Conserving Endangered Plants

Botanical gardens worldwide are becoming increasingly involved in plant conservation through cultivation of threatened species, development of educational programs, and research. Our own conservation activities have expanded rapidly within the last two years. We have taken significant steps to coordinate our efforts with local, state, national and even international gardens and conservation groups.

Extinction is a global problem, affecting species from many different habitats and bioregions. The Botanical Garden's living collection includes endangered species from six continents. Many of these were simply rare to begin with: their natural ranges have always been restricted to single islands or isolated habitats (at least within known historical records). *Juania australis* in the Palm Family and *Dendroseris littoralis* in the Sunflower family are two species known only from the tiny Juan Fernandez Islands off the coast of Chile, setting for the story of Robinson Crusoe. The Garden was able to obtain seeds of both species from botanists surveying the Island flora, and now the plants are doing well in our mild climate.

Other species are rare or extinct in the wild as a result of human interference. The pine-oak forests in Chiapas, Mexico are undergoing rapid destruction like many tropical dry forests, as the local population burns the trees to produce charcoal. For one species on the brink of extinction, *Magnolia sharpii*, only two or three individuals still exist in the wild. Of the six specimens currently in cultivation, three are at the U.C. Botanical Garden.

Although the scale of destruction is greatest in the tropical regions of the world, we face critical problems in our own backyard. Within the United States, the two regions with the greatest concentration of rare and endangered plants are California and Hawaii. As habitats shrink due to urbanization, agriculture, grazing, inundation by reservoirs, quarrying, and poor land management, rare species become more and more rare and may face the danger of extinction. The Botanical Garden’s California native area includes more than 130 types of plants listed as rare or endangered by the California Native Plant Society. Large-flowered Fiddleneck (*Amsinckia grandiflora*) and Chinese Camp Brodiaea (*Brodiaea pallida*) exist in the wild only in single populations. Presidio Manzanita (*Arctostaphylos hookeri subsp. ravenii*) is reduced to a single plant in the wild!

**Ex Situ Conservation**

The best way to preserve endangered species and to encourage recovery in the wild is to protect habitat. With careful management, threatened populations can increase in size over time. In some cases, species on the verge of extinction can even be reintroduced by conservationists to new but suitable sites. Preservation of rare plants in their
natural habitats is known as *in situ* conservation. When this is not practical, or when an additional safety net is necessary, *ex situ* or off-site conservation is the only alternative. One form of *ex situ* conservation is cultivation of plants in botanical gardens. Another is storage of seed under carefully controlled conditions. With both methods, a major objective is to preserve as much genetic diversity as possible from the natural populations. These complex problems require carefully planned collection strategies and are an active area in conservation research.

**Working With Other Gardens**

Last year, the Botanical Garden made a major commitment to expand its conservation activities by joining the Center for Plant Conservation, a national consortium of 19 United States botanical gardens and arboreta, coordinated from national headquarters at the Arnold Arboretum, Harvard University. The Center's purpose is to conserve rare plants of the United States by building permanent, cultivated populations known as The National Collection of Endangered Plants. Each species will have a separate endowment to insure its con-tinued *ex situ* preservation. The two other gardens on the West Coast that belong to the Center are the Berry Botanic Garden in Portland, Oregon, and Rancho Santa Ana Botanic Garden in Claremont, California. This year our garden will add six species to the National Collection.

Also during the past year, the Garden became a member of the Botanical Gardens Conservation Secretariat of the International Union for the Conservation of Nature and Natural Resources. This is the world's largest federation of governments, organizations, and individuals devoted to the protection and sustainable use of the earth's living resources. The Botanic Gardens Secretariat monitors rare and endangered species in botanical gardens worldwide, coordinates global conservation strategies, and provides liason and training for garden technical staff.

The Garden's Education Program is working to find ways to use the garden as a more effective platform for communicating conservation issues to the public. This will include improved labeling of rare and endangered species, new exhibits, and incorporation of conservation themes in docent-led tours. We also plan to encourage conservation research by providing plant materials of endangered California natives to laboratories in the U.C. system that specialize in genetic analysis of plant populations. Few gardens in the United States are affiliated with academic institutions that include such well qualified research units as at Berkeley. We feel the Botanical Garden can make an unusual contribution to conservation biology by promoting and coordinating research concerning endangered species in California.

—Jim Affolter

**Rare Plants in the United States**

About two-thirds of the rare plants of the United States occur in just five states: Hawaii, California, Florida, Oregon, and Texas. Far from continental land masses, Hawaii's flora has evolved in isolation; over 95 percent of its native plants are found only in Hawaii. California is also considered to be an ecological and botanic island, isolated by mountains and deserts to the north, east, and south. Thirty percent of the present 5,100 species native to the state are endemics. This level of endemism is unusually high for a continental area and even high compared to some island areas.

Why so much diversity and specialization in California? The answer lies in the state's wide range of physical environments and plant microhabitats. From high alpine fell-fields to the Great Basin desert, from inland valleys to the coastal dunes — California's diverse topography, climate, and geology provide an unusual combination of conditions for plant growth. Plant species and genera have diversified over time to take advantage of the range of habitats, many becoming quite specialized to particular conditions. Because these specialists are often restricted to only a few localities, they are less likely to survive habitat loss, disease, or the impacts of human activity.
New Grant Supports Costa Rica Connection

The Botanical Garden recently strengthened connections with one of the most important gardens in Central America, the Robert and Catherine Wilson Botanical Garden. The Wilson Garden, formerly known as Las Cruces, is located in southern Costa Rica near the Panamanian border, about six kilometers south of the town of San Vito de Java. It occupies approximately 350 acres, including 30 acres of developed gardens and 300 acres of undisturbed submontane rain forest. The Garden is particularly rich in monocots, especially aroids, bromeliads, heliconias, orchids, palms, and gingers. The native forest within the Garden boundaries is an oasis in a region that has largely been converted to agricultural use. The Wilson Garden is owned and operated by the Organization for Tropical Studies (OTS), a consortium of United States and Costa Rican universities that maintains field stations and trains tropical biologists in Costa Rica.

