, *C. glabriuscula* var. *lanosa*, *Encelia californica*, *E. virginensis* ssp. *actonii*. This seed was required for studies in the relationship between plant parasitic nematodes within different plant genera. Seed of *Quercus kelloggii*, *Q. chrysolepis* and *Acer macrophyllum* was sent to the Botanic Garden, Hebrew University, Jerusalem for their North American plant collection, and the Stanford Research Institute received seed of *Salvia columbariae*, *Baeria chrysostoma* ssp. *gracilis*, *Coreopsis bigelovii* for use in studies on the fate of carbon monoxide in the biosphere. Seed of *Eriodictyon trichocalyx* went to the Vrije University, Amsterdam, for experimental purposes and to the Univer-

sity of Aarhus, Denmark, seed of *Trifolium wormskioldii* and *Lupinus arboreus* for cytotaxonomic studies. The University of California, Irvine, Department of Population and Environmental Biology, received seed of *Ceanothus griseus*, *C. incanus*, *C. rigidus*, *C. thyrsiflorus*, and *C. cordulatus*. The University of Washington, Department of Chemistry, requested leaves of *Olneya tesota* for chemical research. Pollen of *Platanus racemosa* was sent to the National University of Australia for hybridization studies. Emory and Henry College, Virginia, was supplied with seed of *Ephedra viridis* and *E. nevadensis* for research purposes along with information on the cultural requirements of such plants. The Royal Botanic Garden, Edinburgh, Scotland, received seed of *Penstemon caesius*, *Calyptridium umbellatum* and *Allium burlewii*. Hillier & Sons, Nurserymen & Seedsmen, Winchester, England, received seed of *Castanopsis sempervirens* and *Lyonothamnus floribundus*, and Monrovia Nursery, Azusa, California, received seed of *Berberis amplexens* and *B. pinnata*.

The botanic garden attempts to help other institutions to build up their collections and we send such organizations as much material as possible. The Golden View School in Huntington Beach sent the plans for their new Environmental Learning Facility which covers two and a quarter acres; in addition to horticultural advice, the garden was able to send 36 lots of seed suitable for their purpose. A generous amount of seed was given to the Pasadena Audubon Society for use in creating a Wild Life Sanctuary at the Cobb Estate — property purchased through public subscription. This estate was officially deeded to the U.S. Forest Service in December.

A large amount of seed of *Lilium humboldtii* var. *ocellatum* was given to a member of the North American Lily Society. He, in turn, sent a portion of the seed to the lily society for its Seed Exchange List. The remainder was divided into 25 lots of 50 seeds each, and these were sent to lily enthusiasts in Czechoslovakia, Russia, Japan, Chile and Canada and in 13 states in this country. It was interesting that this was the first time that *Lilium humboldtii* var. *ocellatum* had appeared on the society's Seed Exchange List.

The following plants were sent to the Department of Botany, Pomona College, to supplement their native plant collection: 10 *Romneya coulteri*, two *Cneoridium dumosum*, one *Ceanothus rigidus*, three *Umbellularia californica*, three *Tetracoccus dioicus*, one *Ceanothus* 'Sierra Blue,' two *Leptodactylon glandulosum*, three *Helianthemum scoparium* ssp. *aldersonii*, two *Comarostaphylis diversifolia* var. *planifolia*, one *Heteromeles arbutifolia* var. *macrocarpa*, three *Lyonothamnus floribundus* var. *asplenifolius*. To Scripps College went four *Fremontodendron* 'California Glory,' three *Ceanothus* 'Santa Ana' and two *Ceanothus* hybrids RSABG selections. Plants were also given to the Catalina Island Company for the newly proposed botanic garden; two *Fremontodendron* 'California Glory,' six *Cneoridium dumosum*, six *Tetracoccus dioicus*, five *Comarostaphylis diversifolia* var. *planifolia*, three *Populus trichocarpa*, 18 *Lyonothamnus floribundus* var. *asplenifolius*, two *Populus fremontii* var. *arizonica* and two *Rhamnus crocea*.

In August the garden supplied specimens of native material to the California Board of Landscape Architects for their annual Board Examinations.

A member of the staff assisted a representative from the Air Pollution Research Department, Washington State University, Pullman, in making tests of isoprene emissions from the foliage of species of genera of California plants.

One hundred and twenty-seven seed accessions were made during the year.

