he light, warm rain in Hong Kong was refreshing after 15 hours on the plane. The next step was to Guangzhou in the People's Republic of China. I especially looked forward to visiting Professor Xu Honghua who had helped us design a new garden of traditional Chinese herbs in 1987. But I found no train ticket reserved in my name as planned and was told that few tickets were available due to the upcoming Mid-Autumn Festival. Suddenly the reality of traveling in China became apparent. Throughout the next five weeks the main challenge would be getting tickets at each stop on the itinerary because they can only be purchased in each city in turn. This left me with a sense of uncertainty, which proved to be the only constant in the journey.

In Guangzhou I was warmly welcomed by my host Professor Xu. We had much to tell each other, but at this point we only had one day together. In the following weeks I would attend the International Symposium of Botanical Gardens in Nanjing, travel to several other botanical gardens, and spend a week at the Guangzhou College of Traditional Chinese Medicine where Professor Xu teaches pharmacology. Here under his guidance I would research Chinese medicinal plants. The trip was made possible by an exchange between the Guangzhou College and the American College of Traditional Chinese Medicine in San Francisco, and assistance from the Friends of the U.C. Botanical Garden.

International Exchange of Ideas

The Symposium at Nanjing on September 24-28 drew 258 participants from 42 gardens in China and 22 other countries. The event was jointly organized by He Shan-an, Director of Nanjing Botanical Garden Memorial Sun Yat-sen, the Jiangsu Institute of Botany, and over 30 botanical gardens in China. Representatives attended from such organizations as International Union for the Conservation of Nature and Natural Resources, International Association of Botanical Gardens, and World Wildlife Fund. I was one of 17 delegates from the United States representing major botanical gardens and universities. Topics included Conservation and Plant Ecology, Taxonomy, Phytochemistry, Plant Introduction and Breeding, Landscape Architecture, and Education.

During the opening ceremony a repeating theme was facilitating cooperation between gardens on the international level. For example, Professor Kunio Iwatsuki from the University of Tokyo is currently developing a regional program of temperate and tropical gardens to facilitate inter-garden communication. Another key theme was the role of botanical gardens in plant conservation. Many people are unaware that the tropical rainforest in southeast Asia is as threatened as that in Central and South America; this conference marked an important effort to address this problem.

A partial conservation solution is to develop strategies for ex situ conservation of rare and endangered species within botanical gardens. In February 1987, China published a list of 389 rare and endangered species and is now working on a list of 1200 species. Ten percent of the flora of China is known only from type collections; many species are threatened or already extinct, and most of the endangered taxa are monotypic and endemic. Another approach to conservation is to establish nature reserves. There are now 392 in existence in China, covering a total of 24,500,000 hectares. The main management problems...
are the sale of wild plants and the illegal cutting of timber; both need substantial education efforts by the government to reduce the impact on natural habitats.

At a conference session on Medicinal and Economic Plants, I learned about some of the earliest known medicinal plants and their economic uses. For instance, in Lijiang I saw people wearing raincoats made from the fibers of the Windmill Palm (*Trachycarpus fortunei*). Another speaker reported on cell culture of *Panax ginseng* being conducted at the College of Traditional Pharmacy in Nanjing. Later at the Guangzhou College I observed sophisticated equipment for analyzing active chemical components of medicinal plants. Many plants which are mainstays in traditional medicine do not have the correct chemical balance when raised in cultivation and now are being depleted in the wild due to increasing demand. This kind of research is an exciting integration of the age-old Chinese art of healing with modern technological methods.

**Medicinal Plant Gardens**

Following the Symposium, I visited medicinal gardens throughout China. Only the Guangzhou College had the plants displayed by medicinal function as they are at the U.C. Botanical Garden. At both Hangzhou and Wuhan Botanical Gardens the plants are arranged according to cultural requirements; in the Shanghai Garden they are laid out taxonomically. In Kunming, Guangzhou, and the south China Botanical Garden plants are mostly grown and displayed in containers. The Hangzhou Botanical Garden has the most extensive collection including a large shady section with pools and rockeries covered with moss. (*Lycopodium serratum* and several species of *Selaginella* are used medicinally.)

Professor Xu at home in Guangzhou. (photo by Elaine Sedlack)

At the College at Guangzhou I was impressed to see the entire grounds landscaped with medicinal plants. They even have a section of plants used in AIDS research. Here I visited the library, research laboratory, and hospital. Professor Xu’s wife, Lin Shi-shu, who works in the pediatric clinic, has studied both Western and Chinese traditional medicine for eight years. This is now becoming common among modern Chinese practitioners.

In Chinese medicine the most fundamental principles are *yin* and *yang*; these are also key elements in classical Chinese landscape architecture and correspond with water and stone respectively. In Shanghai I had the opportunity to see a newly completed garden designed in this classic style. Called Da Guan Yuan, it is based on the famous Qing Dynasty novel, *A Dream of Red Mansions*, originally *The Tale of the Rock*. This classical garden and others exemplify the ancient principles of Chinese medicine practiced today as a living tradition.