In March, 1987, Dr. James Affolter, Curator of the U.C. Garden, met with Director Luis Diego Gomez to discuss management and curation of the Wilson Garden. Under a joint $20,000 grant awarded by the Stanley Smith Horticultural Trust, UC Garden staff will act as consultants to the Wilson Garden in designing and implementing a computerized system for plant records. Through this contact, they will have an opportunity to analyze the operation of a tropical botanical garden and to observe first hand the diverse rain forests of Costa Rica. An IBM computer system has been purchased and shipped to Costa Rica and three UC staff will visit the Wilson Garden later this year to make recommendations on existing horticultural, curatorial, and managerial problems. They will compile existing plant records and install the computerized plant record system. They will also suggest interpretive strategies and materials to enhance community use of the Wilson Garden as a public museum and educational facility.

The Wilson Garden is operating with very limited resources and has made a special request for assistance in building up their library. They are currently trying to obtain the following volumes (either new or used): *Palms of the World* (Menninger), *Bromeliads for Home, Garden, and Greenhouse* (Rauh), *Hortus III, Exotica Series IV International: Pictorial Cyclopedia of Exotic Plants*, and *Tropica: Color Encyclopedia of Exotic Plants*. If you would like to donate any of these books, or if you would like to make a gift to the Wilson Garden to finance book purchases, please contact:

Gail Hewson,
Director of Development
Organization for Tropical Studies
156 Schooner Court
Richmond, CA 94804

Robert Wilson (left) and his wife Catherine established the garden in 1963, and the Organization for Tropical Studies renamed it in their honor in 1987. The garden (right) enjoys a worldwide reputation for the breadth and scientific quality of its living collection. (Photos by Jim Affolter)
Who Visits the Garden?

Last fall, members of Jim Affolter’s and my class (Botany 129, The Botanical Garden) lay in wait for unsuspecting but compliant visitors entering the garden. These were induced to fill out a questionnaire developed by the class during the semester. We were interested in knowing something about Garden visitors: where they live, how often they visit, how long their visits last, and what they like and do not like.

There were 104 respondents to our survey, evenly divided between weekday and weekend visitors. Forty-nine ZIP codes were represented in the sample, mostly from the Bay Area. We encountered only a few foreign or out-of-state visitors, doubtless a reflection of the survey being taken during the off-season for tourists. Men and women were equally represented with 60 percent of them between 21 and 50 years of age.

About half the visitors come to the Garden three or more times a year. About half spend between one and two hours in the Garden; those who visit the Garden frequently stay as long in the Garden as infrequent or first-time visitors. About a third of the visitors are associated with the University as students, staff, or faculty. We were surprised that this proportion held on the weekends as well, when one might expect fewer University people and more general public to visit the Garden.

Only four of the 104 visitors encountered were members of the Friends of the Botanical Garden. Ironically, although most visitors queried for the survey were “loyal customers,” almost none help support the Garden via membership in its support organization, the Friends of the Garden. When asked if an admissions charge would affect the frequency of visits, 53 percent of the visitors said it would reduce the frequency. We know from a class questionnaire administered in 1986 that most fall visitors do not stop in at the Visitor Center, which is the prime onsite source of information about the Garden, its programs, and membership in the Friends.

Visitors were encouraged to write out comments or complaints on the questionnaire form. They listed their favorite areas in order as the New World Desert/outdoor cacti and succulents, the pond and stream areas, the Asian area, the herb garden, and the California native area. At least one visitor liked everything! Complaints were diverse, mostly minor, and sometimes whimsical. Labels without plants and plants without labels bothered a few people. To the visitor who wrote that the Garden is “the most wonderful and exciting place I have visited in years,” I say thank you, and come back.

—Robert Ornduff

Open House Celebration

The Botanical Garden joins the University of California, Berkeley campus in a gala Open House on Saturday, April 30th, from 11-4 pm. The entire campus will be buzzing with special activities, guest lectures, and displays in all the various University departments. Here at the Garden, docents will welcome visitors and host discovery walks for families and children. In addition to the grand display of spring flowers, there will be educational exhibits and an art show in the meeting room.

The Friends will offer refreshments of botanical origin and early flowering plants for sale. Storyteller Ane Rovetta of Point Reyes brings a storehouse of Coyote Tales from the California Native American tradition and will be on stage in Mather Grove at 12 noon, 1 pm, and 2 pm. Parking will undoubtedly be a challenge, so consider taking the shuttlebus from campus. Admission to all activities is free. For more information, call the Garden Visitor Center at 642-3343 or the University Open House office at 643-8888.
Major Friends' Gifts for 1987

Quite a few major gifts were received by the Friends during the 1986-87 fiscal year. Among them were:

- $25,000 in two gifts for the Orientation Center Project;
- $10,000 for the improvement of the area and the planting of the Mexican collection;
- $20,000 restricted gift to be committed to a special project at a later date;
- $5,000 for a Dahlgren engraver to make labels for plants in the Garden.

A first for the Garden took place this past year. One of our very supportive Friends established a Charitable Remainder Trust through the University of California, Berkeley Foundation for over $50,000. These funds will eventually be placed in the Garden Endowment Fund. Over $8,000 has been received in various gifts for the development of the Japanese Stroll Garden. And many other gifts of $100-2,000 have contributed to funding important Garden improvement projects. We are deeply grateful for all these generous contributions which support the Garden.

