Sister Garden Exchange Strengthens Tropical Bond

As the massing clouds engulfed the forested hills of the Robert and Catherine Wilson Garden, I was reminded of our own Strawberry Canyon. It was the beginning of the rainy season and the spectacular view meant the clouds would soon open up and drench the valleys. Although certainly much wetter, the terrain and atmosphere were not unlike the Garden back home, and Jerry Parsons and I found it easy to settle in at this lovely field station.

As horticulturists in charge of the Tropical House and Mesoamerican area of the UC Botanical Garden, Jerry and I had come to the Wilson Botanical Garden as part of a sister garden horticultural staff exchange. Our trip began in the capital city of San Jose, located in the central highlands of Costa Rica. The Wilson Botanical Garden lies 207 miles to the south very close to the Panama border in mid-elevation or premontane (1400 meters) tropical rainforest. The bus ride from San Jose to San Vito de Jaba near the Garden was a combination rollercoaster ride and sauna. We wound our way up through the highlands of the Talamanca Mountain range where cloud forests have been cut for charcoal production and expanding cattle range, down below frostline where coffee plantations cover the rolling hills, and into humid lowlands of vast fields of densely planted pineapples. Finally, we arrived in the coffee zone where the Wilson Garden lies, very pleased to still have our wits intact 7½ hours after leaving San Jose.

We were greeted by the Director of the Garden, Luis Diego Gomez and his wife Gail Hewson-Gomez, who turned out to be perfect hosts. After settling us into our rooms and encouraging us to test the new self-guided tour booklet, we enjoyed a delicious dinner and good conversation in their home across from the field station. Over the course of our one month stay, Luis shared his knowledge and personal library unstintingly. We were free to take material for propagation from virtually any plant in the collection, and Luis eagerly pointed out those plants he knew would be especially good acquisitions for our garden. Gail also took the time to make us feel welcome and share her knowledge of the Garden and interest in Zamia fairchildiana, a rare native cycad whose phenology and growth rate she is studying.

The Lush Garden

The Wilson Botanical Garden seemed incredibly lush even though we were seeing it at the end of the dry season (usually January through March). This year the rains were late and didn’t really begin until shortly after our arrival in May. One thing contributing to the lush impression is the high density of epiphytes. Every conceivable perch is occupied by ferns, orchids, bromeliads, aroids, gesneriads, even many cacti. The epiphytes festooning the Garden are largely natives having seeded in from the adjacent forest reserve.

The cultivated grounds of the Wilson Garden extend for 25 acres. The collection consists of over 1000 genera in about 200 plant families with an especially extensive collection of palms (80% of the world’s genera) and Heliconia. The Wilson Garden is one of the five repositories for the International Heliconia Society and grows almost all of the 150 known species. There are two large green-
houses and several screened shade houses where plants are propagated and grown for garden plantings. As warmth is no concern in the tropics, greenhouses are more important in controlling the amount of light and water plants receive. We explored the greenhouses many times, discovering some new treasure each time.

We were given a generous portion of the propagation bench where we heeled in the cuttings and plants we collected from the garden and adjacent forest reserve. Because humidity is generally so high and temperatures so warm, bottom heat and overhead mist are not necessary. One hot day, Luis suggested we simply cover our cuttings with wet newspaper. Many commercial products for plant propagation are in short supply in Costa Rica, so Luis has found it practical to develop his own root-inducing extract from a relative of the spaghetti squash.

A Horticulture Contribution

We had brought with us a large selection of seed from the American Begonia Society, knowing that Luis Diego was interested in expanding the Wilson Garden’s collection of these plants. Wasting no time, all the seed was planted by Luis and his staff in the first few days of our visit. By the time we left, Luis had achieved an excellent rate of germination. These plants would quickly fill the greenhouse space once occupied by a large Anthurium collection now planted out on a beautiful new walk in the Garden.

In addition to the Begonia work, we had the opportunity to complete renovation of the Orchid Walk using the generous supply of native orchids on the Garden grounds and in the adjacent forest reserve. Luis found a particularly large Epidendrum which fell from a tree after a heavy rain. He said that its flowers would be especially attractive to butterflies.

We arranged the native collection more or less in order of evolutionary advancement, adopting local methods for securing the plants to the Garden’s stock of tree fern trunks. In the tropics the machete is the basic
The lush grounds of the Wilson Botanical Gardens. (photo by Martin Grantham)

gardening tool, replacing clippers, weeder, hedgers, and more in the skilled hands of the Wilson Garden staff. We reinforced the beam gateway to the walk and to this affixed a diverse array of orchids which should produce an extraordinary display of color and form at peak flowering, typically at either end of the rainy season.

**Beyond the Garden**

We explored a sizable reserve (342 acres) of secondary growth premontane forest adjoining the Wilson Botanical Garden. This is an area rich in native plants (approximately 2,000 species) and animals (300 species of birds, 80 species of mammals, 71 species of reptiles and amphibians). We were overwhelmed by an incredible diversity among the insects with over 3,000 species of moths and butterflies alone. We used a black light to attract insects to the research station at night, and each night there was an entirely new assemblage of moths whose elegance and intricacy fascinated us no end.

We often walked the river trail leading through the dense layered forest to the Rio Jaba, connecting with more extensive loop, crest, and waterfall trails. We were thrilled to catch sight of a group of white-faced monkeys as they vocalized and dropped half-eaten fruit on us from above. Frequently along the path we stopped to examine branches heavily laden with epiphytes begging to enter the ardent plant collector’s satchel. These branches had broken under the weight of their epiphyte loads and fallen to the forest floor where their lush burden was destined to etiolate and die.