#### GROUNDNS:

From the standpoint of weather, 1971 was a year that left much to be desired and a repeat performance would be catastrophic. Dry conditions prevailed throughout the year and were augmented by periods of extreme heat or cold; many plants sustained damage from frost and foliar scorch from excessive heat. The year ended with a grand finale of much-needed moisture with 6.97 inches of rain being received during the Christmas week, and 1971 slipped into oblivion leaving no fond memories for those who love the art of gardening.

With the weather conditions that prevailed it was necessary to start irrigating in January. Seed beds of annuals required moisture and several areas in the Plant Communities were showing signs of drought. Our display of annuals was quite colorful, but short-lived; most of the flowering was over by the end of May. The finest display was on the newly completed coastal bluffs and sand dunes where the high but gently undulating contours exhibited the plants to great advantage.

The damage and losses sustained in some of our conifer plantings during the hot spell, particularly on September 12, were most discouraging. The heaviest losses occurred in the plantings of *Chamaecyparis lawsoniana*, *Thuja plicata*, *Picea sitchensis* and *Sequoiadendron giganteum*, where the plants looked as if they had been subjected to a flame thrower. Although specimens of *Sequoia sempervirens* and *Lithocarpus densiflora* received foliar burns they will recover. Our greatest concern at the present time is for the damage sustained by the sequoiadendrons in the Plant Community Area and it is difficult to say whether or not the trees will survive.

The cypress bark beetle (*Phloeosinus cristatus*) which has attacked our cypress plantings with devastating effect over the past two years has been brought completely under control by the use of Cygon. The recommended 80% wettable Sevin that we had used was not effective. Careful attention was paid to timing in the spray program; the first application of one pint Cygon to 100 gallons water was made on March 17, followed by a second of like concentration on March 30.

The wood rat caused much concern this year. These rodents build their nests in shrubs and trees and feed on the bark. Although we are always on the look-out for these animals they often go undetected until die-back of

the plant is observed. These rodents were discovered in our plantings of *Ceanothus* 'Joyce Coulter' and *C. horizontalis* on the mesa and in *Cupressus forbesii* in the plant communities. Over 83 rats were trapped, and it is not known how many succumbed to bait, none has been observed during the past several months.

The upper pond was cleaned and some minor repairs were made; the bed of the stream that flows southward from it was cleaned, for mud had accumulated over the years and had completely covered the decorative boulders in the stream.

Some alterations were made in the rock garden. To carry out this work it was necessary to rent a five-ton dump truck and a tractor and skip loader to move fill and soil into the area. The equipment also was used to transport many tons of compost into the plant communities where, this year, we concentrated on the redwood forest, mixed evergreen and yellow pine communities. The compost will help improve the soil and conserve the much-needed moisture in these areas. During the spring and fall we also applied light dressings of ammonium sulphate to the soil in the same areas.

During the year, 6,300 plants representing over 50 genera were added to the living collections. Species of *Arctostaphylos*, *Ceanothus* and *Iris* were well represented.

Vandalism, like smog, remains to plague us. Redwood signs continue to be a prime target with over 35 being damaged; ten had to be remade. Last spring the large flowering stems of *Agave utahensis* var. *nevadensis* were broken. During Easter vacation a favorite pastime of some seems to be to run through the plant communities kicking wire cages from around young plants which are then at the mercy of rabbits.

During the summer of 1969 the first Joshua trees, *Yucca brevifolia*, bloomed at the age of 18 years. These were planted as seedlings from six-inch pots during the winter of 1951. At least four more have bloomed during the past two summers. The largest at the time of flowering was eight feet tall. The plants that flowered are now branching with the longest branches being about 12 inches. This species does not branch until after producing a terminal inflorescence at which time vegetative growth starts from one or more of the upper leaf axils. These plants, whether they have flowered or not, are forming dense clumps from the base, and suckering is occurring many feet from the base of the original plant. This is a growth habit that does not normally occur in the wild.

Four plants of *Yucca brevifolia* var. *herbertii* also have flowered. This took place during their 12th and 13th years. They were planted from one-gallon cans during the fall of 1957, and at the time of flowering, these plants ranged in height from four to five and one-half feet. The branching habit is becoming evident on those plants that have flowered. This variety forms large clusters in the wild and ours are showing the same tendency. By contrast, the *Yucca brevifolia* var. *jaegeriana* has never flowered although some are much older than the ones described above. Some of the plants

were originally planted in 1947 at the garden's old site in Orange County and moved to their present location in 1951. One of these is nearly 15 feet tall with no sign of flowering or branching. In its native habitat this variety normally branches at three to four feet and does not clump or sucker; so far it has not shown this tendency under cultivation.