During the trip I accumulated extensive notes for future plantings and collecting expeditions. But some of my most enjoyable moments were spent in the Xu’s family kitchen with Professor Xu, his wife, mother, and two sons. At meals we practiced “Dinner Table Botany,” classifying the plant material in the soup. Professor Xu was a generous host and kept my room well stocked with tea and mooncakes. His attention to detail and his help on many occasions made my trip a pleasure. The renewed contact with Professor Xu and other botanists was well-timed, continuing a long tradition of successful exchange between the U.C. Botanical Garden and China.

—Elaine Sedlack

Gardener, Asian Section
Triggerplants

When I show visitors the marvellous assortment of gardening and botanical books available in the Visitor Center, I seek out a small book entitled *Triggerplants* by Rica Erickson (University of Western Australia Press, 1981) commenting "we even stock unusual titles like this one."

Triggerplants are members of the family Stylidaceae, a group restricted to the southern hemisphere, mostly Australia. The common name derives from a curious pollination mechanism: the trigger is the style, which is cloaked by fused stamen filaments so that the anthers appear to be born at the tip of the style. When an insect visits the flower, it trips a mechanism that causes the trigger to snap downward and release a load of pollen on its back. Once a flower has shed its pollen, the stigma emerges from among the spent anthers and strikes the next insect visitor, picking up pollen from its body, thus accomplishing cross-pollination. Apparently the repeated blows to the pollinators' backs are not a sufficient nuisance to dissuade them from continuing to visit plants for nectar. Australian children amuse themselves by tripping the triggers of triggerplants. However, since the triggers reset themselves, these practices probably do little if any harm to the flower, despite the author's admonition that this floral mechanism "is not designed for human amusement'.

Two Diverse Genera

The Western Australian Triggerplants are mostly members of the genus *Stylidium*, ranging in size from diminuitive winter annuals to subshrubs. Many of these have very attractive flowers; a few can be seen in the Botanical Garden. A related genus in Western Australia is *Levenhookia*, which Erickson calls Styleworts. This small genus is named after Antony van Leeuwenhoek, a Dutch cloth merchant who never visited Australia, never saw a stylewort, but whose hobby was making magnifying glasses and introducing 17th and early 18th century biologists to the microscopic wonders of living beings. Styleworts present a greater menu of pollination mechanisms than do Triggerplants, and some of these are self-pollinated, though cross-pollination appears to be the ancestral rule.

I first encountered Triggerplants and Styleworts in 1983 when I travelled to Perth, Western Australia to study the reproductive behavior of *Villarsia*, a semi-aquatic and very attractive genus of plants that happened not to be in flower when I arrived. I decided to pass time by studying the plant life on the granite outcrops that dot Western Australia. These granite outcrops appealed to me because they have vernal pools, which made me feel at home. The plants there are mostly small and mostly annual, so they are easily collected and dried. And there are no shrubs or trees on these outcrops, so pests such as bull ants and ticks are not a problem. If tiger snakes venture out onto these rocks, they are easily seen, even by a botanist. They are not so easily seen in the bush.

Both genera of Stylidaceae grow in abundance on these outcrops; I found two species of *Stylidium* and nine of *Levenhookia*. Because the species often grow in mixed colonies and look very much alike, I drew sketches of the flowers in my field book, noting stripes and other color patterns. Then when the time came to identify my two-dimensional, faded dried specimens I could reconstruct the intricacy and beauty of the tiny flowers.

Erickson's little book makes delightful reading, even for those who may never see these fascinating plants in the field. Her book can be used to identify triggerplants should one ever visit Australia, but there's more in it that that. Her drawings and watercolors of the plants are attractive. There are lyrical descriptions of the Western Australian countryside and of various Triggerplants that have especially caught her interest. She has coined common names for many of the 136 species she discusses including one she calls "Cowkicks". In a charming aside she explains how she learned of this curious name:

"Lens and watch in hand I crouched beside a triggerplant...preparing to time the repoising of the trigger column. A child stood soberly beside me watching as I probed the throat of the flower to make the trigger shoot over. 'Packs a fair punch for a flower,' he said. 'We call them Cowkicks. Did you know?'

She didn’t and you won’t either, unless you take a look at this book — that is, providing it is still on the shelf.

— Robert Ornduff
GARDEN SPOTLIGHT

Cacti of the High Desert Sun

The cactus collection has been one of the Garden’s most popular features for decades. Although not the largest outdoor assemblage of cacti in the world, it is an outstanding selection of unusual plants, including many found nowhere else in cultivation. As proof of their surprising adaptability, all these cacti have had to survive our cool wet winters, conditions generally considered anathema to desert plants. The long established plantings in the New World Desert area, in combination with the more recent Mexican section cactus associates, complements the equally comprehensive indoor collection in the Desert Greenhouse.

History of the Collection

Some of the cacti in the collection outdate the present site of the Garden. In 1932, when James West established a rock garden at the then four year old Botanical Garden location, he transplanted some cactus specimens from the main campus where they had been growing for a number of years. The director of the Garden, Dr. T.H. Goodspeed, was an ardent supporter of the succulent and cactus collection and encouraged its expansion.

