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Birds at the UCBG

"It's a hummingbird! But is it Anna's, Allen's or Rufous?"

Academic interest in the Garden's bird life over the last few years has primarily been associated with undergraduates studying the territorial behavior of hummingbirds. Any regular Garden visitor can tell you however, that you've never really experienced the Garden until you have taken the time to sit and just watch the birds, listen to their songs and enjoy the way in which they use the Garden! Encouraged by the vast plant variety and habitat diversity, there are around seventy-six bird species regularly sighted here over the course of an average year. The hope of spotting one of the more rarely sighted birds, such as the Western Kingbird or the White-throated Swift, keeps our endless parade of avid birdwatchers in thrall.

Our resident birds, however, whether it's an audacious jay, a noisy woodpecker or a colorful finch, provide plenty of ongoing interest for the Garden community.

The diverse collections of the Garden support an equally diverse population of birds, as is apparent in the list from the recent Christmas Bird Count. In addition to providing general shelter for both resident and migrant species, our collection provides food and nesting sites for many different taxa. The Garden environment offers a range of habitats that are rather different from the native chaparral of the canyon. Some visitors to the Japanese Pool, such as belted kingfishers and green and blue herons, might not otherwise stop in Strawberry Canyon. Native chaparral species are found in parts of the Garden that more closely approximate their preferred habitat. Wren tits, California thrashers, and



Photo by Janet Williams

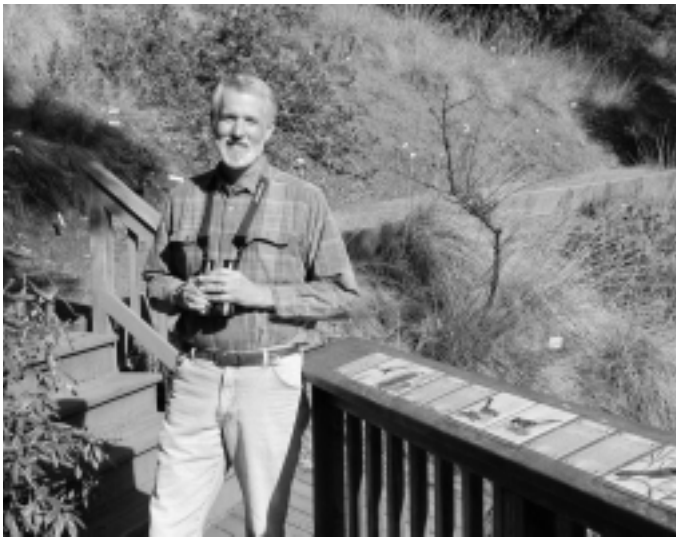
Aloes in the Southern African Area attract hummingbirds and demonstrate how birds at the Garden enjoy the diversity of plants in this collection.

spotted towhees are most commonly found in the scrubby areas of the South American and Australasian sections. Similarly, native riparian species are found in the trees along Strawberry Creek, such as Wilson's and orange crowned warblers.

Many birds have identified new food sources among the many non-native plants in our collections. This is particularly obvious when watching humming-

birds feed on both native salvias and penstemons, and also on bird-pollinated plants from other parts of the world. Aloes in the Southern African Area are pollinated by sun birds in their native habitat. These small colorful nectivores perch on the rigid blossom stalks of the aloes. This is a distinct contrast to the hovering feeding habit of the hummingbirds, which as a group are restricted to North and South America. Nonetheless, as a walk through this area at this time of the year demonstrates, hummingbirds utilize aloes extensively and assertively defend their feeding resources against other intruding hummers.

—Chris Carmichael



Photos by Janet Williams

When not watching birds from the Elizabeth Hammond Interpretive Center, where he is pictured here, noted local ornithologist Dennis Wolff, regularly teaches popular birdwatching classes in the Garden.

From Killing to Counting

Before 1900, Americans engaged in a holiday tradition known as the Christmas “Side Hunt”. People would choose sides and go afield with their guns; whoever brought in the biggest pile of feathered quarry won. On Christmas Day 1900, ornithologist Frank Chapman, an early officer in the Audubon Society, called for an end to the slaughter. Rather than shooting birds, he suggested counting them. From Toronto to Pacific Grove, California, the Christmas Bird Count began. In its first year, 27 people participated, counting 18,500 individual birds of ninety species.

On Christmas Day 2000, 52,000 people participated in 1800 counts in the United States and Canada. They sighted 78,636,382 individual birds of 676 species! A century of bird counts has amassed a wealth of data which scientists use to monitor the health of bird species, pinpoint and explain trends, and detect the rise of environmental threats.

Along with three other members of the Audubon Society, I came to the rich and varied habitats of the UC Botanical Garden for this annual count. We found a total of 226 individual birds of 38 species, including such rarities as hermit and black-throated warblers.