Natural regeneration of *Pinus radiata* was noted for the first time in the plant communities. This is most encouraging as smog continues to take its toll of these pines each year; four succumbed during 1971, one of which was a particularly fine specimen.

A plant patent for our new introduction, *Mahonia* 'Golden Abundance,' has been applied for and many nurserymen are anxious to see this fine plant in the trade as soon as possible. Several thousand cuttings were taken from our stock plants this winter by Monrovia Nursery and Pomona Wholesale Nurseries.

In March a representative of the American Horticultural Society Plant Record Center microfilmed our master record file. Over 7,000 sheets were photographed and have since been placed on data processing forms. Readers may recall that several years ago the botanic garden was one of the original donors of funds to the American Association of Botanic Gardens and Arboretums for a feasibility study of establishing a national plant record file. The October issue of the AABGA Bulletin was devoted to the history and activities of the Plant Records Center.

Two new cesspools were installed during 1971. In the early part of the year we had evidence that the disposal system was not operating properly even after the septic tank had been cleaned. Inspection showed that the leach lines were no longer functioning and soil in the area had reached saturation. It was in this area that we had earlier lost a fine specimen of *Lithocarpus densiflora* and a large area of the ground cover, *Arctostaphylos* 'Point Reyes.'

During the spring the garden entered a small display of native plant materials at the Flower Show and Garden Exposition held in the Colonial Savings and Loan Association building in Claremont. Dick Tilforth spoke to the public on the history of the Rancho Santa Ana Botanic Garden and its many functions. The talk and display were enthusiastically received by visitors to the show. John Dourley gave a short talk to the El Monte Rose Society in March and then conducted a tour of the garden.

A new one-ton Ford truck with dump body was purchased and is a most welcome addition, for its predecessor had become nearly useless. Eighty-six plastic labels were acquired, some to replace those lost or broken and the remainder for new plantings.

#### FIELD WORK:

Partly because of the new graduate course in field taxonomy, 1971 was a period of considerable field activity in the local San Gabriel Mountains.



Approximately 50 forays were made into this range by Dr. Thorne, usually with Dick Tilforth, John Dourley and various graduate students or by the graduate students in connection with their canyon surveys for the field course or with their individual research projects. Nearly 1,750 collections were made totalling perhaps 3,500 sheets of about 900 species of the 1,150 known from the range. Two strenuous over-night back-packing trips were made across the mountains. One two-day trip was made with the field taxonomy class to Santa Catalina Island, and two collecting trips were taken into the Sierra Nevada.

Dr. and Mrs. Thorne spent their vacation in Mexico during the month of October where in the tropical state of Chiapas Dr. Thorne, with Dr. Earl Lathrop of Loma Linda University and Dr. Dennis Breedlove of the California Academy of Sciences, made more than 1,900 collections, mostly in multiples, of 160 vascular plant families. All the major physiographic provinces of Chiapas were visited from Oaxaca to Guatemala and from the Pacific Coastal Plain to the Gulf Slope.

In their search for seeds and plants John Dourley and Dick Tilforth collected in a wide range of areas. In San Bernardino County the Clark and New York Mountains, Eagle Mountain, the eastern San Gabriels and the Morongo Valley were visited. The southern and eastern portions of San Diego County and the Mount Palomar area were also covered. The Sierra Nevada circle was travelled and included Inyo, Mono, Tuolumne, Mariposa and Madera counties. Another trip into the Sierra Nevada foothills included Fresno, Madera and Mariposa counties. Eighty-three collections were made from these trips. Dr. Lenz visited a large number of areas on the western slopes of the Sierra Nevada in his continuing study of members of the *Brodiaea* complex. He also collected in San Luis Obispo County. Dr. Benjamin collected only locally in 1971.

#### SCIENTIFIC COLLECTIONS:

The integrated herbaria of Pomona College and the garden continue to receive much use, particularly from southern California botanists, although there are frequent visitors from other states and from abroad. Nearly 11,300 newly mounted RSA sheets have been filed into the vascular plant collections, necessitating the addition of hundreds of new genus or species covers. From the combined herbaria or RSA 2,926 sheets were sent on loan to 19 institutions in 25 shipments; 1,996 sheets in 20 loans were returned to us from 14 institutions; 4,749 sheets were borrowed by us from 16 herbaria in 19 loans; and 661 sheets were returned by us to eight herbaria. Additional loans were sent out by Pomona College. During 1971 the graduate assistants mounted 11,298 sheets of vascular plants, bringing the total RSA collections to more than 225,000 sheets and the integrated herbaria to perhaps 515,000 sheets of vascular plants. More than 19,000 RSA fungi and other cryptogamic specimens and nearly 21,000 POM cryptogams swell the total herbarium collections to 555,000 specimens. Not included in this total are the large wood block, pollen slide, preserved seedling, seed and fruit and

cone and spirit collections. Received on an exchange basis were 4,069 sheets from 25 institutions; whereas, the garden sent out on exchange 769 sheets to five herbaria. A large distribution of RSA duplicates is intended for early 1972. More than 4,350 specimens of vascular plants were received by RSA as gifts, some for determination, from 18 individuals or institutions.