Luis and Gail accompanied us on a collecting trip to several high elevation sites in the Talamanca Range. We visited Cerro de la Vueitas (Hill of Changes, ca. 3500 meters) where open boggy meadows with their silvery mats of *Alchemilla* and patches of *Puya dasylirioides* (the only species of this largely South American genus to extend so far north) alternate with groves of massive oaks covered by cool-growing epiphytes and surrounded by gracefully arching bamboos. We collected many unusual plants in the oak forests of the Villa Mills area (ca. 3000 meters) including a *Podocarpus*, a *Taxus*, many cool-growing orchids and the lovely *Hydrangea oerstedii*, a robust liana with magenta lacecap-type flowers. Sadly this area is likely to be completely destroyed soon by logging for production of charcoal.

However, I am pleased to say that the majority of our collected material is doing well and in time will serve to enrich our outdoor cloud forest collection and contribute to a future paramo (high elevation grassland) planting. In the special setting we can provide here at UCBG, these plants will help promote an appreciation for endangered natural plant communities and an urge to conserve them. Some will doubtless prove desirable for horticulture as well.

**Magnolia poasana**, a gem of the high cloud forest on Volcano Poas. (photo by Martin Grantham)

We offer a special thank you to Luis and Gail for their exceptional hospitality, to OTS Agroecology Coordinator, Martha Rosemeyer, whose boundless enthusiasm spurred us on, and to Doña Ana who prepared our excellent meals at the station and cultivated our tenuous Spanish with such good humor and wit. We look forward to future visits and the imminent completion of the new lecture hall and laboratory funded by the National Science Foundation. We also thank the Friends of the Botanical Garden for their support of this trip which added greatly to our personal knowledge of the extremely diverse Costa Rican flora, and allowed hundreds of new plants to enter both our greenhouse and outdoor collections. Most importantly, this month-long visit strengthened the ties between our two gardens so that the exchange of knowledge and plant material is sure to continue.

—Martin Grantham
Kids Go Wild for Green Stuff!

After teaching the winter Rainforest Rap sessions, I was eager to see what it would be like to have the same group of children in the garden for a week instead of just an hour. Luckily, Soozi de Mille, former docent and Green Stuff instructor, was visiting in the Bay Area as I was redesigning the four week-long sessions for Green Stuff campers. I picked Soozi's brain for a week to learn all of her tricks, including some new ones she had learned at the Brooklyn Botanical Garden. With the help of gardener Jerry Parsons and our experience with Rainforest Rap, we were able to quickly create an inspiring, green, and relatively childproof atmosphere. When maps, posters, plants, and props were all in place, we were ready for the kids.

The day always started with a huddle in the Meeting Room, followed by an activity introducing the day's theme. After a snack break with theme treats, the docents took the children off on a garden tour relevant to that day's topic. Around 11:00 we would all meet on the lawn to play games that heightened the children's senses and demonstrated biological concepts. The kids would then return to the Meeting Room to set up experiments, look into microscopes, or color part of their habitat coloring books.

After lunch, Sabrina Sonntag arrived to run the post-lunch activities. The children really thought Sabrina was great — even when she was being the "cookie monster" eating all the treats leftover from the morning snack break! Sabrina would lead an outdoor activity or experiment, followed by an arts and crafts hour. The day usually ended with "Quiet Time" where we recounted the day's lessons and often read a story relevant to the environment. The children appreciated this daily rhythm because they knew what to expect and could always look forward to their favorite activity.

Theme for a Day

Monday was Plant Diversity Day. We started by playing Plant Sleuth, investigating what was and was not a plant. "Are mushrooms and fossils plants?" "Are all plants green?" The children used microscopes to find clues, although they were often distracted by insects and dirty fingernails. The docents then led them on a Habitat Walk to look for mosses, liverworts, stoneplants, and other "green aliens." Sabrina helped everyone plant agaves and start bean sprouts to observe all week, and at the end of the day, they adopted a plant friend by drawing a picture and writing a poem about it.

Tuesday was Plant Parts Day. After learning the flower parts, campers went on a flower walk where they used magnifying glasses. After lunch, we held a Caterpillar Walk where 3-5 blindfolded kids were connected in a line behind Sabrina or the docents who were leading them through the Redwood Grove. At the end of the walk they had to take off their blindfolds and draw a map of their route based on what they heard, smelled, or touched...and then find their way back! It was quite entertaining to watch four 8-year old boys try to come to a consensus about who knew the correct route. "We went downhill here," "No, he was fooling us by going in circles and I felt this fern! See, here are the three steps."

Wednesday was Plant Adaptation Day. "Do plants eat, breathe, and sleep?" "Do plants really defend themselves?" I helped children answer these questions with the assistance of props and by having them draw murals of rainforest and desert habitats. Sabrina showed them California habitats in a "Bio 1B Tour for Kids." We had a plant wilting contest, saw dye go up celery stalks, and learned how Venus fly
traps moved. They also made leaf rubbings and solar prints of leaf shapes on photosensitive paper.

Thursday was Ethnobotany Day. We started by finding the origins of all the foods we ate for breakfast on a world map. "Could Native Americans eat bananas from Costa Rica and drink coffee from Ethiopia for breakfast?" After a tour of the herb gardens, Sabrina and I set up the California Native Ethnobotany Scavenger Hunt by tying teabags to madrone, diapers to cattails, juice to manzanita, and marking other products that California natives got from plants. The children worked in 2-3 person tribes to find all the clues on a list..."and no running!"

Friday was Rainforest Ecology Day. After eating tropical treats, seeing the garden's rainforest, and playing ecological-relationship games, we went to the Redwood Grove to compare tropical forests with our own. "How are they different?" "Why can't we treat the rainforests like our forests?" They answered these questions by writing a "Recipe for a Forest" where they put all the ecological components together to make a functioning forest. All week we had had long discussions about conservation, but we really hit the message home on Friday.

Loving and Learning

These are just samples of what we did, as each day was crammed with activities. I learned, however, that the most learning and the most fun occurred during those activities that took a lot of work and preparation. Running a day camp is more than just finding areas of the garden that are kidproof. It is about helping children become more aware of their environment and their feelings.