—Dennis Wolff

AUDUBON CHRISTMAS COUNT DECEMBER 17, 2000

American Robin	30
Anna’s Hummingbird	25
Steller’s Jay	21
Bushtit	16
Golden-Crowned Kinglet	14
Ruby-Crowned Kinglet	12
Yellow-Rumped Warbler	10
Townsend’s Warbler	9
Western Scrub-Jay	9
Chestnut-Backed Chickadee	7
Hutton’s Vireo	7
Song Sparrow	6
California Towhee	5
Golden-crowned Sparrow	5
Bewick’s Wren	4
Fox Sparrow	4
Dark-eyed Junco	4
Turkey Vulture	3
Hermit Thrush	3
Allen/Rufous Hummingbird	3
Common Raven	3
Band-Tailed Pigeon	2
Northern Flicker	2
Black Phoebe	2
Red-breasted Nuthatch	2
Brown Creeper	2
California Thrasher	2
Spotted Towhee	2
White-crowned Sparrow	2
Cooper’s Hawk	1
Sharp-shinned Hawk	1
Red-breasted Sapsucker	1
Nuttall’s Woodpecker	1
Hairy Woodpecker	1
Wrentit	1
Black-throated Gray Warbler	1
Hermit Warbler	1



Dr. Chris Carmichael, UCBG Manager of Collections and Horticulture, is one of our noteworthy birders, a group which also includes Dr. Jennifer White, Associate Director for Education, and Curator Holly Forbes. Chris’ academic background in vertebrate zoology equips him to effortlessly make the connections between the birds here in the Garden and their relationships to the plants.

SIBLEY'S GUIDE TO BIRDS

National Audubon Society: The Sibley Guide to Birds, written and illustrated by David Allen Sibley; A Chanticleer Press Edition, Alfred A. Knopf, NY, ©2000; 544pp. Flexible Binding. \$35.00.

Most visitors to the Garden come to see and study our special plants, but a surprising number also come to see the animals and birds which feed and take shelter in the hospitable environment. We have newts which breed yearly in our Japanese Pool and monarch butterflies visiting our milkweed plants. Now and again we are surprised to learn that we are on the Audubon Society's Hotline, as we were several years ago when dozens of visitors came to see a rare bird sighted in the southwest corner of the Garden.

In past years, the Roger Tory Peterson *Field Guide to Western Birds*, or the National Geographic Society's *Field Guide to Birds of North America*, were seen tucked under the arms of our 'Garden Birders'. Now there is a new, up-to-date field guide these birders will want to own, although its size and weight make it awkward to carry in the field.

The Sibley Guide to Birds is a great user-friendly guide containing over 6600 wonderfully detailed watercolor paintings of 810 species and 350 populations of North American birds. Descriptions and remarks accompany the illustrations, removing the need to flip back and forth between text and pictures. The birds are shown in similar poses to make comparisons between species easy. All important plumages are depicted and range maps show migration routes, summer, win-

ter, and breeding locations, and bird distribution. Of particular interest are the good introductory pages preceding each family or group of families showing bird classification and speculation at a glance.

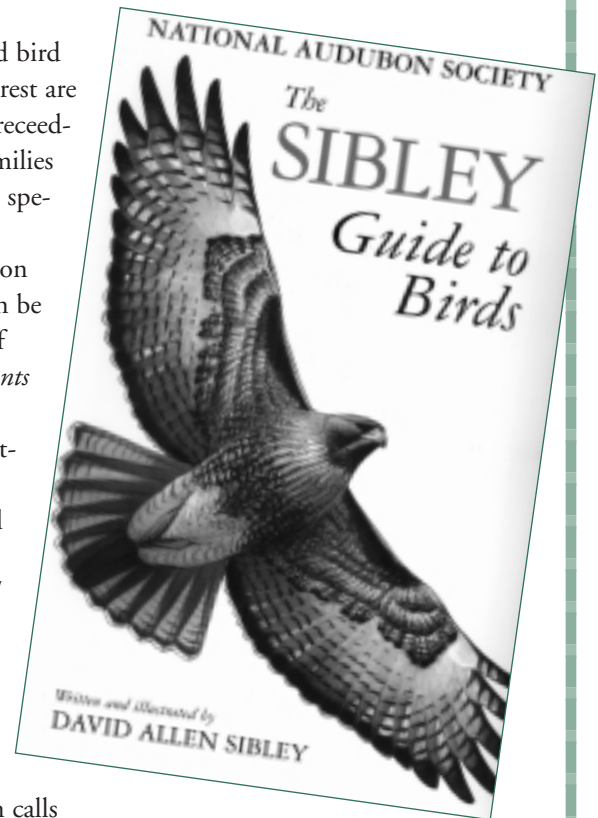
In many ways the publication of *The Sibley Guide to Birds* can be compared to the publication of *The Jepson Manual: Higher Plants of California* a few years ago. Both were preceded by respected long-used references. It is likely that the *Sibley Guide* will become the current authority for birds, as the *Jepson Manual* has become for plants. But keep your worn, well-loved field guides handy. For this reader, at least, it is hard to think that the beloved California Quail in the Garden calls "put-way-do" rather than the familiar "chi-ca-go" of old, which we teach the touring school children.

The Garden Shop also carries the following books related to the above review:

■ *Birds of Northern California* by David Fix and Andy Bezener; range maps by Don Roberson and David Fix; Lone Pine Pub., Renton, WA, ©2000; 384pp. Paper. \$19.95.

■ *Birds of San Francisco and the Bay Area*, by Chris C. Fisher and Joseph Morlan; Lone Pine Pub., Renton, WA, ©1996; 159pp. Paper. \$9.95.

■ *Common Dragonflies of California, A Beginner's Pocket Guide*, by Kathy Biggs; Azalea Creek Pub., Sebastopol, CA, ©2000. 96pp. Paper. \$9.95.



■ *Newts and Salamanders, Everything about Selection, Care, Nutrition, Diseases, Breeding, and Behavior*, by Frank Indiviglio; with photos by Richard D. Bartlett; illus. by Michele Earl-Bridges; Barron's, Hauppauge, NY, ©1997; 128pp. Paper. \$6.95.