Of the 11,298 sheets processed, nearly 2,700 were from California and 1,000 from the immediately adjacent Atomic Test Site in Nevada; 1,300 from other parts of the West; 1,500 from the Southeast; nearly 1,950 from mainland Mexico; more than 1,500 from Australia and other Pacific and Indian Ocean islands; about 500 from Chile and tropical America; 500 from Iran; and 325 from Europe. The acquisition of the processed sheets included nearly 4,700 from exchanges; 5,800 from gifts; and 800 through recent staff and student collections.

About 75 new isolates were added to the fungus culture collection. Most of these fungi either were isolated by Gerald Benny, graduate student in mycology, or were solicited by him from other institutions for use in his studies. Several of the fungi received were cultures representing type collections and specimens of these have been placed in the mycological herbarium. Some 50 accessions were made to the Laboulbeniales collection, all prepared by Dr. Benjamin. Among these was an important series of specimens representing several species of *Aporomyces* taken from large collections of Limnichidae (Coleoptera) kindly provided for study by Drs. T. E. Brooks, Southeast Missouri State College, Cape Girardeau, and M. W. Sanderson, Illinois Natural History Survey, Urbana. As in the past, routine maintenance of the culture collection required in excess of 1,000 transfers of isolates to fresh media, mostly carried out by Mr. Benny.

#### LIBRARY:

We should call 1971 the library's "Project Year." In May, nearly 1,000 periodical and serial titles were sent to Honnold Library as our part of their computer print-out science holdings of The Claremont Colleges. This catalogue should be available for use early in 1972.

By June, the graduate students had completed the reconditioning of the leather-bound volumes. In July and August, with the help of two students from the Neighborhood Youth Corps, 250 horticultural books were recatalogued, thus resulting in a shift of two ranges of books.

The same two students also started another long-awaited project. The nursery-seed catalogues were sorted and alphabetized by country and/or state. During the fall, the graduate students alphabetized by company within the country and/or state and arranged these catalogues into 312 enclosed boxes. The catalogues are now housed in the herbarium.

There was a number of short-term projects including properly stamping the map collection and adding 100 California geographical quadrangle maps to the holdings.

Several on-going projects include weeding the reprint collection and making subject cards for the card catalogue. The latter project has also lead into uncatalogued periodical/serial floras being added to the card catalogue.

The major 1971 continuing project, an inventory of the book collection, was started by the graduate students in September. We are finding many perplexing problems and with the help of Miss Patience Milrod, a junior at Pitzer College, we are trying to solve them.

Serial/periodical statistics show 434 current titles received; 1,700 single issues checked in including 21 bound volumes; 12 new titles added; 2 titles deleted; and 296 volumes sent to the bindery. During the year, 250 volumes were catalogued, 127 volumes accessioned and 176 new books received. Fifty were deposited in the garden library by Honnold Library, 250 volumes reclassified, 500 volumes assigned subject headings, and 49 boxes of microfiche were catalogued. Numbers 32-35 of *Index Nominum Generi-corum* and numbers 260-263 of the *Gray Herbarium Card Index* were received.

#### RESEARCH AND PROFESSIONAL ACTIVITIES:

Dr. Thorne has continued his studies of the San Gabriel Mountains toward the projected flora of that range. Intensive field activity this past year in the range by him and fellow staff members and graduate students produced specimens and extensive distributional data for more than 900 of the probable 1,200 species in the range. Work upon the plant communities of California and his new classification of the Angiospermae was continued. Two papers were sent off to editors for publication, one on floristic relationships between tropical America and Africa to be published by the Smithsonian Press and another on the Sapindales for the *Encyclopaedia Britannica*. Another on the classification of major distributional disjunctions in the vascular plants is under preparation for *Aliso*. Further additions to an annotated check list being prepared in conjunction with Dr. Earl Lathrop of Loma Linda University and Dr. Dennis Breedlove of the California Academy of Sciences on the vascular plants of the Jitotol Ridge of the Northern Highlands of Chiapas, resulted from more than 1,000 collections made in October on the Ridge. So far about 1,000 species of 155 families have been determined and listed.