I was often struck about just how aware and compassionate children are about environmental concerns. They had a lot to say about rainforests, recycling, and conservation if we were willing to listen. They had many ideas about how to solve our environmental problems. It is encouraging to know that we can teach children that they are part of the solution. We all learned how important botanical gardens are for educating the public. But more importantly, we all learned to love Green Stuff.

— Chris Pires

Hammond Center Dedicated

Over one hundred friends and family members gathered to honor Elizabeth Hammond at the dedication of the Elizabeth Hammond Interpretive Center on Sunday, August 19th. The Center was given to the Garden by Marianne and Richard Peterson, her daughter and son-in-law. Mrs. Hammond was completely delighted with the beautiful deck which will be used by many tour groups and visitors for years to come. The deck and trails were designed by Elise Brewster and David Kahn, two landscape architecture students at U.C. Berkeley.

A long-time supporter of the Garden, Mrs. Hammond gave the first donation of $2500 for seed money to develop a design for the project in spring, 1989. With the generous contribution of the Petersons, the first piece of the Strawberry Creek project was put in place. Situated on an embankment in the California Native area, the Center overlooks Strawberry Canyon and Creek, looking east. Two interpretive panels discuss the ecology of the stream community and restoration of native habitat. Additional handpainted tiles of local birds and other fauna will be added to the deck later this fall.

— Gladys Eaton
A Garden for the 21st Century

The last decade of the first century of the Garden, the 1980s, was a period of great productivity and change. Under the direction of Dr. Robert Ornduff, the Garden significantly expanded its education, conservation, and fundraising activities. Garden accessions passed the 15,000 mark, making this Garden one of the largest in the United States.

As the Garden approached its Centennial year in 1990, the emphasis of programs expanded to include conservation as well as horticulture. To meet the challenges of the next century, the Garden began to assess its role in the University and in the wider plant conservation and botany community. It forged important links with local, national, and international organizations concerned with the preservation of biodiversity and sustainable ecosystems. Such expansion would not have been possible without the substantial efforts of staff, volunteers, and the Friends.

New Collections Add Diversity

At the end of the drought of the late 1970s, new areas were added to the already widely diverse geographical representation in the Garden. A Pacific Island collection was established, along with a special floriculture Garden of Old Roses. In 1980-81 the Garden sponsored a joint seed-collecting expedition to the People's Republic of China, led by Curator Bruce Bartholomew. Bruce returned with more than 2000 specimens from high mountain forests including many Viburnum, Rhododendrons, and Clematis. Five years later, new Curator Jim Affolter arranged a second trip to China, as part of a staff exchange with the Guangzhou College of Traditional Medicine. Professor Xu from this college then traveled to the United States and spent six months at the Botanical Garden, working with gardener Elaine Sedlack to establish a new collection of Chinese medicinal plants. The garden crafted beautiful metal photo labels in 1989, explaining the names and uses of each herb.

With the expansion of the Garden into the northeastern slope of Strawberry Canyon, three acres were cleared of native oaks and madrones to make way for a new Mesoamerican section in 1988. A crew from the California Conservation Corps burned brush, pulled stumps, and created a network of trails through the area. A large patch of Salvias was established as a Hummingbird Garden, and several endangered Cloud Forest magnolias were transplanted successfully.

Heat and cold took their toll over during the 80s, though most plants remained remarkably stable under the variable climate conditions. The Garden's ancient water system suffered greatly during the February cold snap in 1989. A number of pipes broke, leaving beautiful ice sculptures over burst stems and branches.

More and More Visitors

Public visitation increased dramatically over the course of the decade, especially with all the publicity before and during the Centennial year. But the biggest area of growth was in service to U.C. classes. Director Robert Ornduff and Curator Jim Affolter taught Botany 129, The Botanical Garden, and Manager Daniel Campbell and Assistant Manager Judith Finn offered Botany 128, Horticultural Methods in the Garden. Education Coordinators Stephanie Kaza designed a new course for Conservation and Resource Studies in Conservation Education, and with Jim, taught a U.C. summer session course in Tropical Conservation Education in Costa Rica. Garden staff continued to supply many campus classes with plant material for their labs, and over 900 Biology 1B students visited the Garden each spring in 1988-90, hosted by docents.

Meanwhile, to support all this activity, the Garden was expanding its budget — both through grants and through the generosity of the Friends and other volunteers. In 1983-84, the Garden was fortunate to receive substantial funding for conservation work and computerization of the plant records through the Institute for Museum Services, the National Science Foundation, and the Stanley Smith Horticultural Trust. The IMS grant supported extensive exhibit design work and renovation for the Desert and Rainforest House. The Friends continued with their annual plant sales in spring, fall, and winter, providing additional revenue beyond the university operating funds for Garden projects.

By the 1980s, the Friends were ready to undertake...
several major projects. The first Friends' Symposium was held in 1984, coordinated by Elly Bade and June Falkner on Old Roses. The first Alstroemeria wine-tasting festival was held the same year to raise funds for the Garden, and was an annual event until the Chinese Medicinal Herb Garden replaced the Alstroemerias in 1987. In the winter of 1988, the Friends renovated the Education Annex, creating new offices for Education and the Friends staff, as well as an improved conference room and docent library.

Under the strong fundraising leadership of Friends' vice president Gladys Eaton, the Friends raised $30,000 to build a Tour Orientation Center to accommodate tour groups. Spurred by this success, they commissioned architect Walter Brooks to design a new entrance plan for the Garden, complete with new office building, greenhouses, and plaza entry. During this decade, over 20 new benches and study tables were placed in the Garden, each representing significant personal contributions to the Friends on behalf of friends and family.

In 1989, the Garden hired a two-person development staff to formalize the Garden's fundraising efforts. Cindy Rasicot and Bobbie Ohs developed a computerized data base of donors and campus contacts, and hosted several luncheons for prospective contributors. The Garden worked closely with the campus development office to publish a beautiful case statement brochure and lay the groundwork for future fundraising efforts.