Brochures:

■ *Birds of the UC Botanical Garden*, UC Botanical Garden Staff. \$1.00.

■ *Butterflies of the San Francisco Bay Region, A County Species List*, 5th ed., by John Steiner; San Francisco Bay Wildlife Soc, 1988. \$1.00.

—Elly Bade

DIRECTOR'S COLUMN

Celebrating the Garden

Spring is here again! The hills are green and spangled with flowers. The wind is whipping across the coastal bluffs, and anyone with even the slightest inclination toward gardening has their hands in the soil. As I watch the seasons march across the landscape and think back to the past year, I'm amazed at the amount of progress we have to celebrate here at the Garden.

The living collection is in superior condition. Over the years, the horticultural staff has done an inspired job of maintaining and building the collection. However, with leadership by Manager of Collections and Horticulture, Chris Carmichael, and better access to materials and supplies, they have added new shine to the Garden. I invite you to push past the construction sites in the entrance to get a better look!

Ah, yes, those construction sites. We were so excited when they started. Now, we look forward eagerly to their completion. The Garden has not been a peaceful place to work or visit this year. Staff and volunteers have been wonderful, carrying out their work over the din of jackhammers, dump trucks, cement mixers, and more. From all this dust, mud, and upset, the Garden is gaining many physical improvements. Some, like the utility upgrades, make our jobs easier but are invisible to visitors. Others, such as renovated bathrooms and FEMA restoration of pathways in the Mexican and Central American area, are essential but not sensational. Many projects, though, are downright sensational!

Master rock garden creator, Phil Johnson, has just completed a spectacular hardscape in the Southern African section, and horticulturist Lawrence Lee will soon begin planting it with material obtained during his collecting trips to South Africa. This garden will feature the natural beauty of bulbs and succulents from the winter rainfall areas of the Karoo and Fynbos semi-arid and desert habitats. It also provides an opportunity to inform visitors about the precarious situation of these habitats in the face of regional development and global climate change.

Our new Arid House is also nearing completion. The name has recently been changed to Arid House from Desert Greenhouse — Arid House being more appropriate for that collection, though we are still making the name transition. This structure will house a substantial number of the most biologically and scientifically valuable plants in our collection, including many living “type” specimens. Type specimens are the exemplar individuals a taxonomist uses to describe a new species. Other specimens belong to species that are now extinct in the wild, and are therefore irreplace-

able. The new house provides the public with excellent visual access to the exciting and unusual plant forms in this collection while ensuring their security.

UC researchers are anxiously awaiting opening of the Center for the Study of Plant Conservation (CSPC) at the Garden. Although the lab is not yet finished, scientists associated with this center are already exploring a diversity of questions related to plant conservation. Richard Shefferson, a graduate student at the Center, writes in this issue about his research devoted to discovering the types of fungi that sustain terrestrial orchids. Another graduate student, Jessica Riquetti, recently established a major field experiment to determine whether soil-borne organisms can limit the spread of European beach grass, an invasive species that reduces native plant diversity in sand dunes along the Pacific coast of North America. Work by these students and other scholars will be greatly facilitated by the new Center.

In preparation for our next round of construction, we have just begun design of the Jane Gray Research Greenhouse, which will be an important adjunct of Garden research in plant conservation and ethnobotany. This house will be erected in the place currently occupied by the temporary arid house and will serve researchers from both the CSPC and elsewhere on the Cal campus.

Although construction is the most visible sign of progress that visitors can see, the Garden has many other achievements to celebrate as well. Our educational outreach programs are receiving national recognition. Many partners are joining our Math in the Garden initiative. Beginning this spring staff at the UC Davis Arboretum, Brooklyn Botanic Garden, Missouri Botanical Garden, Morris Arboretum, and Atlanta Botanical Garden become active partners in the development process of the ‘Math in the Garden’ project as they try out the activities in their own programs. San Francisco Girl Scout Council troops and 4-H programs across California are also partners in this effort. Over the next year their evaluations of the effectiveness of the project's activities will provide crucial information to ensure that the final published materials will fit into different informal settings and programs and work in gardens throughout the country. Collaborations with these, and other partners, provide audiences diverse program opportunities that strengthen this and other aspects of the Garden's Education Programs.

*Cactus drawings by UCBG horticulturist, Judith Finn. Above: *Gymnocalycium saglione* and at right: *Euphorbia* cf. *leuconeura*.*

Our collaboration with East Bay Municipal Utility District, which resulted in our spectacular and innovative contribution to last year's San Francisco Flower and Garden Show, is now producing exciting new Garden interpretation materials. Garden staff and dedicated volunteers worked with EBMUD staff to develop an extensive and well-received tour of Plants for Water-wise Gardening. (See the Education Director's column for more information about this tour.) The tour takes advantage of our diverse and outstanding collection to illustrate landscape uses of water-conserving plants. Most species highlighted in the tour are available in the horticultural trade, but some are not, which puts the tour on the leading edge of horticultural innovation.

Through all of these changes, the Garden continues to expand its primary mission of support for botanical research. New molecular tools are allowing exciting discoveries in evolutionary biology and plant systematics. These tools work best on DNA extracted from live tissues, which makes living collections such as ours ever more important scientifically. Important new studies that have used UC Botanical Garden specimens are finding exciting and sometimes disturbing results. For example, Olmstead, DePamphilis, Young, and colleagues report this spring in the *American Journal of Botany*, (Vol. 88: 348-361, 2001) that the snapdragon family (Scrophulariaceae) is not a natural evolutionary grouping. In their new interpretation, which was based in part on samples from the UC Botanical Garden, the only member of this family in the California flora that will remain in the Scrophulariaceae is the eponymous *Scrophularia californica*. Even the snapdragons (*Antirrhinum*) will no longer be in the "snapdragon" family.