Friends' donations support development of the Japanese Stroll Garden (below) and the placement of benches throughout the Garden (right). (Photos by Stephanie Kaza)

In 1986, the Friends established two Endowments through the University of California, Berkeley Foundation with the Garden as beneficiary of both. Memorial benches have been donated to the Garden with all income except the actual cost going into either Endowment. This past year, six Garden benches were donated with $9,000 in gifts going into the Endowment Funds. This brings the total number of donated benches to 17. The amount in each fund is now over $10,000, thereby enabling us to draw interest on these accounts. To date our total Endowment stands at $32,898. We would like to see this sum continue to grow so we have created a new Endowment incentive: the donation of study tables. One can give a table and benches to seat 4-6 people for a donation of $3,000. These tables will be placed in those areas now being used as study or picnic areas. A brass plaque will be fitted into the central portion of each table bearing the donor's name.

If you are considering a review of your will at this time, please remember the Garden and the happy hours you spent here. Your gift by way of a bequest will insure that others will be able to enjoy the Garden for years to come. For further information on gifts to the Garden, please call Gladys Eaton, Major Gifts Chair, 652-0366.

–Gladys Eaton
California Native Bulb Bed

A top the small oak knoll in a northwest corner of the Garden is one of our most unusual collections, commonly known as the "Bulb Bed." Here by the scenic picnic area in the California native plant area, over 300 pots of bulbs (and corms) are neatly arranged in curved beds to show the variety of lilies and amaryllids of California. There are representatives of each of our genera, collected from meadows, chaparral, roadside waste areas, montane zones, and serpentine soils around the state. In peak flower, the bed reveals the remarkable diversity of color, form, and growth habits that mark the native bulb species of California.

The bulb collection was first started by Wayne Roderick in the 1960's. He developed a system of underground cages to protect the bulbs from gopher appetites. Wayne kept examples of common species from around the state, sharing his fondness for Mariposa Lilies and Wild Onions with the visiting public. Eventually the collection became overgrown and invaded by the noxious exotic bulb Nothoscordum inodorum.

When Roger Raiche and Kurt Zadnik came to the collection, they dug up all the native bulbs and sorted through them, verifying identification and adding updated labels. With funding contributions from Myrtle Wolf, they created raised beds using basement screens as well as individual pots to guard against pesky rodents. After they cleaned out the weedy Nothoscordum, the pots were covered with gravel for insulation against temperature and moisture extremes. They established a hand watering system for species that need more moisture than they receive with our usual winter rains.

Over the past five years, Roger and Kurt have expanded the native bulb collection substantially, and it is now the largest collection of its kind in California. The more than 300 kinds of bulbs in the bed represent two families (Liliaceae and Amaryllidaceae); 13 genera; 139 species, varieties, and naturally occurring hybrids. Collections of some genera such as Brodiaea, Chlorogalum, and Zygadenus are nearly complete and may be missing only one or two species. Those that are absent are often those that won't grow well here, such as Wild Onions from rock outcrops and areas of thin soil in the high montane region. For species that are widespread, Roger and Kurt have collected three to six types of each to reflect a variety of growth forms and habitats. For Brodiaea pulchella, for
example, the bulb bed includes the desert type with small leaves, the vernal pool sample with small flowers, and the Santa Cruz Island giant form.

**The Brodiaees**

The *Brodiaea* group is perhaps one of the most interesting in the bed. The more than 80 plantings are subdivided into the *Brodiaea* group, the *Dichelostemma* group, and the *Tritelea* group, now generally recognized as three separate genera. *Brodiaea* in the broad sense has been alternately lumped and split over the years with some species changing genus as well as species names. In our bed, they are all labeled *Brodiaea*, following Munz, but this too might change over time.

Named for James Brodie, early Scottish botanist, this genus is an especially significant example of endemism in the California Floristic Province, an area encompassing most of California. Of the 45 species of *Brodiaea*, 39 occur in this region, and 32 of these are endemic. Like some other California genera, this group shows a high degree of edaphic endemism, or distribution limited by soil type. Many *Brodiaea* species are restricted to serpentine areas and other associated rocks which occur around the state. These species may have been more widely distributed when California was a much wetter area. As the climate grew drier, populations declined and only a few isolated pockets remained. These were restricted to serpentine soils or vernal pools which stay moist longer into the year than the surrounding soils. Some examples are *Brodiaea minor*, a vernal pool endemic, *B. stellaris* and *B. coronaria* var. *rosea* on serpentine and *B. pallida*, known only to one site in Tuolumne County, also on serpentine.

The genus *Brodiaea* has its generalists and specialists (see side box). The widespread Blue Dicks (*B. pulchella*), Ithuriel's Spear (*B. laxa*), and Harvest Brodiaea (*B. elegans*), well-known to wildflower enthusiasts for their purple flowers, are found in a variety of habitats throughout the state. The Garden has a wide representation of these diverse forms. But the Bulb Bed is also filled with other, less common species that show off the evolutionary extremes of the genus. Two are Firecracker Flower (*B. ida-maia*) with a tubular red flower that attracts hummingbird pollinators, and Twining Brodiaea (*B. volubilis*), the only vine in the genus. *B. volubilis* grows from an understory stem to reach the light, often up to the top of chaparral Leather Oaks. By the time of flowering, the succulent flower stem may actually disconnect from the corm, so seed set becomes dependent on water and nutrients stored in the stem.

Lest they be overlooked, there are also some widely different *Calochortus* in the bed — from the dainty Pussy Ears to the tall, graceful Mariposa Lilies, as well as the delicate Globe Lily variants from around the state. There is even a species named for Roger — Cedars' Calochortus, *Calochortus raichei*. Also there are many species of Wild Onion or *Allium*, an assortment of species of *Lilium* and *Erythronium*, and many Checker Lilies or *Fritillaria*, the earliest genus to flower. In the late afternoon, you might see the pale flowers of Soap Lily (*Chlorogalum pomeridianum*), open only late in the day. All of these native bulbs are winter active and flower at the end of our growing season, in contrast to home garden daffodils and hyacinths that flower at the beginning.