In May, Dr. Thorne presented several lectures in the East at the Smithsonian Institution, the University of Maryland, and Kent State University, Ohio. In November, he lectured to the botanists at the University of California, Davis, and to the Friends of the Davis Arboretum also at Davis, and in December to the Claremont Men's Garden Club at the Rancho Santa Ana Botanic Garden and to the Southern California Horticultural Institute in Hollywood.

Dr. Thorne continues to serve as chairman of the Advisory Council and *ex officio* member of the Steering Committee for the *Flora of North America*. In January, he attended joint meetings of the Editorial and Steering Com-

mittees of the project at the Missouri Botanical Garden. He has continued to serve locally as Secretary-Treasurer of The Claremont Colleges Sigma Xi Club and for the City of Claremont as a member of the Parkways and Street Trees Commission. He is a member of the Visiting Committee for the Arnold Arboretum of Harvard University and a Research Associate of the University of Hawaii Botanical Garden. He has served as external examiner on several doctorate committees for the Universities of Singapore, Sydney and Adelaide. He continues to make many determinations of plants brought or sent in to the garden for identification, and has reviewed various grant proposals and manuscripts submitted for publication.

Dr. Simon returned from Chile at the end of January after a three-month stay during which he collected and studied several disjunct species groups found in western North and South America. At the end of March Dr. Simon attended the first meeting on mediterranean ecosystems held at Valdivia, Chile. This research was sponsored by the National Science Foundation and is part of the International Biology program (IBP).

Dr. Simon continued his serological investigations of the Order Nymphaeales and a second paper of the series was published in the 1971 issue of *Aliso*. He also continued his studies of disjunct species groups of *Prosopis* and *Lupinus* with the assistance of Colin Wainwright. The extensive plant collections made in Chile were processed during the early months of 1971.

Although his research was somewhat curtailed due to ill health, Dr. Munz was still able to finish several important projects on which he has been working for some time. All of his many friends will be pleased to learn that the manuscript of the *Flora of Southern California* was completed during the year and is now being prepared for publication by the University of California Press. Dr. Munz also completed a manuscript on the Onagraceae of Santa Catarina, Brazil, and has nearly completed one on the Onagraceae of Ecuador. Much time was devoted to the identification of two large lots of plants, one a set made by Mary DeDecker of specimens primarily from Inyo County and another set made by Delzie Demaree, mostly of plants from New Mexico.

Dr. Lenz continued his investigations of the members of the *Brodiaea* complex and at present is devoting most of his time to the yellow-flowered species of the section *Calliprora* of *Triteleia*. Cytologically the members of the group are very complex. Artificially produced intra- and interspecific hybrids are contributing much information toward an understanding of the evolution of the taxa within the section. Because of the cytological complexity of the group an unusual amount of field work has been required in his study. At present only two taxa remain to be studied in the field.

Dr. Lenz continues to serve as Chairman of the Graduate Program in Botany of the Claremont Graduate School and as the botany representative to the Graduate Council. During the fall semester he served as Chairman of the Academic Procedures Committee and was appointed by President

Keeney to serve on the Medical School Study Committee. He is also a member of the Life Sciences Field Committee.

During 1971, Dr. Carlquist prepared and completed the manuscript for a book to be entitled *Island Biology*. This book, written in scientific style, covers topics concerning island plants and animals and will be published by Columbia University Press. Continuing studies of wood anatomy, Dr. Carlquist received a two-year grant from the National Science Foundation for the purpose of preparing a more modern and comprehensive concept of evolution in woods. David Wheat is working on this project.

In April, Dr. Carlquist presented a series of lectures as the George Lamb Lecturer in Botany at the University of Nebraska. He also presented lectures at Colorado State University and Utah State University.

Dr. Benson's research during the year emphasized the Cactaceae. Two extensive trips to Arizona, Utah and Nevada were devoted to field study of natural populations, collection of specimens and securing black-on-white and some colored photographs for illustration of *The Cacti of the United States and Canada*. The many maps, line drawings, black-on-white photographs and colored photographs were finished and assembled into 569 plates. This work was completed during 1971; the text was completed earlier. Preparation of the third edition of *The Trees and Shrubs of the Southwestern Deserts* is now the major research project.