Although living tissue is the *sine qua non* for molecular phylogenetics, it is still essential that every plant used in such research be vouchered. Vouchering, which involves removing a sample of the plant to produce a herbarium specimen, creates a permanent record that persists after death of the plant itself. It is essential that Garden material be vouchered so that future scientists can examine the specimens that today's botanists are using to classify plants and understand their evolutionary relationships. Thus, an important goal of the Garden is to voucher all accessioned plants in our collection. This academic year, our graduate student assistant, Rich Shefferson, has helped to voucher 274 plants in our collection.

With all this happening this year, one might ask whether Garden staff has had time to plan very far into the future. In fact, we have embarked on the early stages of strategic planning and, as the first round of construction nears completion, we will continue to move forward on this very important project.

—Ellen Simms

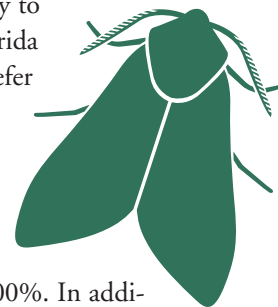


Garden Visitors

(left to right): Horticulturist Elaine Sedlack accompanied Mark Flanagan, "Keeper of the Gardens" at Windsor Great Park, and William McNamara, director of Quarryhill Botanical Garden in Glen Ellen, CA, during their visit on April 16th. Mr. Flanagan was the April speaker for the California Horticultural Society meeting.

Gardening Tips

■ The larvae of the diamond back moth can be a serious pest for members of the cabbage family, including cabbage, broccoli, collards, kale and others. The insects are becoming resistant to Bt, which has been used widely to control the insect. A researcher in Florida found that the larvae of the moths prefer feeding on highly fertilized collards more than on any other members of the family. Fields of crucifers to be protected are surrounded by a crop of specially treated collards, resulting in a reduction of sprays from 75 to 100%. In addition, a naturally occurring parasitic insect of diamond backs built up in the collards, and this helped control them in the desired crop. *Agricultural Research* 47 (3): 26.



■ The old world fern, (*Lygodium microphyllum*), introduced into Florida in 1950, now covers over 40,000 acres. In the last 6 years, there has been a 100 fold increase. A single leaf can be 100 feet long. Fortunately, it is believed that the plant will not move farther north than central Florida. *American Nurseryman* 191 (3): 10.

■ *Euphorbia esula*, an introduced species in the northern midwestern states, has colonized vast areas of marginal and non-agricultural land, displacing many beneficial plant species. In addition, it is toxic to sheep, cattle and horses. Recently, a gall midge was released which produced galls on the stem tips resulting in their destruction, thus preventing flowering and seed production. The insect may produce 3 or 4 generations in a season though the first generation produces the largest number of adults. It is these that can be harvested and used for new releases. *Biological Control* 16(2): 128-132.

—Robert D. Raabe

The Overlooked Equation

When I was an undergraduate living in Chicago, I volunteered at local county nature preserves to help restore Illinois' endangered prairies, savannas, and wetlands. Very often, my work involved monitoring the endangered plants that grew in the area, especially the imperiled populations of native, wild lady's slippers.

The lady's slippers we all know and love (*Paphiopedilum* spp.) are tropical, and have been propagated and hybridized for many years. Should you ever see a lady's slipper of the genus *Cypripedium* on display at a nursery, be warned – it was most likely stolen from the wild. Cypripedioid lady's slippers grow on the wild lands of North and Central America, Europe, and Asia, and have not been propagated successfully at all. Yet, as we have seen in other endangered plants, propagation is very often integral to successful restoration.

Why has propagation been so unsuccessful? The biology of orchids, especially the rare terrestrial orchids that evolved in the temperate regions of the world, is very complex. In fruiting structures known as pods, they produce thousands to millions of seeds no longer than a single millimeter, and half that in width. These seeds very rarely survive to produce a mature plant, and this seems to be why they have evolved to produce so many seeds all at once. The seeds scatter in the wind and find a new place to settle in the soil. Once the winter snows and rains are over, they imbibe water, and then they just sit. Why? Because they cannot progress any further



Photo by Janet Williams

This Cypripedium californicum in the Garden was collected by Garden horticulturist, Roger Raiche.

in their development without the aid of a soil-inhabiting fungus. The orchid family is one of the few plant families that depends completely on soil fungi for germination. This kind of interaction is called “mycorrhizal,” and requires some more explanation.

A mycorrhiza is an interface of two organisms – a plant and a fungus. The fungus, which can be one of many different species, grows through the soil as a mass of tiny filaments known individually as hyphae, forming a hyphal network called a mycelium. The fungus grows outward, looking

GARDEN NOTES

SUDDEN OAK DEATH...Horticulturists **Judith Finn** and **Jerry Parsons** attended an all day symposium, “Combating the Sudden Oak Death *Phytophthora*: a new disease”, in Marin County, hosted by UC Cooperative Extension on March 9th.

CHANNEL ISLAND VISIT...Horticulturist **Nathan Smith** accompanied **Steven Junak**, of the Santa Barbara Botanic Garden, on a three-day visit to San Nicolas Island in late March. This island is part of the southern group of Channel Islands off the coast of southern California. They were conducting plant surveys and removing exotic plants. Nathan was able to collect several plants for the Garden's Californian Area.