A New Focus in Conservation

The dissolution of the Botany Department in mid-1989 left the Garden without an obvious point of attachment to the campus, since the key faculty were split into several departments. Dr. Ornduff, in consultation with Dean Gardner, chose to shift the Garden from the College of Letters and Sciences to the College of Natural Resources— in some ways, taking the Garden back to its earliest beginnings. This set the stage for highlighting the conservation work already begun at the Garden in the mid 80s.

In 1987, the Garden was asked to be one of 20 U.S. gardens in the Center for Plant Conservation, a national organization committed to the study and preservation of rare and endangered plant species in the United States. With this came the responsibility for collecting seed and propagating a number of local central California species, known to be near extinction.

As the oldest and largest botanical garden in the University of California system, the Garden joined the Botanical Gardens Conservation Secretariat of the International Union for the Conservation of Nature and Natural Resources in 1987, representing botanical gardens around the world and actively promoting a conservation role for gardens. The next summer saw the adoption of our sister garden in Costa Rica, the Robert and Catherine Wilson Garden, one of the three principal research and education sites for the Organization for Tropical Studies. Garden staff traveled to Costa Rica to offer computer consulting, development of interpretive materials, and horticultural assistance in 1988-90. The sister garden relationship has drawn national attention as one of the more successful arrangements between temperate and tropical gardens today.

The garden continues to grow as an exciting and valuable resource with a mission to serve the campus, the community, and to function at an international level as well. As this Centennial draws to a close, the Garden looks forward to the tasks of the 21st century and a leadership role among the world’s great botanical institutions.

— Stephanie Kaza
CALIFORNIA'S varied landscapes are marked by two distinctive botanical features: the diverse vegetation types — from grasslands to desert scrub, from giant coniferous forests to dwarf alpine fell-fields — and the diverse soil types — sand, clay, granite, basalt, gypsum, and limestone. Two of the most unusual yet typical California plant associations represented in the Botanical Garden are those of the serpentine and the chaparral. Though in general, plant ecologists will tell you that climate is the most important factor in determining the vegetation type of an area, in areas of serpentine or other unusual substrates, soil features will often override climatic effects.

Serpentine rock occurs in island-like patches, ranging from a few square feet to vast tracts covering hundreds of square miles. These patches may appear as abrupt breaks in oak woodland or coniferous forest, where the trees give way to chaparral shrubs or even serpentine grassland. The rock is called serpentine because of the fancied resemblance of its mottled surface to snakeskin. (Technically, the rock is named serpentinite, but commonly it is called merely serpentine.) It is common in the Coast Ranges, the Sierra foothills, and in the northwestern counties; outside of California it is abundant in southwestern Oregon, but elsewhere in North America it is rare.

One of the most noxious chemical mixes imaginable, it is a wonder that any plants survive on serpentine at all. Added to the relatively harmless magnesium silicate are substantial dollops of chromium and nickel, both toxic to plants. A further challenge are the low quantities of nitrogen, molybdenum, and calcium — essential plant nutrients. Serpentine often contains high amounts of iron, revealed in the characteristic red color of weathered serpentine and the soil derived from it.

**Serpentine Endemics**

In the California Native Area we have attempted to recreate a serpentine patch to display sample stones and typical inhabitants of this peculiar substrate. These annuals, perennials, and small trees look like species of more ordinary soils, but are distinctive in their preference for serpentine. Some of these serpentine endemics will fail if grown in ordinary garden soil, but that is not always the case. For several years I have been growing *Brodiaea pallida* very successfully in pots of ordinary greenhouse soil and find I must repot my plants at least every three years or flowering will cease due to overcrowding by bulb production. Isn't it odd then, that this reproducively vigorous species occurs naturally only along a quarter-mile length of stream in the serpentine of Mother Lode country?

In our display, we include unusual species which thrive despite the hostile serpentine chemistry, many of them very limited in distribution. In Marin County, the Jewelweed, *Streptanthus niger*, the Indian Paintbrush, *Castilleja neglecta*, and the Tiburon Mariposa Tulip, *Calochortus tiburonensis*, are each known from only a single population. Other species, such as the handsome orange-flowered *Senecio greenei* are more widespread, but always on serpentine. Still other species, such as Toyon (*Heteromeles arbutifolia*), occur both on and off serpentine, but take different growth forms according to the substrate.

When the Biology 1B students from campus visit the Garden, we use the serpentine section to explain the concept of ecotopes. In a classic study four decades ago, then Berkeley Botany graduate Arthur Kruckeberg demonstrated that in some herbaceous species, serpentine races or ecotopes can survive on normal soils, but non-serpentine races die or develop poorly when grown on serpentine. In nature, however, serpentine ecotopes do not grow on non-serpentine soils even though their seeds are dispersed there. Why not? One idea is that the
serpentine ecotypes are susceptible to disease from soil fungi that abound in the non-serpentine soils but cannot tolerate the odd chemistry of serpentine. Just how plants do grow on serpentine is not well understood, though it is likely that several physiological strategies have evolved to support their survival.

**California Chaparral**

While chaparral commonly occurs on serpentine, it also grows on a variety of other soils, though these are usually poor in nutrients, shallow, or in steep and rocky terrain. The word chaparral comes from the Spanish *chaparro*, referring to a scrub oak; the *-al* ending means "a place of." California Chaparral contains oaks — notably Leather Oak (*Quercus durata*), but also a wide variety of other shrubs, including California lilacs (*Ceanothus* species), manzanitas (*Arctostaphylos* species), and Chamise (*Adenostoma fasciculatum*, or in southern California, *A. sparsiflorum*). The chaparral collection at the Botanical Garden is unusual in its diverse representation of these species. We have 57 species and 23 subtaxa of manzanita (several more recently described than Munz), and 41 species and 20 subtaxa of *Ceanothus*.