Dr. Benjamin continued his studies of Laboulbeniales and he completed a chapter on these fungi to be published in Vol. IV of *The Fungi*, a treatise being published by the Academic Press, New York & London. His *Introduction and Supplement* to a reprint edition of Thaxter's classic monograph on the Laboulbeniaceae was published early in the year by J. Cramer, Lehre, Germany. Current projects involve completion of studies on the Laboulbeniales infesting semiaquatic Hemiptera, a revision of the genus *Aporomyces*, and the description of a new genus from New Guinea.

Dr. Benjamin continued as Editor-in-Chief of the journal *Mycologia* for the Mycological Society of America. He also served on the Board of Editors of the society's *Mycologia Memoirs* and retained his appointment on the Advisory Committee on Fungi of the American Type Culture Collection. In November, he lectured on the Laboulbeniales for students of the Department of Biology at California State College, Fullerton.

#### GRADUATE INSTRUCTION:

Two students received the Ph.D. during the year. They were Dr. Theodore Mortenson, presently assistant professor at Chapman College, Orange, and Dr. Ruth Wilson, assistant professor at the California State College, San Bernardino. Among the students registering for the first time were Larry DeBuhr from Iowa State University, Ames; Loucile Housely, a graduate of Pomona College; Robin Collins from Principia College, Alton, Illinois; and Donald Bissing from the University of Maryland, College Park.

Students continuing their studies are Gerald Benny, Christopher Davidson, Gary Cromwell, Arthur Gibson, Colin Wainwright, and Gary Wallace who returned to graduate studies after duty in Vietnam. Professor Homer Metcalf continued work on his Ph.D. thesis but was not in residence during the year. Dr. Simon resigned in July to accept a position with UNESCO and Dr. Ronnie Scogin of Ohio University, Athens, was appointed to replace him. Dr. Scogin's appointment is a joint undertaking of the Claremont Graduate School and the Rancho Santa Ana Botanic Garden, the first such arrangement and it represents a strengthening of the ties between the two institutions.

During the 1971-72 academic year the botany faculty will be augmented by having a distinguished visiting professor, Dr. Rajah de Fonseca of the University of Ceylon, Peradeniya. Dr. Fonseca, who holds a NSF Senior Foreign Scientist Fellowship, will present lectures and an organized class in bryophytes and lichens.

#### EDUCATION DEPARTMENT:

The third annual nature interpretation class was conducted during January and February and 15 new volunteers were added to our group. The new nature interpreters are Eloise Baker, Kathy Calagna, Ann Comito, Barbara Crow, Carol Everett, Gloria Ingels, Judith Kettenhofen, June Lombard, Judith Mercer, Maureen McIntosh, George Palmer, Mary Sandoe, Frank Scott, Marion Wilson and Cara Wingert.

In early October, letters were sent to 15 neighboring school districts advising them of our youth education program and encouraging them to use the garden as a teaching tool in their science curriculum. The response has been good with many teachers scheduling tours in the Fall of 1971 and Spring of 1972. The number of students visiting the garden during 1971 was lower than in 1970. This seems to be due to budget limitations in local school districts which makes it difficult, if not impossible, for many teachers to arrange transportation.

Early in October, letters were sent to 26 high schools in Los Angeles, San Bernardino and Riverside counties. The purpose of these letters was to inform these schools of the education department's willingness to assist life science teachers in using the garden as a part of their biology programs. At this time only one school, Claremont High School, has responded. Mr. Jim Troutner, of Claremont High School, is presently using the plant communities section of the garden to study plot ecology.

Explaining the lack of response from 25 of the 26 high schools contacted is difficult. It is hard to envision 25 high school science departments so satisfied with their existing programs that they would not even inquire about our offer and its possibility of adding to or improving their curriculum. This unresponsiveness is more puzzling in view of the good response from elementary schools contacted in the same areas.

The after-school Audubon junior program resumed its activities in November. The response to the program by youngsters in the Claremont area was much greater than anticipated, with many more requests for membership than existing facilities could accommodate. The program was staffed by Sally Vogel, Molly Cornell, Mary Sandoe, Harriett Johnson and Ken Zakar. Assisting these group leaders were: Erika Wodinsky, Beth Platt, Laurie Goman, Barbara Preston, Wendy Price and Patty Baskin.

At the end of this year the education department had 24 active volunteer nature interpreters. A training session for new interpreters is scheduled to begin the first week of January, 1972, which will add approximately ten new members to the volunteer group.