GARDEN SHARING...Curator **Holly Forbes**, distributed duplicates of the Garden's epiphytic cactus collection to the

Huntington Botanical Gardens in San Marino and to Ganna Walska Lotusland in Santa Barbara. It is common practice among gardens to share duplicates of collections, providing some protection against loss in any one location. **John Trager**, Curator of Desert Collections at the Huntington, donated several collections of South African material for the Garden's African Area.

RESEARCH GRANT...We are pleased to report that the Genetic Resources Conservation Program at UC Davis funded a grant proposal by **Dr. Jason Koontz** and Holly Forbes to study the genetic variability of Baker's Larkspur, *Delphinium bakeri*. The research will seek to determine the genetic diversity of this species to obtain base-line data for future research and conservation efforts. The grant money will pay for the cost of DNA analyses to be performed by Dr. Koontz. Baker's

for new patches of resources to digest and absorb. Part of the mycelium grows into the root system of a plant, penetrating the root tissue itself, and “colonizes” it. Other parts of the same mycelium grow far beyond the range of the plant’s root system, and collect nutrients such as phosphorus and calcium. Amazingly, the mycelium then gives the plant vast quantities of these nutrients, which are very often limiting to the plant’s growth. But the fungus does not do this out of the goodness of its fungal heart! It gets a very valuable commodity from the plant: carbon. The plant produces sugar in its photosynthetic leaves, and it now appears that, on average, at least 20% of all the sugar produced by the plant goes to the fungus. This makes sense: the plant is limited much more by phosphorus, calcium, and other nutrients than carbon. Hence, the fungus and the plant seem to exist in a mutually beneficial system.

The importance of mycorrhizae is evident in the fossil record, which shows that the first land plants (now thought to be *Rhynia* species), growing roughly 500 million years ago, actually had mycorrhizal structures in their roots. Indeed, current estimates suggest that 90% of plants are mycorrhizal – a situation that clearly displays the importance of this unusual interaction.

Which brings us back to the orchid. Orchids are unlike any other plants. We are discovering that this is true in their biology as well as in their aesthetics. Orchids break all the rules. With most plants, germination and growth are possible

without fungi, although the plant will generally be stunted throughout its life. But orchids do not appear to grow without these organisms. Although some orchids can be cultivated in the lab under very specific conditions, these orchids generally grow poorly relative to their wild-grown kin. More and more we find that most orchids cannot even germinate without a fungus.

Why should this concern us? The kind of interaction that orchids exhibit with mycorrhizal fungi is very different from what we are used to, and this has important ramifications for propagation, and ultimately restoration. First of all, we have as yet not seen any evidence that orchids donate carbon to the fungus. Second, we have found that as seedlings, and in the case of the non-photosynthetic “ghost” and “phantom” orchids, orchids even extract sugar from the fungus! Third, orchids are very particular about which fungi they will associate with, and it appears that they choose fungi that are mycorrhizal, or sometimes even pathogenic, on local trees and other plants. So, these unusual plants indirectly acquire their sugar from other plants in the ecosystem. Fourth, orchids native to the northern temperate latitudes generally stay within the soil as seedlings for many years without developing any leaves, relying on mycorrhizae for complete nourishment. Finally, even mature, photosynthetic orchids choose not to break the surface and sprout leaves in some growing seasons. This happens particularly often in lady’s slipper populations. In my Midwestern study sites, I have found that lady’s slippers can stay belowground like this for many years without interruption, while still growing more root and rhizome tissue. Other researchers have found very solid evidence that this “dormant” condition can last for 25 years or more. Considering that lady’s slippers have very low sugar reserves, this is an amazing feat.

The key, then, to understanding what can be done to restore native orchid populations, which are in decline all over the world, is to explore this overlooked equation: orchid + appropriate fungus + appropriate conditions = successful growth.

It is an exciting topic. We are now beginning to understand the nature of this puzzling interaction, and modern scientific methods and tools, including molecular techniques, genetic sequencing, carbon-isotopes, and mathematical and statistical theory, are helping us in tackling major environmental questions. My research is an example of the conservation issues which will be investigated by Cal scientists and graduate students at the Garden’s new Center for the Study of Plant Conservation.

—Richard P. Shefferson

larkspur is one of several endangered and rare California native plants the Garden is committed to helping conserve through its participation in the Center for Plant Conservation. Dr. Koontz studied the genus *Delphinium* for his dissertation project. He is now at the Center for Biodiversity of the Illinois Natural History Survey.

NEW STAFF MEMBER...

We extend a warm welcome to Ms. Leslie Wozniak who has joined the staff at the Garden in the capacity of Visitor Services Specialist. Leslie is a long time fan of the Garden and brings a wealth of work skills to the new position.



Photo by Janet Williams



EDUCATION AT THE GARDEN

One goal of the Education Program is to encourage visitors to discover the Garden's magnificent collection and to look at plants from new perspectives. While our seasonal self-guided tours showcase different plants in their peak flowering or display seasons, other brochures focus on ethnobotanical (Chinese medicinal herbs) or special collections

(serpentine plants). Building on the interest generated through our successful collaboration at last year's San Francisco Flower and Garden Show, the Botanical Garden and the East Bay Municipal Utility District (EBMUD) have teamed up again, this time to develop a self-guided tour in the Garden. This interpretive tour of the collection focuses on plants that grow successfully in the Bay Area, but use little water.