![Arctostaphylos imbricata](image)

San Bruno Mountain
manzanita

Although substrate is an important factor influencing the distribution of chaparral, an equally important ecological factor is fire. Under natural conditions, the dense, evergreen, scrubby chaparral was probably swept by fire at least once a decade or perhaps longer in some areas. While television newscasters often refer to the many thousands of acres "destroyed" each summer and fall due to fire, this term is only applicable to human life and property. For chaparral, fire is a means of rejuvenation and perpetuation. Without it, chaparral would in time, lose many of its distinctive species or might even be replaced by another vegetation type that is not fire-resistant.

Fire benefits plants by removing the dense vegetative cover, allowing more sunlight to reach the ground, and by depositing a layer of nutrient rich ash on the soil surface. These conditions are favorable for lush development of herbaceous plants and germination of shrub seeds. Some chaparral annuals require the heat of fire for seed germination. Others do not germinate until after a fire, perhaps because only then are the toxic compounds produced by chaparral shrubs dissipated from the soil by heat.

The chaparral beds at the U.C. Garden are located at the far end of the California Native Area, on the most directly south-facing slope, with typically poor soil and very dry conditions. This is one of the warmest spots in the Garden under almost any weather conditions. Associated with the stresses of high temperatures and low soil moisture, chaparral shrubs show many adaptations that reduce water loss: gray or pale leaves often held vertically, with possibly a thick waxy cuticle or hairy covering, or reduced leaves that are needle-like in shape. While one might expect a rational chaparral shrub to lose its leaves in summer (as does the California Buckeye), most species in that community are evergreen. It may be that losing leaves in summer would mean mobilizing more nutrients to produce a new crop of leaves the following spring, and chaparral soils are too poor to support this luxury.

**Late Fall Blossoms**

When plants in the rest of the California Native Area have stopped flowering by late fall, some chaparral plants are coming into their peak of blossoms. Manzanita flower buds are preformed the preceding growing season and can be seen on the branches from June onward. Once the fall rains begin and sometimes even before this, these manzanitas will burst into flower, announcing the beginning of California spring.

All during the summer and well into fall a variety of plants in the California area are in flower, such as the Tarweeds and Clarkias, and many of the plants not in flower, such as our native sages and sagebrush emit marvelous odors from their leaves on balmy days. And at a time when most of the U.S. is restoring their woodpiles and filling their oil tanks for a long winter, our manzanitas respond to the first fall rains as harbingers of spring.

— Robert Ornduff
A Celebration of Strawberry Creek

Did you know there are 75 check dams on Strawberry Creek? That goats are being used to restore the upper watershed to native vegetation? That fallen leaves are the main energy source for creek organisms? That runoff rates have increased with the paving of the canyon? Participants at the Strawberry Creek Symposium, held at the Garden on Saturday, September 8th, listened to speakers from many different areas share their knowledge and enthusiasm for this creek and its fascinating ecology and history. The program was a special invitation to the public to walk the new trail along the lower stretch of Strawberry Creek and enjoy the new Hammond Interpretive Center below the Oak Knoll.

The first panel of the morning focused on the natural and ecological history of the creek. UC Berkeley professor of stream ecology Vince Resh painted an elaborate picture of the micro-food webs of the creek, with invertebrate shredders, collectors, scrapers, piercers, filterers, and engulfers all picking up a different piece of the nutrient supply. Taking the long-term perspective, hydrologist Jeff Haltiner raised questions about what people value in creeks. The native Ohlones used the creek for water and game supplies; later on, the Spanish used the water for their cattle. By the 1850s, agricultural interests wanted the water for irrigation, and the urbanized town culverted the creek because it found flooding problems a nuisance. Now there is interest in the creek as habitat again, and people are coming to value the presence of the creek as a visual amenity on campus and in town.

Campus Clean-up of Creek

The second panel offered some history of campus planning and management regarding Strawberry Creek, complete with diagrams of utility lines and photos of underground culverts. Planner Bob Charbonneau and engineer Sonja Biorn-Hansen reported on the activities of the Departments of Environmental Health and Safety and Facilities Management in cleaning up point sources of pollution and faulty sewage channels, as well as establishing erosion control mechanisms. Because the creek serves as a good indicator of what is happening in the watershed, the campus has also been actively managing the upper hill area. Consultant Carol Rice explained the five-year fire reduction program to restore the area to native vegetation and manage water runoff to minimize sediment flow. The California Conservation Corps crews have been thinning eucalyptus and goat crews have been chewing up the invasive broom and poison oak. Under the advice of the Chancellor’s Advisory Committee on Strawberry Creek, the creek has received much needed attention and is now once again a pleasant and relatively healthy corridor through the Garden and campus.

Panelists in the last session addressed the role of creeks in urban settings. Carol Schemmerling of the Urban Creeks Council, John Steer of the East Bay Citizens for Creek Restoration, and Nancy Stone of the National Park Service shared colorful and inspiring examples of the hard work of local citizens in improving creek habitat. There are a number of creek restoration projects around the San Francisco Bay Area, many of which were represented in the poster display area outside the Meet-
ing Room. The East Bay group provided bright banners and a 25-foot long paper mache fish called Ganesh as part of the celebration of the life of the creek. Perhaps the most hopeful story was told by landscape architect Gary Mason about Strawberry Creek Park, where a once totally buried creek now flows beautifully above ground, surrounded by green grass and children playing.

Following the morning program of speakers, docents led visitors on short walks along the new creek trail up to the Hammond Interpretive Center overlooking Strawberry Canyon. John Brault coordinated a fish release of native species into the small waterfall pool area, and several speakers offered tours of the lower creek through campus.

The Symposium program drew people to the Garden to introduce the Strawberry Creek restoration project, now well into its first phase. With the completion of the Interpretive Center, building efforts will now focus on the boardwalk and lower deck by the waterfall. The trail is cut but still needs reinforcement, and erosion control mechanisms are yet to be put in place. This fall we expect to develop the plans for the planting exhibit, drawing on plant lists from the past 100 years of botanical collecting in the creek. In a year or two, the creek corridor will begin to look like a natural stream habitat — one that we hope will attract a few more migrating warblers, keep the native fish and newts around, and bring visitors back to the Garden again and again, to enjoy the serenity and intimacy of this beautiful creek.