#### SUMMARY OF EDUCATION PROGRAM

Number of students and adults participating in organized programs during 1971:

	<i>Winter</i>	<i>Spring</i>	<i>Fall</i>	<i>Total</i>
Schools: Elementary	748	1,838	446	3,032
Junior and Senior High	131	89	60	280
College and Adult	166	20	0	186
Youth groups:	241	441	75	757
Afternoon Junior Audubon:				
3rd grade	0	0	12	12
4th grade	0	0	12	12
5th grade	0	0	12	12
6th grade	0	0	12	12
Junior High	25	25	10	60
Nature Interpreters Service (hours leading tours):	165	297	78	540

#### PUBLIC SERVICE:

The garden staff continues to answer many questions of horticultural nature, either by correspondence, telephone or direct contact. This service is possibly used more by landscape architects and landscape contractors than by laymen. This can, no doubt, be attributed to the fact that there is much more native plant material used today than ever before as the public becomes more acutely aware of the importance of the environment. More land has become available for wild life preserves, bird sanctuaries and nature study centers, or, as in the more affluent communities, for environmental learning facilities. Within such projects landscape architects encounter many problems when dealing with native plant material and seek advice on cultural requirements of various native plants, the advisability of installing irrigation systems and, most often, where these plants can be obtained. We try to be as helpful as possible.

The University of California invited Dick Tilforth and John Dourley to serve on its Advisory Committee on Horticultural Supervision and Management.

The newly formed Claremont Men's Garden Club was granted permission to hold monthly meetings in the auditorium of the botanic garden.

## PUBLICATIONS:

The third number of Volume 7 of *Aliso*, edited by Dr. Benjamin, was published on April 22. The issue consisted of 92 pages and included eight scientific papers and the Director's Report.

## PUBLISHED WRITINGS OF THE BOTANIC GARDEN STAFF

- Benjamin, Richard K. 1971. Introduction and supplement to Roland Thaxter's contribution towards a monograph of the Laboulbeniaceae. *J. Cramer, Lehre*. 155 p.
- Carlquist, Sherwin. 1971. Wood anatomy of Macaronesian and other Brassicaceae. *Aliso* 7: 365-384.
- Leuz, Lee W. 1971. Experimental evidence for hybrid origin of *Dichelostemma venustum* (Liliaceae). *Aliso* 7: 309-312.
- , 1971. Two new species of *Dandyia* (Liliaceae) from Mexico and a reexamination of *Bessera* and *Behria*. *Aliso* 7: 313-320.
- , 1971. Chromosome numbers in the genus *Milla* Cav. (Liliaceae). *Aliso* 7: 321-324.
- , 1971. The Director's Report. *Aliso* 7: 385-400.
- Simon, J. P. 1971. Comparative serology of the Order Nymphaeales II. Relationships of Nymphaeaceae and Nelumbonaceae. *Aliso* 7: 325-350.
- Thorne, R. F. 1971. Summary statement on North Temperate floristics. *BioScience* 21: 533.

## GIFTS AND GRANTS:

- American Type Culture Collection, Rockville, Maryland, one fungus culture.
- Atwood, N. Duane, Brigham Young University, Provo, Utah, 11 herbarium specimens, including nine types.
- Balazuc, Dr. J., Eaubonne, France, collections of insects bearing Laboulbeniales, mostly European.
- Beatley, Dr. Janice C., Curator, Nevada Test Site Herbarium, 330 herbarium specimens.
- Beauchamp, R. M., San Diego State College, 624 herbarium specimens.
- Benjamin, R. K., Claremont, books.
- Bodger Seed Company, Chino, six lots of seed.
- Brigham, Dr. Warren, Route 1, Box 84, Sullivan, Illinois, two collections of insects bearing Laboulbeniales.
- Brooks, Dr. Travis E., Southeast Missouri State College, Cape Girardeau, collection of insects of the family Limnichidae (Coleoptera) bearing Laboulbeniales.
- California Department of Agriculture, Sacramento, book (deposit).
- California State College, Los Angeles Library, books.
- Carlquist, Dr. Sherwin, Claremont, books, periodicals and herbarium specimens.
- Chien, Dr. Chiu-yuan, National Taiwan Normal University, Taipei, three fungus cultures.
- Davidson, Christopher and G. L. Benny, Claremont, 12 herbarium specimens.
- DeDecker, Mrs. Paul, Independence, 137 herbarium specimens.
- Damaree, Dr. Delzie, Hot Springs, Arkansas, 123 herbarium specimens.
- Deutsche Akademie der Naturforschen Leopoldina, periodicals.
- Dourley, John, Claremont, 60 herbarium specimens.
- Ebert, Babett, Hemet, cash donation.
- Ellis, Dr. J. J., Northern Regional Research Laboratory, Peoria, Illinois, 12 fungus cultures.