Most people have no idea how much water their garden needs. The typical Bay Area residential landscape is irrigated enough each year to flood it six feet deep. This is at least twice as much as plants need for healthy growth. Using water-efficient plants and creative design, local gardeners can create a garden that thrives on little more than natural rainfall. Properly designed, a water-efficient garden is easier to maintain than one that is over-watered. It requires less weeding, pruning, mowing, fertilizing, and pest control. It is better adapted to fluctuations in rainfall and seasonal changes. There is no one way to create a water-efficient garden. The Botanical Garden is filled with a plethora of exciting possibilities from around the world.

This walking tour of the Garden introduces you to some of these beautiful plants that thrive in the Bay Area. California's chaparral is our local community of drought tolerant plants. The climate and plant communities in Chile's matorral, South Africa's fynbos, and the



Photo by Barbara Lyss

*The shining silver leaves of *Leucadendron argenteum* make it an interesting choice for water conservative landscaping in the Bay Area. Threatened in its native habitat in South Africa it can be seen in the Garden in the Southern African Area, where it is just one of the 125 exciting plants in the new Water-Wise Gardening Tour.*

Mediterranean maquis, with their winter rains and summer drought, are but a few of the parts of the world that have water-conserving plants similar to California's chaparral. Most of the plants on this tour have been in our collection for many years. They will give you a good idea of what that seedling in the local nursery will look like once it gets established in your garden.

This new publication is the collaboration of the Garden's horticultural, educational and communications staff working with three knowledgeable and dedicated docents — Barbara Lyss, Kathryn Welch and Alison Mills. After hours of walking through the Garden and conversations with horticulturists, Barbara, Kathy and Alison wove fascinating plant histories, horticultural information, name derivations and ethnobotanical information into stories for more than 100 plants. A lot of give and take occurred as the Garden staff vetted the information from different perspectives. Weeding out some plants that we all loved but which did not fit all the criteria was one of our biggest problems. Plants included on the tour use little water, are available (or could be available) in the horticulture trade, and are not weedy or endangered.

Ten thousand preview versions of the tour are available this Spring: in the Garden, at this year's San Francisco Flower and Garden Show and at Earth Day events. Over the next several months, Education staff will be collecting evaluations from visitors. This information will be used to improve the final version of the brochure. I invite you to come to the Garden, go on the tour, and give us your feedback.

We are grateful for EBMUD's participation and support of the process and production of this new exciting self-guided tour of the Garden.

—Jennifer Meux White

Research at the Garden

The Garden recently provided research materials to these individuals:

Ms. **Eden Abram**, dissertation student with Prof. **Donald Kaplan**, UCB Dept. of Plant Biology launched her study of comparative morphology of succulent, drought-tolerant plants. She will be using the desert collections for illustration purposes.

Prof. **David D. Ackerly**, Stanford University, again visited to collect many species in the Rhamnaceae (buckthorn family). He is looking at the evolution of the "evergreen sclerophyll" strategy in California chaparral. The project is to examine each of the major taxa in comparison with their close relatives from non-chaparral habitats, employing a phylogenetic approach where possible.

Dr. **Stephen Burgess**, post-doc, UCB Dept. of Environmental Science, Policy, and Management, used the Mather Grove for an investigation of the basic physiological ecology of redwoods with the aim of relating climatic and hydrological factors with the growth and distribution of *Sequoia sempervirens* (Coast Redwood). They are particularly interested in quantifying direct foliar absorption of fog water by redwoods and determining its role in mitigating drought and allowing redwoods to grow to extreme heights. This study will principally involve the use of sensitive xylem sap flow meters to gauge patterns and amounts of water transport in branches and stems of redwoods.

Prof. **Todd Dawson's** class, Physiological Plant Ecology, used several Garden plants for measurements of photosynthesis under sun and shade conditions during the Spring Semester.

Prof. **James Eckenwalder**, University of Toronto, received leaf bases of *Zamia integrifolia*. These were plants used by Dr. Robert Ornduff for a study published in 1996: Gender performance in a cultivated cohort of the cycad *Zamia integrifolia* (Zamiaceae). *Amer. J. Bot.* 83: 1006-1015.

Mr. **Taylor Field**, dissertation student at Harvard, visited to take cuttings of primitive angiosperms for his project (*Chloranthus*, *Illicium mexicanum*, *Illicium simonsii*, *Schisandra henryi*).

Ms. **Ruth Kirkpatrick**, dissertation student with Prof. **Brent Mishler**, UCB Dept. of Integrative Biology, received fronds of several xerophytic ferns for a course project on desiccation tolerance.

Ms. **Nancy Kiang**, dissertation student with Prof. **Dennis Baldocchi**, UCB Dept. of Environmental Science, Policy, and Management, tested a sap flow sensor on a Garden oak for several weeks prior to using it in the field.

Ms. **Jessica Messmer McAbee**, graduate student at UC Davis with Prof. **Charles Gasser**, visited to obtain cuttings of *Impatiens hookeriana* and *Impatiens balsaminifera* for her graduate studies in ovule diversification in the angiosperms.

Dr. **Susana Magallon**, UC Davis, post-doc with Profs. **Michael Sanderson** and **James Doyle**, received a wide range of species for their study of seed plant phylogeny, the age of angiosperms, and the evolution of pentamery among basal eudicots.

Ms. **Jodi McGraw**, dissertation student with Prof. **Wayne Sousa**, in Integrative Biology completed her soil seed bank study in the Garden's research greenhouse.

Prof. **Rei Rasmussen**, Oregon Graduate Institute in Beaverton, Oregon, visited the Garden to collect emissions from several oak species for his study on terpene release by oaks.