The Bulb Bed is a concise and impressive display of diversity and should not be missed on a spring tour of the California native area. Some of these lilies and amaryllids are easy to cultivate and are even being studied as prospects for commercial flower cultivation; a few species are already easily available on the market. Here at the Botanical Garden you have the chance to see what is possible for your home designs and to marvel at the wonders of evolutionary processes in a close-at-hand viewing of the state's bulb treasures.

—Stephanie Kaza
FRIENDS OF THE BOTANICAL GARDEN
ANNUAL SPRING PLANT SALE

PREVIEW SALE FOR MEMBERS
Saturday, May 7, 9am-Noon

PUBLIC SALE
Saturday, May 7 Noon-2pm
Sunday, May 8 9am-2pm

The following are highlights from our wide selection of unusual and rare plants, for sale this spring, all propagated by Garden volunteers. Our plants are grown from horticultural sources rather than collected in the wild. They have been propagated from the Garden collection, from seed from other botanical gardens, from collectors' gardens, and from seed houses in the United States. Many plants which bloom early will be offered before the sale at the Visitors' Center. Please bring a BOX when you come.

WEST SIDE, BY THE MATHER GROVE

CALIFORNIA NATIVES
- Brodiaea — 15 species
- Camassia leichtlinii
- Delphinium — 5 species
- Dodecatheon — 2 species
- Iris sp and Pacific Coast hybrids
- Lewisia cotyledon
- Romneya coulteri
- Trillium chloropetalum (white)
- Vancouveria hexandra
- Zauschneria
- Diplacus hybrids
- Ferns and annuals

VINES/CLIMBERS
- Bomarea
- Chorizema cordatum
- Clematis
- Cithianthus punicus
- Dipogon (Dolichos) ligulosus
- Discocere
- Hardenbergia
- Hibbertia
- Jasminum
- Kennedia
- Lapageria rosea
- Lophospermum (Asarina)
- Mandevilla
- Passiflora
- Solanum
- Thunbergia

ROCK GARDEN/ALPINES
- Achillea
- Aquilegia
- Arabis
- Campanula
- Dianthus
- Edraianthus
- Geranium
- Heuchera
- Iris
- Phloxema
- Potentilla
- Primula
- Pulsatilla
- Spirerium parvulum
- Symphyandra
- Viola 'Bowles Black'

TREES AND SHRUBS
- Araucaria araucana
- Buxus variegata alba
- Cornus capitata
- Cornus sericea 'Kelsey'
- Chiranthodendron pentadactylon
- Drimys lanceolata
- Eucalyptus caesia, E. coronata
- E. forestiana, E. malue
- E. tetraplera

PERENNIALS
- Aciphylla aurea
- Adenophora
- Anemone
- Anigozanthus
- Aruncus
- Aster
- Astilbe
- Astrantia
- Campanula
- Cynoglossum
- Digitalis lamorckii
- Eryngium
- Geranium
- Iris - bearded and non-bearded
- Kniphofia
- Lobelia
- Pelargonium
- Penstemon
- Thalictrum
- Trollius
- Veronica
Volunteer propagators put in hundreds of hours caring for plants in preparation for the spring plant sale. (Photo by Stephanie Kaza)

**MEETING ROOM**

<table>
<thead>
<tr>
<th>RHODODENDRONS</th>
<th>FERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rhododendron burmanicum</em></td>
<td>Adiantum</td>
</tr>
<tr>
<td><em>R. 'Countess of Haddington'</em></td>
<td>Cheilanthes</td>
</tr>
<tr>
<td><em>R. crassum</em></td>
<td>Dryopteris</td>
</tr>
<tr>
<td><em>R. cubittii 'Ashcombe'</em></td>
<td>Pellaea</td>
</tr>
<tr>
<td><em>R. 'Else Frye'</em></td>
<td>Pilopogonma</td>
</tr>
<tr>
<td><em>R. edgeworthii</em></td>
<td>Platycerium bifurcatum 'Netherlands'</td>
</tr>
<tr>
<td><em>R. 'Fragrantissimum'</em></td>
<td>Platycerium kilii 'Drummond'</td>
</tr>
<tr>
<td><em>R. leucopsis</em></td>
<td>Platycerium willincki 'Scofield'</td>
</tr>
<tr>
<td><em>R. 'Lemon Mist'</em></td>
<td>Polypodium</td>
</tr>
<tr>
<td><em>R. 'Red Bird'</em></td>
<td>Polystichum</td>
</tr>
<tr>
<td><em>R. 'Ward's Ruby'</em></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BROMELIADS</th>
<th>HOUSEPLANTS</th>
<th>ORCHIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Abromeitiella</em></td>
<td>Anthurium</td>
<td>Both &quot;botanicals&quot; and hybrids, standard and miniature</td>
</tr>
<tr>
<td><em>Aechmea</em></td>
<td>Begonia</td>
<td><em>Cattleya</em></td>
</tr>
<tr>
<td><em>Ananas</em> (pineapple group)</td>
<td><em>Ceropegia</em></td>
<td><em>Cymbidium</em></td>
</tr>
<tr>
<td><em>Billbergia</em></td>
<td><em>Gesneriads</em></td>
<td><em>Laelia</em></td>
</tr>
<tr>
<td><em>Cryptanthus</em></td>
<td><em>Peperomia</em></td>
<td><em>Paphiopedilum</em></td>
</tr>
<tr>
<td><em>Dyckia</em></td>
<td>terrarium plants</td>
<td><em>Phalaenopsis</em></td>
</tr>
<tr>
<td><em>Guzmania</em></td>
<td>carnivorous plants</td>
<td></td>
</tr>
<tr>
<td><em>Hechtia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Neoregelia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Nidularium</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Orthotrichum</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Pitcairnia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Puya</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Quesnelia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tillandsia</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vriesea</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAIN PARKING AREA</th>
<th>CACTI /Succulents</th>
<th>HERBS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Aeonium</em></td>
<td>A large selection of culinary herbs</td>
</tr>
<tr>
<td></td>
<td><em>Aloe</em></td>
<td>and their relatives</td>
</tr>
<tr>
<td></td>
<td><em>Crassula</em></td>
<td><em>Artemisia</em></td>
</tr>
<tr>
<td></td>
<td><em>Echeveria</em></td>
<td><em>Origanum</em></td>
</tr>
<tr>
<td></td>
<td><em>Exorrhiza</em></td>
<td><em>Pelargonium</em> (scented)</td>
</tr>
<tr>
<td></td>
<td><em>Lithops</em></td>
<td><em>Tagetes</em></td>
</tr>
<tr>
<td></td>
<td><em>Mammillaria</em></td>
<td>lavender, mint, rosemary,</td>
</tr>
<tr>
<td></td>
<td><em>Sedum</em></td>
<td>germander, thyme</td>
</tr>
<tr>
<td></td>
<td><em>Sempervivum</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Stapelia</em></td>
<td></td>
</tr>
</tbody>
</table>