—Stephanie Kaza

FROM THE DIRECTOR

Many of you are familiar with the Graeco-Egyptian mausoleum-like building on campus known as the Life Sciences Building. You may also be familiar with one of the Botanical Garden’s specialties — a fine collection of the members of the Redwood Family (Taxodiaceae) including several Dawn Redwoods (Metasequoia glyptostroboides). What is the connection between LSB and the Dawn Redwoods?

The Garden’s Dawn Redwoods include the first plants of this species brought to the United States in 1949, some grown from seeds, others planted as imported seedlings. Fossil samples of the Dawn Redwood were well-known in the paleobotanical record, but the species was thought to be extinct in the wild. Then shortly after World War II, a Chinese forester discovered a group of trees growing in a remote locality in south-central China. Ralph Chaney, distinguished UC Berkeley paleobotanist, and The Arnold Arboretum of Harvard University were instrumental in bringing living material of this handsome tree into cultivation outside China. Our trees were given to the Garden by Dr. Chaney.

Despite the fact that the Garden’s Dawn Redwoods are as old as any known outside China, they are not the largest in cultivation. One magnificent specimen, also from this initial importation, was planted in the courtyard of the Life Sciences Building. This tree is now over four stories tall and is well-shaped. To those of us working in LSB, it is a beautiful sight at all times of year, whether in leaf in spring, or leafless in winter. That tree was planted by now-retired Botany Department staff member Bill Hirano, who nurtured it through its early years.

The Price of Renovation

As some of you know, LSB is now vacant and is undergoing extensive renovation to make it a modern scientific facility. Its distinctive exterior facade will remain as is, but the courtyard will be filled in as the lower story of the renovated building. As a consequence, Bill’s beautiful Dawn Redwood will be destroyed.

In anticipation of this, and for sentimental reasons, the Garden propagated a few plants from the LSB tree. In response to an inquiry from distinguished retired zoologist Richard Eakin, we gave a rooted cutting to Eakin’s son David, now chair of the Science Department at John Swett High School in Crockett. This summer, David wrote saying that the tree was doing well on the high school grounds. (See photo to left.) I hope that the future of this historical tree will be more secure than that of the tree which grows, or grew, in the LSB courtyard, and that in four decades, it will be as stately as the parent that gave rise to it.

—Robert Ornduff
New Projects for Fall

**Taking Stock:** The Garden has almost concluded its management self-assessment process, complete with newly revised mission statement and organization chart. A subcommittee of representatives from staff, Friends, and the College of Natural Resources have been meeting regularly with Elena Minor, consultant from the campus Management Analysis Group, to develop project priorities and appropriate staffing relationships. The final report will be presented to the Dean, with recommendations for administrative changes and top projects for the coming years. Copies will be available upon request from the administrative assistant by early 1991.

**Strawberry Creek:** The Garden has completed the first stages of the Strawberry Creek project, with the building and dedication of the Hammond Interpretive Center and the preliminary clearing of the trail between the lower waterfall and the new deck. Interpretive panels have been installed near the entrance to the trail and on the railings of the deck. Handcrafted tiles will be added to highlight the local birds and other fauna. A lovely self-guided tour booklet to the creek on the lower campus is now available at the Visitor Center, written by Education Coordinator Stephanie Kaza, Bob Charbonneau, U.C. environmental Planner, and Vince Resh, U.C. professor of aquatic ecology, and designed by Linda Cook. The next stages of the project are to build the lower waterfall educational deck and boardwalk and to design a vegetation plan for restoring the creek and its banks to native riparian or stream habitat.

**Education:** The new fall docent class has 32 docents-to-be and is off to a good start with guest lectures in botany, evolution, and ecology. The fall tour schedule for October is quite full with two weeks of Biology 1B classes as well as other school groups. We hope to have a new Education Coordinator very soon to pick up the job where Stephanie left off.

**AABGA Conference:** Holly Forbes, Bobbi Ohs, and Stephanie Kaza all attended the June national meeting of the American Association of Botanic Gardens and Arboreta in Seattle. Stephanie presented two papers on the Rainforest Rap program and our sister garden relationship with the Wilson Garden in Costa Rica, and chaired two sessions on Environmental Education.

**Improved Access:** The department of Physical Resources received the go-ahead to spend $10,000 improving the Garden restrooms to make them handicapped-accessible. They will enlarge the stalls, add grab bars, and change the entrance to allow wheelchair entry.

The Garden parking lot has been graded and received some attention from campus parking, although its paving has been rescheduled for March, 1991 at the earliest. With state budget cuts, it is hard to say when the parking lot will actually be completely safe for the high load of visitors coming to the Garden at all seasons.

**People:** Cindy Rasicot, Development Coordinator, left the Garden at the end of September for another development position with San Francisco Performances. She leaves behind the groundwork for further fundraising efforts, which will be useful to the College and the campus Development Office in supporting the Garden into the next decade. Bobbie Ohs will continue in her publicity efforts, following through on donor contacts and local projects.

On October 14, the Friends of the Garden celebrated the many contributions of Myrtle Wolf, longtime friend and supporter of the Garden. Gladys Eaton presented Myrtle with an album of fan letters and a framed poster featuring a species of manzanita named after Myrtle. It is friends like these that make things truly possible at the Garden. Many thanks, Myrtle.

David Coronado, former gardener for the Mesoamerican area, died on June 22, 1990. We are sorry to lose him from the Garden family, and wish his parents well in surviving this loss. A bench for David donated by family and friends has been placed in the Mesoamerican area to remember his contributions in developing this garden.

— Stephanie Kaza
Holiday Plant Sale
Saturday, December 8, 10am-3pm

The Friends of the Botanical Garden will hold their annual Holiday Plant Sale on December 8 from 10am to 3pm at the Botanical Garden. The sale will feature a wide array of lovely plants for holiday gifts, including many hard-to-find species. Proceeds from the plant sale go to support the Garden’s programs, activities, and general operations.