Mr. **Andrew Salywon**, dissertation student at Arizona State University, is working on the molecular systematics of the Myrtaceae family. He received cuttings of *Eugenia capuli*, *Austromyrtus dulicis*, *Myrceugenia chrysocarpa*, *Syzygium jambos*, and *Ugni molinae*.

Ms. **Caroline Stromberg**, dissertation student at UC Berkeley, Department of Integrative Biology, received dozens of specimens and associated herbarium vouchers for development of a phytolith reference collection.

Dr. **Nori Yoshikawa**, a post-doc at the University of Washington in Seattle, visited to collect *Hibbertia scandens*, *Dillenia*, and *Aextoxicon punctatum*. His main object is to find where in the phylogeny of angiosperms particular genes (the RPB2) are duplicated.

—Holly Forbes



Recognition

Contributions received from 2/01/2001 up to and including 4/15/2001.

New Members

The Garden wishes to thank our new Individual and Family Members:

Ms. Shellie Albright & Mr. Scott Emmett
 Mrs. Monica Baldzikowski
 Ms. Marge W. Barry
 Mrs. Wendy S. Bergman & Mr. Robert G. Bergman
 Ms. Barbara Boster
 Ms. Suzanne M. Briley
 Ms. Michaela Brockstedt
 Dr. and Mrs. Daniel Callahan
 Ms. Dwyn Daniels Robbie
 Mr. and Mrs. Randy Davis
 Mrs. Lois De Domenico
 Mr. Bob Deloria
 Ms. Carmel Drudy
 Ms. Anna Eastwood
 Ms. J. M. B. Edwards
 Dr. and Mrs. Ray Ergas
 Mr. Raymond Ford
 Mr. Sam Foushee
 Ms. Gloria Galindo
 Ms. Judith E. Garvens
 Mr. Kent N. Garvens
 Mr. Patrick Gavin Duffy
 Ms. Penelope E. Gordon
 Ms. Anna Greenwood
 Ms. Alix Greenwood
 Ms. Jeane Hamilton-Lecky
 Mr. and Mrs. Alan Hoben
 Ms. Lynne Hosley
 Mr. and Mrs. David Huang
 Ms. Laura J. Kainik
 Ms. Gretchen Kell
 Ms. Sydney Kustu
 Ms. Marie C. Lagarde
 Ms. A. Lim & Mr. K. Henderson
 Ms. Kiamara Ludwig
 Ms. Caren Maghreblian
 Ms. Pradeep & Mr. Karek Mathew
 Ms. Helen McKinley
 Mrs. Laura Miller & Mr. Dave Miller
 Mr. Charles L. Moreau
 Ms. Alexandra Moss
 Ms. Phyllis Peacock
 Ms. Phyllis Potter & Ms. Nora Underwood
 Ms. Delaine Renard & Mr. Bruce Bedortha
 Ms. Janet A. Rudolph
 Ms. Jeanine Sidran
 Mr. Steve Sivier
 Ms. Jean Smith
 Ms. Laura Sueoka
 Ms. Anita L. Thomas
 Mr. Dan Vierra
 Ms. Virginia C. von Colditz

Mr. Whitney Vosburgh
 Ms. Herta Weinstein
 Ms. Karen Wesson
 Ms. Charlotte Woody

Grateful Thanks

The Garden thanks these new members for their substantial gifts over and above membership:

Ms. Patti Barker
 Mr. and Mrs. David Benning
 Ms. Beth Burnside
 Mr. and Mrs. Ronald Clendenen
 Mr. and Mrs. Fred Dengler
 Mr. and Mrs. Jack Dolhinow
 Dr. and Mrs. A. Carl Helmholz
 Ms. Fonda Kareliti
 Mr. and Mrs. Ron Lai
 Mr. Jim Lovekin & Prof. Iris Tommelein
 Mr. and Mrs. Geoff Machin
 Mr. and Mrs. Stuart McDonald
 Mr. Bill McJohn
 Mr. Ron Morrison
 Ms. Sally O'Connell
 Ms. Ann Reynolds
 Mr. and Mrs. Weldon Rucker
 Mr. Bernard Taper & Ms. Gwen Head
 Ms. Carol Thompson & Mr. Roderic Duncan
 Mr. and Mrs. William D. Watkins
 Mr. Stewart Winchester
 Mr. Thomas (Rex) Wolf

In Appreciation

The Garden offers appreciation and thanks to these donors for their generous contributions:

Mr. and Mrs. Earl Hamlin
 Dr. and Mrs. A. Carl Helmholz
 Mr. Bernard Taper & Ms. Gwen Head
 Mr. Stewart Winchester
(Ornduff Fund for Garden Interpretation & Docent Activities)

In Memory

The Garden offers appreciation and thanks for gifts from these donors in memory of:

Shih Ning Chern from:
 Mr. & Mrs. Kenneth Palladino
(Chinese Medicinal Herb Garden)
Jean & Earl Hyde from:
 Mr. and Mrs. Harry Heckman
(Myrtle Wolf Library)
Josephine Tonge Larson from:
 Mr. and Mrs. Bill Bade
(Myrtle Wolf Library)
 Ms. Ellen Felker

Ms. Elenor Mulkey
 Ms. Mildred J. O'Connor
 Ms. Jean Portello
 Ms. Jacqueline Woodfill & Mr. John Woodfill
(Myrtle Wolf Library)

James Harrold Van Sicklen from:

Mr. and Mrs. Richard Amundsen
 Mr. and Mrs. Bill Bade
(Entrance Improvement)
 Mr. Michael Gilmore & Family
 Mr. Bruce Hayes
 Mr. & Mrs. R. Sheldon Milligan, Jr.
 Mr. John P. Stock

Gifts In Kind

The Garden offers appreciation and thanks for gifts in kind:

Ms. B. Sonja Altena
 Ms. Mary Lynn Cox
 Ms. Louise Dutton
 Mrs. Myrtle Wolf



WISHLIST

The Garden particularly thanks Dr. and Mrs. David Reiffel for their contributions of a sofa and a projector for the new Center for the Study of Plant Conservation.