**BULBS**

Stock will be low as winter bulbs are past their prime by May:

- *Crinum kirkii*
- *Cyclamen libanoticum*
- *Ferraria crispa*
- *Iris magnifica*
- *Korolkowia severtonii*
- *Moraea spathulata*
- *Nerine filifolia*

**FERNS**

- *Adiantum*
- *Cheilanthes*
- *Dryopteris*
- *Pellaea*
- *Pilopogonma*
- *Platycerium bifurcatum 'Netherlands'*
- *Platycerium kilii 'Drummond'*
- *Platycerium willincki 'Scofield'*
- *Polypodium*
- *Polystichum*
Mexican Area: During February and March, a California Conservation Corps crew of 8-10 young men and women cleared two acres of southwest-facing slopes to make way for an expanded Mesoamerican garden. This area will feature a collection of high elevation trees and shrubs from the state of Chiapas in southern Mexico. Most of these were collected by Dennis Breedlove of California Academy of Sciences; some were brought by Fred Boutin, and others arrived via Huntington Gardens in Los Angeles. One section of this garden will feature Mayan healing herbs, representing another of the world’s great herbal medicinal traditions, a complement to the new Chinese medicinal herb garden.

The CCC crew took down trees and carried out a controlled brush burn, all for the small cost of their supplies and materials. In exchange for their fine work, we have provided them with educational information and tours of the Garden. They enjoyed this project so much, they would like to continue helping us construct trails and lay the irrigation lines, perhaps even help with the planting. The CCC members also helped clear an additional quarter-acre for the European section above the Floriculture area.

Annex Renovation: The dilapidated, antiquated facilities that house the Education Program and the Friends’ office have been transformed into a bright, pleasant place to work. With new paint, new carpet, new doors, new chairs, and new bathroom floor and fixtures, the building is now in great demand for meetings and work space. The renovation was made possible by a gift from the Friends of the Botanical Garden. We now have a new seed sorting room for handling the Seed Exchange requests, a new area for Visitor Center storage and docent teaching materials, and new offices for the Friends and the Education Program.

Pine Removal: Several Monterey pines were removed from behind the Visitor Center due to safety hazards. One of the trees was in decline, infested with beetles and leaned precariously over the office and Visitor Center. Falling branches were a serious threat. The area will now become an extension of the African area. Already we have put in some African *Celtis* (a hackberry tree) and some South African heathers. Eventually the area in front of the Annex will be covered with bright African flowers as well.

Tree Survey: Under a grant from the Institute for Museum Services, Garden staff and consultants will be undertaking a thorough survey of the Garden’s trees. Some of our trees are rare and endangered; others are important for providing class or research material. We will be collecting information on each tree’s state of health: checking for disease such as oak root fungus, insect damage, degree of aging, safety hazards, the quality of existing data and label, as well as height, diameter, and location.

Some trees that have poor or no data will be removed, and others that are in the wrong geographical section will be moved if possible. The long-range goal is to be continually planting a succession of trees so that at any one time there will be a mix of mature, juvenile, and intermediate-aged trees in the Garden. Right now many of the trees are senescent, so we have already planted a new generation to succeed them.

Seed List: This year’s Seed Exchange list is the largest ever — 477 species of California natives. It has been keeping Margriet Hecht and Lizzie Lee very busy filling orders since the first of the year. The seeds were mostly collected by Roger Raiche and Kurt Zadnik on two Garden-sponsored trips to northern and southern California and many weekend expeditions. It took three months to clean and sort the seeds and enter the list on the computer.

Within the first two months there have been 200 orders, ranging from 2 to 211 species per order, and taking over 200 hours to fill. The largest stateside order so far has come from Santa Barbara Botanic Garden for 211 species; from overseas, a new botanical garden in Israel requested 153 packets. At the end of the season we’ll provide full details on the most popular species; so far, *Puya raimondii* and *Darlingtonia californica* have received the most requests.
Staff Changes

The past several months have seen some significant staff changes at the garden. In late 1987, Wendy Mitchell, Bernice Kattchee, and Jean Shady left the garden staff. As staff person for the Friends of the Botanical Garden, Wendy was in charge of several fund-raising activities, most notable of which were the annual Alstroemeria Wine-tasting Festival and the plant sales. Her energy, independence, and creativity will all be missed. Bernice was in charge of the Education Program, with her most recent class of docents graduating in 1987. She left behind a thoroughly professional, flourishing program. Jean Shady, curatorial assistant, initiated the flowering phenology program in the garden and completed the arduous job of computerization of our plant records. She now is on the staff of the Mildred Mathias Botanic Garden at UCLA.

Don Sujishi, gardener, and Gary Quinn have also left the Garden. After 20 years of faithful service, Don has now retired. African Hill's "good looks" and popularity are a tribute to his skill and devotion as a gardener. As former weekend guard, Gary will be remembered for keeping a watchful eye on weekend crowds and for dealing with troublesome matters with tact and good will. We wish to thank all these people for their help in making the garden such a bustling and successful place, and wish them all well in the future.