Holiday special items include ferns, cacti, succulents, houseplants, epiphytic orchids, and Cymbidiums. A special feature is an assortment of bulbs, available now in anticipation of their blooms next spring – in your garden!

Plants for sale will be drawn from this list, depending on the condition of the plants at sale time and may include others not on the list.

**BULBS**

*Antholyza ringens* (Iridaceae) – South African bulb with scarlet and yellow flowers on a stem with a velvet appendage evolved as a perch for pollinating sunbirds.

*Babiana* spp. (Iridaceae) – our usual mixed hybrids from the Garden.

*Bellevalia* spp. (Liliaceae) – several species of this genus formerly included in *Hyacinthus*.

*Biarum tenuifolium* (Araceae) – low-growing plant with black-purple spathe, wild-collected in Greece.

*Brunsvigia slateriana* (Amaryllidaceae) – a rare South African from the garden that forms a ball of pink flowers over a foot in diameter. Not likely to flower for several years.

*Brimera amethystina* (Liliaceae) – small plants with light blue flowers like a tiny hyacinth.

*Cyclamen* spp. (Primulaceae) – a selection of rare species, may include *C. africanum*, *C. balearicum*, *C. creticum*, *C. cyprium*, *C. hederifolium*, *C. libanoticum*, *C. purpurascens*, *C. repandum*.

*Ferraria crispa* (Iridaceae) – yellow-brown frilled flowers intricately blotched and spotted with darker brown-purple from South Africa.

*Gladiolus* spp. (Iridaceae) – seldom offered northern hemisphere species *G. communis*, *G. illyricus*, and *G. palustris*.

*Lencoium autumnale* (Amaryllidaceae) – delicate fall blooming plant with white flowers flushed with pink.

*Muscari* spp. (Liliaceae) – several species including *M. aecheri*, *M. caucasicum*, *M. chalusicum*, and *M. commutatum*.

*Nerine* spp. (Amaryllidaceae) – *N. filifolia* from the Garden and *N. masonorum*, a dwarf species, both with typical pink trumpet-shaped flowers.

Friends Report 1989-90

<table>
<thead>
<tr>
<th>Balance July 1, 1989</th>
<th>$106,906</th>
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**Income:**

- Membership: 36,892
- Gifts: 84,885
- Program and Tour: 63,757
- Symposia: 29,132
- Centennial Program: 311
- Plant Sales: 35,094
- Donation Box: 4,675
- Japanese Stroll Garden: 4,427
- Interest: 4,778
- Visitor Center: 30,000

**TOTAL:** $293,951

**Expenses:**

- Membership: 6,792
- Newsletter Printing: 14,685
- Major Gifts: 1,177
- Program and Tour: 63,894
- Symposia: 18,768
- Insurance: 2,199
- Propagators/Plant Sales: 7,339
- Misc Board Expenses: 406
- Public Relations: 120
- Administration: 13,496

**TOTAL:** $128,896

**Disbursements:**

- Centennial: 13,563
- Garden General Use: 27,000
- Entrance Design: 33,046
- Horticultural Staff Development: 2,339
- Japanese Stroll Garden: 4,427
- Volunteers: 1,529
- Docents: 847
- Memorials: 610
- Orchids: 229
- Discretionary: 5,320
- Case Statement: 4,000
- Fundraiser's Expenses: 2,329

**TOTAL:** $95,239

**Balance June 30, 1990:** $176,722

**Current Assets:**

- Checking Account: 26,470
- Savings Account: 8,303
- Sales Tax Reserve Account: 780
- Certificate of Deposit: 21,754
- Treasury Bill: 49,106
- Market Savings Account: 70,309

**TOTAL:** $176,722

**U.C. Berkeley Foundation Accounts July '89 - June '90**

**Disbursed from Current Use Fund to UCBG Regents Account:** $20,554

**Endowments:**

- Directors' Fund: 35,197
- Twenty First Century Fund: 21,998
The Friends of the Botanical Garden welcome the following new members:

Susan Aberg
Charles Akin
Peter S. Albini
Daniel & Eugenie Alexander
Sonja Allena
Janet L. Alvarez
Gene & Pat Angell
Mr. & Mrs. R. Stanton Avery
Robert & Irene Byrne
Gene & Pat Angell
dr. Jim Budke
Sonja Altena
Louise Braunischweiger
Robert Browning & Linda Maio
Dr. Jim Budke
Robert & Irene Byrne
Abby Campbell
Shirley R. Carrie

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Friends' Board of Directors:
Robert Riddell, President
Gladys Eaton, Vice President
Ramona Davis, Treasurer
Thomas Shaw, Secretary

Marilyn La Brash
James Latti
Errol Mauchlan
Elmo R. Morgan
Nancy Swearingen
James Van Steklen

Dr. Robert Ornduff, Director
Dr. Robert Raabe, Associate Director
Daniel Campbell, Manager
Judith Finn, Assistant Manager
Holly Forbes, Assistant Curator
Toni Kafton, Administrative Assistant
Bobbie Oha, Development Assistant
Nancy Swearingen, Education Assistant
Deborah Darnell, Friends' Assistant
Scott Chance, Security

Gardeners and Maintenance:
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John Domzalski
Gerald Ford
Martin Grantham
Sean Hogan
Peter Klement
Jerry Parsons
Roger Raiche
Elaine Sedlack
Kurt Zadnik

Newsletter:
Stephanie Kaza, Editor
Lisa Krieshok, Production
Printed by UC Printing Services
(415)642-3343 Visitor Center • 642-0849 Administration
643-8040 Curation • 642-3352 Education
643-7265 Friends • 642-3012 Development

In Appreciation
The Friends offer appreciation and thanks for gifts from these donors in honor of:

Elizabeth Hammond, for the Elizabeth Hammond Interpretive Center, from Cynthia S. Schwabacher
Harland Hand, from Thomas Driscoll
Margaret von Hacht, from Mrs. Phillip M. McCombs
Myrtle Wolf, from Gladys Eaton and Mr. & Mrs. Lincoln Constance
Jacqueline Woodfill, from Mrs. D.I. Robinson
In Memoriam

The Friends offer appreciation and thanks for gifts from these donors.