This issue we are asking our readers if they could support us by donating:

- A "point and shoot" camera
- Card tables

If you can donate, please call (510) 643-2937—we would appreciate the help.



Pictured after receiving their awards from the Director at the recent ceremony are: (Back, left to right) John Domzalski, Judith Finn, Jerry Parsons, Peter Klement, Gerald Ford. (Front, left to right) Elaine Sedlack, Nancy Swarengen, Holly Forbes and Dr. Ellen Simms, Garden Director.

Staff Members Honored

Various members of the Garden staff were recently recognized and applauded for their many years of service. Director Ellen Simms commented that the Garden is the envy of many campus units for the longevity of its staff! University service award pins were given to **Holly Forbes, Gerald Ford, Jerry Parsons** and **Nancy Swarengen** for 10+ years of service; to **Elaine Sedlack** for 15+ years; to **Peter Klement** and **Roger Raiche** for 20+; and to **John Domzalski** for 25. **Judith Finn** had already received her 25-year pin! Congratulations to all you long-timers!

Noteworthy Donations...

The Garden Library received several donations of books and journals. **Mrs. Mary Lynn Cox** donated over 130 books on garden design, horticulture, and botanical subjects. **Mrs. Myrtle Wolf**, donated a complete run of *Pacific Horticulture Magazine*, many issues of the *Journal of the California Horticultural Society*, several volumes of the *Bulletin* of the American Rock Garden Society, the early issues of *The Four Seasons* (journal of the Regional Parks Botanic Garden), and *Fremontia* (journal of the California Native Plant Society), among others. Additional donations of books for the library were made by **Mrs. Sonja Altena** and **Ms. Louise Dutton**. Thank you very much indeed!

GARDEN STAFF

Dr. Ellen Simms, *Garden Director*

ADMINISTRATION

Afroz Navid, *Administrative Assistant*
 Margaret Richardson, *Tour & Rentals Coordinator*
 Michael Rimar, *Administrative Assistant*
 Candice Schott, *Business Operations Supervisor*
 Nancy Swarengen, *Volunteer Services Coordinator*
 Janet Williams, *Marketing & Development Officer*
 Leslie Wozniak, *Visitor Services Specialist*

COLLECTIONS & HORTICULTURE

Dr. Christopher Carmichael,
Manager of Collections and Horticulture
 Holly Forbes, *Curator*
 Barbara Keller, *Curatorial Assistant*
 Anthony Garza,
Supervisor of Horticulture and Grounds
 John Domzalski, *Propagator*
 Judith Finn, *Horticulturist*
 Peter Klement, *Horticulturist*
 Lawrence Lee, *Horticulturist*
 Jerry Parsons, *Horticulturist*
 Dr. Robert Raabe, *Garden Pathologist*
 Roger Raiche, *Horticulturist*
 Eric Schulz, *Horticulturist*
 Elaine Sedlack, *Horticulturist*
 Nathan Smith, *Horticulturist*
 Gerald Ford, *Building and Grounds Maintenance*

EDUCATION

Dr. Jennifer White, *Associate Director for Education*
 Christine Manoux, *Program Assistant*

FACULTY ADVISORY COMMITTEE

Dr. Nan Crystal Arens, *Integrative Biology*
 Dr. Lewis Feldman, *Plant Biology*
 Dr. Joe McBride, *Environmental Science,
 Policy, & Management*
 Dr. Brent Mishler, *Integrative Biology*
 Dr. Vincent Resh, *Environmental Science,
 Policy, & Management*
 Dr. Alan Smith, *Herbarium*

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CALENDAR OF EVENTS

TREES AND SHRUBS OF CALIFORNIA

We are pleased to help launch a new book from University of California Press, *Trees and Shrubs of California* by two distinguished faculty members from Humboldt State University, John Stuart, Professor of Forestry and John Stewart, Professor of Botany. Both authors will be with us, to share highlights of their research, and to sign copies of their book. Also on hand will be their illustrator, Andrea Pickart, exhibiting samples of her work.

Wednesday, June 13, 7:30 pm

Free

Registration requested

TWILIGHT TOURS

Celebrate the long evenings of summer with us in the Garden. Members of our horticulture staff will share their favorite spots and special insights about the Garden on Wednesday evenings at 5:30 pm. Each walk will be different, so plan to come every week during July, beginning July 11, and every week during August. Free with Garden admission.

University of California Botanical Garden

Second Annual Garden Party

Please Join Us!

Enjoy fabulous food, wine and music,
stroll around the Garden at the peak of its glory,
and tour the newly renovated South African Desert Habitat.
At 4 PM we'll celebrate the opening of
the new Desert Greenhouse!

Saturday, June 16, 2001, 3 - 6 PM



Your reservation will be acknowledged by postcard. Please bring postcard to the event.

To register for any program or event*, call 510-643-2755.

University of California Botanical Garden
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