New Faces

With these departures we made some important changes in the division of responsibilities among the staff. The Education Coordinator position was upgraded from half-time to full-time. After interviewing six candidates from around the country, we were fortunate to hire Dr. Stephanie Kaza, who holds a Ph.D. in Biology from the University of California at Santa Cruz, with special emphasis on conservation. Most recently, Stephanie was Education Director at Point Reyes Bird Observatory, where she developed a fine track record of fund-raising and innovating new programs. Stephanie hopes to expand the Education Program at the Garden and will assume responsibility for publication of the Garden newsletter. Our new Curatorial Assistant is Holly Forbes, who came to us from the Santa Barbara Botanic Garden where she was an herbarium assistant. Deborah Darnell, a docent, has joined the staff as Administrative Assistant for the Friends. David Gartland, a botany student on campus, joins us as the new weekend guard.

—Robert Ornduff
CLASSES

The Education Program plans to expand the number and diversity of class offerings in the fall, subject to the limits of the University football schedule. If you would like to request particular subjects, please pass your suggestions on to Stephanie Kaza, 642-3352.

Cacti and Succulents. May 14-June 25, Saturdays from 10-12 noon (except May 28). This course is for anyone fascinated by the strange shapes and adaptations of plants of dry places; beginners and experts alike are welcome. Instructor Fred Dortort will share his extensive knowledge and collections of cacti, succulents, and caudiciform plants as he discusses their habitats, distribution, ecology, and evolutionary relationships. This is an opportunity to consider in detail the amazing diversity of cacti, euphorbs, agaves, stonecrops, and many others. Fred has taught and lectured at the Botanical Garden since 1975. He has written for Pacific Horticulture and Cactus and Succulent Journal and traveled extensively in the arid regions of Mexico and the United States, joining U.C. Botanical Garden staff on research expeditions. The course costs $30 for members, $35 for non-members and meets in the Garden Meeting Room. Call 642-3352 to register.

Photography Workshop. June 11 and 18, Saturdays from 2-5 pm. George Waters, master photographer and editor of Pacific Horticulture, will lead a special two-session workshop for the Friends of the Botanical Garden. This workshop is for beginner and expert photographers — anyone who would like to improve their skills in plant and landscape photography. The Garden provides an excellent variety of settings and subjects for practice. Cost is $30 members, $35 non-members; the course meets in the Garden Meeting Room. Call 642-3343 to register.

Introduction to the Garden. July 9-August 13, Saturdays, 10-12 noon. Everything you always wanted to know about the Garden, or at least a good start on it. Docents will host a series of six classes featuring the major areas of the Garden, including behind-the-scenes tours. They will cover the history of the Garden, an introduction to plant structure and ecology, and uses of plants in daily life. The last class session focuses on conservation of rare and endangered species in the Garden and the impacts of habitat loss in the wild. This is an excellent background course for prospective docents and anyone else interested in learning more about the Garden. Cost is $25 members, $30 non-members; each class will begin in the Meeting Room. Call 642-3352 to register.

Call For Volunteers

Visitor Center. Volunteers greet visitors, provide information, and handle sales in morning and afternoon shifts. This is a great way to learn about the Garden and work with some of the most dedicated Friends’ volunteers. Training days for old and new volunteers on April 16, 9-12 noon and June 11, 9-12 noon. Call Nancy Swearengen at 547-2548 to sign up for a training day.

Docents. Next training will begin in September for 1989 tour season. Docents offer our most important educational service for the public through garden tours. We will be planning additional school outreach programs and specialized tours in the coming year. Call Stephanie Kaza, Education Coordinator, at 642-3352 if interested and consider attending the summer class, Introduction to the Garden, July 9 - August 13.

Japanese Stroll Garden. This committee needs members to help meet its fundraising goals. The landscape plans have been completed and enthusiasm is high for an expanded Japanese garden. If you would like to help make this vision a reality, contact Daniel Campbell, Garden Manager, at 642-0849.

Friends’ Board of Directors. The Nominating Committee is looking for names of potential board members for 1988-90 terms, beginning in the fall. Members serve on standing committees and meet once a month as a board. Call Elly Bade at 644-1656 to obtain a suggestion form for nominees.
BOOK REVIEWS

One of the benefits of membership in the Friends of the Botanical Garden is discounts on books in the Visitor Center. The Center's shelves are packed with colorful new titles, for children as well as adults. New book buyer Elly Bade is constantly on the look-out for more fascinating and beautiful books about plants. These are two that have come in recently and are reviewed here by Garden docent and propagator, Jacqueline Woodfill.


In this sequel to The Englishwoman's Garden, the authors have gathered 28 more English ladies to tell the stories of their gardens. The styles and sizes of the gardens they describe vary considerably from ancestral acres to a tiny back garden in North Oxford, giving the reader a fairly comprehensive picture of gardening in England today. Their stories are told in informal conversational style, revealing with charm the personal histories of each garden. The book is illustrated and enhanced by 150 excellent photographs and delightful drawings by Louis MacKay.

When I take first-timers round the garden they fall into three categories. There are those who go round chattering about something else completely, and pass each specially prepared view with unseeing eyes, even walking over a brand new bridge without so much as a 'My, oh my!' They are the ones who take gardens for granted. Next, there are the recently converted enthusiasts, who never stop asking questions and telling you about their own gardening problems — 'How exactly do you grow begonias from seed?' and 'When are you meant to prune ceanothus?'... The last category are the old hands, who walk around in virtual silence. When they pass an evidently glorious display of tulips, they do not say, 'What wonderful tulips,' but 'What are you going to follow those tulips with?'
—Mrs. Rupert Lycett Green's garden, Caine, Wiltshire


The author, who is a botanist and gardener as well as a weaver, has produced a most unusual and interesting book. In it, she tells of plants used for fiber, dyes, and soap making, of fragrant plants used for protecting fabric, and plants used for making textile tools. She describes the plants in each category and explains how they are used. The last chapter is about making a garden with the plants that have been described. The book is scholarly and contains bibliographies, a list of resources, a glossary, and a pronunciation guide. It is illustrated with lovely photographs and drawings by the author's husband.