- Everett, P. C., Claremont, periodicals.  
Faurel, Dr. L., Pasteur Inst., Paris, two fungus cultures.  
Ferguson, Mr. and Mrs., periodicals.  
de Fonseka, Dr. R. N., Claremont, books.  
Foote, Stanley S., Alhambra, cash donation.  
Gauger, Dr. Wendell, University of Nebraska, Lincoln, five fungus cultures.  
Gibson, Arthur C., Claremont, 187 cacti and other herbarium specimens.  
Hall, B. Brower, Fort Lauderdale, Florida, cash donation.  
Hannibal, L. S., Fair Oaks, books and periodicals.  
Hayes, Byron J., cash donation.  
Hesseltine, Dr. C. W., Northern Regional Research Laboratory, Peoria, Illinois, one fungus culture.  
Honnold Library, Claremont, books.  
Kimbrough, Dr. J. W., University of Florida, Gainesville, two fungus cultures.  
Lathrop, Dr. E. W., Loma Linda University, Loma Linda, 369 herbarium specimens.  
La Verne College Library, La Verne, periodicals.  
Leech, Hugh B., California Academy of Sciences, Golden Gate Park, San Francisco, several collections of insects bearing Laboulbeniales.  
Lenz, Dr. Lee W., Claremont, books and periodicals.  
Mehrotra, Dr. B. S., University of Allahabad, India, one fungus culture.  
Munz, Dr. P. A., Claremont, books and periodicals.  
Muth, Gilbert, University of California, Davis, 69 herbarium specimens.  
National Arboretum, Washington, D.C., six *Arbutus texana* plants.  
Orr, Dr. G. F., Dugway, Utah, 24 fungus cultures.  
Rogerson, Dr. C. T., New York Botanical Garden, Bronx, N.Y., eight fungus cultures.  
Sanderson, Dr. M. W., Illinois Natural History Survey, Urbana, collection of insects bearing Laboulbeniales.  
Simon, Dr. J. P., Claremont, 900 herbarium specimens and vouchers of Chilean plants.  
Solbrig, O. T., Cambridge, Massachusetts, seed samples of *Prosopis* species.  
Stern, Professor W. L., University of Maryland, College Park, 161 herbarium specimens.  
Stevens, Trow, Claremont, two plants.  
Taktajan, Professor Armen, Komarov Institute, Leningrad, USSR, six herbarium specimens.  
Thomas, Dr. John H., Curator, Dudley Herbarium, Stanford University, 575 herbarium specimens.  
Thomas, Dr. John H., Curator, Herbarium of the California Academy of Sciences, San Francisco, 59 herbarium specimens.  
Thorne, Professor R. F., Claremont, 1,000 herbarium specimens and journals.  
Tilforth, C. W., Claremont, 75 herbarium specimens and book.  
Twisselmann, Ernest, Cholame, 300 herbarium specimens.  
University of California, Los Angeles, Bio-medical Library, book.  
Union Oil Company, Brea, cash donation.  
Wallace, Gary, Claremont, four plants.  
Wilson, Mrs. Howard S., Fullerton, cash donation.

## RANCHO SANTA ANA BOTANIC GARDEN

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 Kenneth Zakar, B.S.....Supervisor, Education Program

\*Resigned July, 1971

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## RANCHO SANTA ANA BOTANIC GARDEN

Dedication of Garden Foundation to the Board of Trustees for the Rancho Santa Ana Botanic Garden of the Native Plants of California:

“The Nature, Object and Purpose of the Institution hereby Founded and to be Maintained Hereunder:

“Its Nature: A botanic garden of the native plants of California, herbarium and botanical library, containing living and/or preserved specimens of trees, plants and flowers native to California, and literature relating thereto.

“Its Object: The preservation and improvement of the property now transferred and such property as may hereafter be transferred to the Trustees for those who not only wish to enjoy, but to study, assembled in one accessible locality, native California plants; and for the advancement of science and education with reference to plant life indigenous to the State of California.

“Its Purpose: (a) An institution founded primarily for scientific research in the field of local botany.

(b) To preserve the native California flora, try to replenish the depleted supply of some of the rarest plants which are rapidly being exterminated, and bring together in a comparatively small area as complete a collection of the rich store of native California plants as can be grown in this southern section of the state, thereby promoting the general welfare of the people of the state by providing the means for encouraging and carrying on the above mentioned activities in said state and by doing such other things as may be necessary and desirable to carry out the objects thereof.”