In Memory of Sarah Millett Arndt Gale two benches were donated by her friends and family.

Daphne F. Achilles
Robert Bruce Anderson
Barbara B. Anderson
Joyce Appelbaum
Dr. Karl Arndt
Dick & Sandy Bails
David & Curry Barber
Dr. Charles Barnes
Suzanne Becker
Dr. & Mrs. Gordon Benzer
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Dr. David & Carolyn Woodruff
Kay Woodruff & William Lyman
Steven Wright & Barbara Nelson
Joel & Karen Zeldin
Joe Zicherman
Bettty Zichatkin

For donations given in memory of:

A bench was donated in memory of David Coronado from Ely Bade, Daniel Campbell, the Manuel Coronado family, June Falkner, Stephanie Kaza, Robert Ornduff, Elaine Sedlack, Mary Schroter, Sara Wikander, and California Flora Nursery
Janet Hayashida, from Jeanne & Malcolm Miller
Margaret Koontz, for the Japanese Stroll Garden, from Marjorie Jackson
Glen and Ruth Mohr, from Dr. & Mrs. T.W. Ohlson
Haruko Obata, for the Japanese Stroll Garden, from Wanto Fukuoka-Kenji Kai (an organization of former residents of the city of Fukuoka).

Grateful Thanks

The Friends wish to thank these donors who have made a substantial gift over and above membership:

Mr. & Mrs. William R. Anderson
Sherrie Althouse & Philip Van Soolen
Anonymous
Ernestine Avery
David Bigham
California Association of Nurseriesmen — Northern California chapter
California Flora Nursery
Combustion Engineers*
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Richard & Elizabeth Holating
Maurine & Preston Inman
Charles & Marian Huggins
Grant & Suzanne Inman
Barbara Jameson
Richard & Betty Keating

Picea mariana

Membership

The Friends of the Botanical Garden offers public education programs and provides independent funding to support the many needs of the Garden. You can enjoy and support the Botanical Garden year-round by becoming a member of the Friends of the Botanical Garden.

Membership benefits include:

• Newsletter
• Workshops, lectures, and tours
• Discount on Visitor Center purchases
• Discount on educational classes
• Early admission to Spring Plant Sale
• Volunteer opportunities

Friends of the Botanical Garden Membership Application

Yes, I would like to support the U.C. Berkeley Botanical Garden as a member:

□ Student* .......................$10
□ Individual .....................$25
□ Dual/Family ....................$35
□ Supporting ....................$100
□ Sponsor ......................$250
□ Patron .........................$500
□ Benefactor .....................$1000
□ Friends’ Circle ................$5000
□ New  □ Renewal

Name _______________________
Address _______________________
City/State/Zip ___________________
Telephone _______________________

Contributions are tax deductible. Please make checks payable to Friends of the U.C. Botanical Garden and mail to:
Friends of the Botanical Garden, U.C. Botanical Garden, Berkeley, CA 94720
Calendar of Events

RAINFOREST RAP
TEACHER TRAINING
Wed, NOV 14
Information, displays, activities, and teacher materials available as preparation for a unit on the Tropical Rainforest or a field trip to the Garden's winter Rainforest Rap program. $10 per teacher, call 642-3352 for reservations.

PLANT DISEASE CLINIC
Sat, DEC 1
Bring your sick plants for free consultation with Master Gardeners and others on infection, disease, and pest problems. 9am-12noon, Meeting Room.

HOLIDAY DECORATIONS
Sun, DEC 2
Make wreaths and arrangements from unusual dried natural materials with expert Wayne Roderick. Meeting Room, 1-4pm. Limit 18. $20 members, $30 non-members, includes materials.

HOLIDAY PLANT SALE
Sat, DEC 8
Gift plants of all sizes and shapes for the holiday season, including orchids, cacti and succulents, bromeliads, ferns, and other Garden specialties. 10am-3pm, Meeting Room and Garden entrance.

PLANT DISEASE CLINIC
Sat, JAN 5
Bring your sick plants for free consultation with Master Gardeners and others on infection, disease, and pest problems. 9am-12noon, Meeting Room.

RAINFOREST RAP
TEACHER TRAINING
Tues, JAN 8
Information, displays, activities, and teacher materials available as preparation for a unit on the Tropical Rainforest or a field trip to the Garden's winter Rainforest Rap program. $10 per teacher, call 642-3352 for reservations.

ROSE PRUNING
Sat, JAN 12
Peter Klement, U.C. Botanical Garden staff, will demonstrate rose pruning techniques, as well as proper pegging for shrub roses. 9:30-11:30am, Meeting Room. Limit 25. $15 members, $20 non-members.

RAINFOREST RAP
Mon-Fri, JAN 15-MAR 15
Programs for school groups and others on tropical ecology and conservation, complete with pollination lab, tropical economic plants, and poster displays. $1 per child, chaperones free. By reservation only, phone 642-3343.

COMPOSTING WORKSHOP
Sat, JAN 19
Learn about the latest techniques for regular, accelerated, and vermicomposting (with worms) from Dr. Robert Raabe, U.C. Berkeley professor of Plant Pathology. 10-11:30am, Meeting Room. $5 members, $8 non-members.

PLANT DISEASE CLINIC
Sat, FEB 2
Bring your sick plants for free consultation with Master Gardeners and others on infection, disease, and pest problems. 9am-12noon, Meeting Room.

For further information on classes and events, call the Visitor Center, 642-3343. To register for classes, send checks to UC Botanical Garden. No refunds the week before the class date unless class is cancelled. The Garden is open every day of the year except Christmas from 9:00am to 4:45pm. Free public tours led by docents are given on Saturdays and Sundays at 1:30pm. Admission to the Garden is free.

Plants are for sale at the Visitor Center all year 642-3343