Pokeweed, Phytolacca americana

To use pokeberries as a dye, gather them after they have fully ripened. I wear rubber gloves and use pruning shears to clip off whole clusters and toss them into a plastic pail. Get as many as you can, or pick until you get tired. You can plan to dye two or four ounces of wool with each gallon of berries. Use a potato masher to smush down on the berries, they do not say, 'What wonderful tulips,' but 'What are you going to follow those tulips with?'
—Rita Buchanan
CONTRIBUTIONS

Major Donors in 1987-88

The Friends of the Botanical Garden wish to thank the following Major Donors to the Garden:

Susan and Michael Addison
Wm. Stephen Allen
California Japanese Alumni Assn.
Joy and Jerry Carlin
Elizabeth R. Carter
Britt Lofgren and Jan Chilton
Gladys M. Eaton
Marjory and Francis Farquhar
Elizabeth Hammond
Dr. and Mrs. August Carl Helmholtz
Susan Hossfield
James H. Jones
Pearl Kimura
Stella Mary Knause
Gwen and Bernard Lauhere
Paula Massengill and Leo Simon
Errol W. Mauchlan
Joan Mirov
Mrs. Herman Nichols
Jean Nunally and Barbara Husted
Mary and John Ricksen
Kay and Robert Riddell
Agnes R. Robb
Helen and Albert Rosenblatt
Ruth Alice Greer Estate
Slosson Fund
Irma and James Uren
Jane and Nelson Weller
Alba and Bernard Witkin
Myrtle and Frantisek Wolf

Grateful Thanks

In honor of:

Edith L. Bloom, from Marian and Hans Ury
Harland Hand, from Mr. and Mrs. E.K. Hulet and Skyline Garden Club
Roger Raiche, from Richard G. Turner, Jr.

In memory of:

Ruth Campbell, mother of Daniel Campbell, from Gladys Eaton
Andrew Fisher, from Mr. and Mrs. Duncan Copeland
Dr. and Mrs. E.R. Frenkel, from Karoline D. Laib
Burr Garman, from Mr. and Mrs. Robert Hitchcock
Floyd Hammond, from Gladys Eaton
Floyd Hammond, from Mrs. Helen H. Bragg
Richard Janssen, from Mr. and Mrs. Heath Angelo, Jr.
Turner A. Moncure, from Mr. and Mrs. Peter C. Dolliver
Eric Schmeink, from Sacha Bunge
Alice Spencer, from Florence C. Holmes
Mrs. Oscar Watson, from Ned Heringer
Walter Woodfill, from Addie Collins

If you would like to make a special gift to the Garden on behalf of a friend or colleague, please send your contribution to:

Friends of the Botanical Garden
University of California
Berkeley, CA 94720

In Memory of Margaret Carl Lofgren

Lillian and Dudley Aldous
Marian and John Bennett
Alice V. Berggren
Elena and Dennis Boedt
Dorothy H. Bryant
Bonnie and John Burnham
Patricia and John A. Carl
Jan T. Chilton and Britt Lofgren
Harriet Dahlgren
Kerstin and Anders Dahlgren
Anna-Britta and Sten Ek
Karin and Henry Engstrom
Astri and Bruce Feist
Eve and Daniel Freudenthal
Frances L. Gardoni
Anne and Paul Gregory
Inga Hackzell
Frances and Kjell Hellbom
Sandra and John Hoover
Inger and Ake Josefsson
Frank Jung
Clifford H. Kinney
Gifven and Tore Kjellander
Gun and Ed Landwehr
Ann Lofgren
Birger Z. Lofgren
Gunilla and Martin Lofgren
Inger and John Z. Lofgren
Karin and Ingvar Lofgren
Floy and William Lundy
Artur Monsen
Margaret L. Murphy
Birgit and Ewert Persson
Ulla and Martin Persson
Lena and Per Petren
Maud and John Rice
Audrey and David Runyan
Helen and John Shaw
John Lawrence Shaw
Susan and Kerry Shore
Lorraine and Art Smith
Birgit Soderen
Barbro and Gunnar Sundblad
Ann and Andy Tatum
Shiena Thomas
Lilian Trillo
Inger and Hans Wiklander
Betty and Pete Woodward
Irma and Yngve Zacco
New Members of the Friends

The Friends of the Botanical Garden wish to welcome the following 140 new members:

Carol Anderson
John K. Ballantine
Mariece M. Batey
Sue Bawhav
James Benet
Bonita Garden Club
Rachel Bradley
Dr. Alan D. Breslow
Marion Bristol Bridge
Cliff Burnhill
Christina Campbell
Rose Carney
Lloyd Cole
Color and Design
Ann Caw
Barbara Cyphers
S.M. Delamore
Juanita Doran
John T. and Lisa Doyen
Norma Draper
Theresa Ewener
Toni Ehrlieh-Feldman
Emmett and
Natasha Eiland
Sanford S. Elberg
Sue Emmons
Freddy Fong
Ann and Harold Fox
Gloria Fraser
Mrs. William E. Gauge
Krista E. Glickman
Catherine M. Graham
Philip Groody
Jean T. Groulx
Edward and
Kathleen Haberer
Heather D. Hadeigh
Melanie Simo Hagan
Richard Harland and
Marietta Dunaway
Gene M. and
Robert Hassen
Robert Hejn
Francine M. Henderson
Lyman I. Henry
Chuck Herndon
Michael J. Herz and
Naomi Schalit
Marjorie Hirschkind
Ernest B. Hook
Alvin Horton
Gail Howe
Mrs. R.S. Hume, Jr.
Evelyn Humphrey
Dr. George Jaqua and
Phyllis Jayed
Roger P. Jennings
JoLynn Jordan
Abe Kalish
Lucy Kaplan
Le Ann Keaton
Don Klein
Abbey R. Kietz
Margaret Kloster
Randy Knowles
Judith Koumrian
Thomas and Jayne
Krauss and family
Lizabedt Kaska Lee
James Lerner
Joann Lesisco
Jacquelyn Lesmeister
Dr. and Mrs. Martin
Lichtman
Edwin D. Lisherness
Patricia D. Lissner
Birger Z. Lofgren
Marianne Loring
Daniel Luk
Petra MacDonnell
Ken and Lynn
Carlson Marshall
Kathryn H. McCrodden
Daniel and
Janine McLoughlin
Dr. Leo N. Melcyco
Francine Memmo
Linda E. Merritt
Isabel Moll
Joan M. Moura
Nancy Muller
Rosemary Murphee
Martha T. Naylor
Sandy Nichols
Betty Norstrand
Judie O'Young and
Gregg Hauser
Carrie Orelsky
Gloria T. Osterloh
Maude Pervere
Beverly Peters
Dr. Harry E. Peters, Jr.
Sandra Politi
Suzanne Portero and
Terry Smalley
Suzanne Poulson
Margaret S. Purser
Jean K. Reilly
Grace M. Reineman
Mr. and Mrs. George A.
Rhodes
Robert H. Rieders
Charlotte Rieger
Sylvia S. Russell
Donna K. Saka
Mary Schank
Valere Scott and family
Alan and Gail Searcy
Pam Seifert
David and
Kathy Shaw
Donald Shively
Nancy N. Siegel
Jane Smith-Williams
Jan Sogge and
Chuck Regets
Shelia Sondik
John J. Spring
Thomas E. Stanton
Ruth Stiver
Louise E. Taylor
Chris and
Stephanie Tebbutt
Judith F. Terlizzi
Page J. and
Virginia Thibodeaux
Mary Ann Thompson
Mr. and Mrs. William
Tomlinson
Elsa Trexler
Pamela Underhill
Genevieve Walczak
Frank and
Dorothy Walrath
Anne M. Walton
Joan H. Warshaw
Dr. Anne Watkins
Jane Watson
Mrs. Delia Watt
Kenneth B. Weiner
Eric Weiss
Jo Anne Welsch
and family
Dr. Michael West
Robert E. Westfall
and family
Baird and
Mary Ann Whaley
Richard and
Kay White
Richard and
Arlene Wilkison
Alida Wilson
Pindy Wong

BOTANICAL GARDEN
University of California Berkeley, CA 94720

(415) 642-3343 Visitor Center
642-0849 Administration
642-8040 Curation
642-3352 Education
642-7265 Friends of the Garden

Dr. Robert Omduff, Director
Dr. James Affolter, Curator
Daniel Campbell, Manager
Judith Finn, Assistant Manager
Dr. Stephanie Kaza, Education
Holly Forbes, Curatorial Asst
Toni Kafon, Administrative Asst
Deborah Darnell, Friends' Asst

Gardeners and Maintenance:
Louis Caizza
John Domzalski
Peter Kemler
Frank Magabey
Roger Raiche
Elaine Sedlack
Kurt Zadnick
Tony Zerilli

Friends' Board of Directors:
Robert Riddell, President
Gladys Eaton, Vice President
Ramona Davis, Treasurer
James Ratcliff, Jr., Secretary
Elly Bade
June Faulkner
Harlan Hard
Eleanor Higson
James Jones
James Lattie
Eric Nutcliffe
Nancy Swearengen

Dr. Robert Omduff, Director
Alba Wilkin
Ex Officio:
Dr. Lincoln Constance
Erroll Marchlan
Peggy Newell
Dr. Robert Omduff

Newsletter:
Stephanie Kaza, Editor
Al Stout, Production
Printed by TechniPrint
Calendar of Events

APRIL 30 OPEN HOUSE
Discovery quests for children and families, storyteller Ane Rovetta with Coyote Tales in Mather Grove, and the Garden in a festive show for this campus-wide event. 11-4 pm.

MAY 7-8 SPRING PLANT SALE
Members' Preview Sale. 9-12 pm. Unusual and hard-to-find trees, shrubs, bulbs, perennials, herbs, old roses, and California natives propagated by Garden volunteers.

MAY 14-JUNE 25 CACTI AND SUCCULENTS
Fred Dortort shares his extensive knowledge and collections of cacti, succulents, and caudiciform plants. $30 members, $35 non-members. 10-12 noon. (No class May 28)

JUNE 11, 18 PHOTOGRAPHY WORKSHOP
George Waters, master photographer and editor of Pacific Horticulture, offers a two-session workshop on plant and landscape photography for beginners and experts. Limit 15. $30 members, $35 non-members. Garden Meeting Room. 2-5pm.

JULY 9-AUG 13 INTRO TO THE GARDEN
In-depth survey of the Garden collections, everything you always wanted to know about each area, hosted by Garden docents. $25 members, $30 non-members.

JULY 7-21 GARDENS OF IRELAND
Tour the beautiful green gardens of Ireland with Penelope Hobhouse, garden writer and consultant, Professor John Malins, and Garden Manager Daniel Campbell.

JULY 23-25 MOUNT EDDY WILDFLOWERS
Roger Raiche and Stew Winchester, specialists in California native plants, will lead a group to explore this dramatic serpentine peak near Mt. Shasta. Rare alpine flowers, lovely lakes, meadows, and vistas. Limit 20. $30 members, $35 non-members.

For Information Call 642-3343

Friends of the Botanical Garden
University of California
Berkeley, California 94720