The present collection started taking shape in the 1930s after an expedition to South America, the first in a series of collecting trips that continued for 30 years. These expeditions, under the leadership of West and later Paul Hutchison, introduced many species new to science. The later expeditions to Peru and Chile focused interest on the previously unknown cacti of the Chilean deserts, leading ultimately to their widespread cultivation.

Recently Jim Affolter, Kurt Zadnik, and I travelled to Baja California and the American Southwest on a number of shorter expeditions, sharing information and plant material with local botanical institutions. Now, plans are afoot to establish experimental plantings from areas previously thought too climatically different from Berkeley for success. Already some plants from Baja California have survived the last two winters in the ground in good health, though they have not yet been tested by a really wet or cold winter. Over the years a number of plants from South America have been lost, but many others have proven perfectly hardy in our climate.

The New World Desert Outdoors

The struggle for survival under adverse circumstances has molded almost everything about cacti: their development of spines and water-retaining tissue, and even their striking shapes. Yet constrained as they are by the confines of harsh environments, cacti have developed endless variations on a few basic themes. This variability may be the most interesting thing about them. The plants in the outdoor collection embody almost all of the forms cacti attain. Here then, are some plants that may catch your eye during a walk through the cactus garden.

From over 13,000 feet in the Peruvian and Bolivian Andes come several species of columnar Espostoa and others now known as *Borzicactus* (once called *Oreocereus*). In this region temperatures can vary an astonishing one hundred degrees during a single day, from below freezing at night to over 100°F during the day. Here the wooly coverings on the column not only protect the...
cactus from the cold and occasional snow, they also trap moisture. As the dew condenses on the wool and runs down the stems, the plants are supplied with extra water vital to survival in the high arid habitat. Some Cleistocactus, mostly from Argentina, are densely covered—not with wool but with thin, glassy, white spines. If you walk through the New World Desert early in the morning, you may see these cacti completely covered by sparkling drops of dew that will soon drip down to their thirsty roots.

Some of the largest cacti in the garden are various species of Trichocereus, a mostly Peruvian genus. The tall Trichocereus terscheckii has been growing beside the main stairway in the New World Desert for over 30 years. Notice its spines: those along the lower part of the plant's stem are long, sharp, and menacing, while higher up they are noticeably shorter and less threatening. Many columnar cacti produce fiercely protective spines in their vulnerable youth. When after many years, they grow beyond the reach of browsing predators, their lofty new growth doesn't require the protection needed closer to the ground. Other Trichocereus in the Garden are much smaller plants, no more than a foot tall, arranged in dense clusters, a configuration that minimizes the amount of surface area exposed to the elements. All Trichocereus are notable for their large white flowers in late spring and summer.

Many of the more interesting cacti are barrel cacti growing as solitary, stout, ribbed cylinders. These plants swell and shrink in accordion fashion depending on their water content. The most familiar barrel cacti are those from the Southwestern deserts, from Palm Springs east to Texas. Though a majority of our outdoor cacti are South American, we have a number of Golden Barrels (Echinocactus grusonii) from Mexico, a popular and widely grown cactus valued for its bold geometric shape and prominent yellow spines. Tucked away in more sheltered parts of the New World Desert are several Neopoterias and Copiapoa from the very arid lands of northern Chile — rare plants often considered much too susceptible to rot for planting outdoors. Our plants, however, have survived for many years in good health, producing pink and yellow flowers year after year. Mixed in with all the other forms of cacti are many Opuntias, the prickly pears, known for their tasty and colorful fruits.

The Greenhouse Collection

Inside the controlled climate of the Desert Greenhouse we grow a number of more sensitive cacti with Mexican species the most significant part of this collection. Although beneficial, the extra heat obtained from growing under glass isn't the main reason for keeping these plants indoors. In fact, many of them live at high elevations where they endure severe cold. These cacti, however, must remain very dry in winter, making their cultivation outdoors impossible.

The genus Mammillaria with well over a hundred mostly Mexican species encompasses a tremendous range of size, shape, and spination patterns. Also growing under glass are some of the most bizarre cacti—hard, sometimes spineless Ariocarpus, Pelecyphora, and Turbinicarpus that resemble rocks or perhaps some peculiar variety of underwater coral. Anyone who has seen these plants growing in chunks of pure limestone in extraordinarily desolate circumstances can only marvel at their existence, and indeed they survive where almost nothing else can.

A Garden for the Public

The cactus garden is laid out in more or less geographically associated groupings, allowing for considerations of cultivation. Future areas of interest include the Baja California fog desert and the high arid lands of the Great Basin. Many cacti from the Great Basin such as Pediocactus and Sclerocactus have stringent, poorly understood environmental requirements that severely restrict their range. As a result the survival of these species is threatened by increasing commercial development of the region. Some species have been collected almost out of existence.

Able to survive under the most arduous circumstances, with lustrous flowers that belie their armored appearance, cactus plants have intrigued people since Columbus first brought some back to Spain. The collection here at the Botanical Garden provides an unequalled opportunity to see and learn about some of the rarest of these plants. Whatever the future holds in store for the Botanical Garden, we can be sure that cacti will remain a major part of its total picture.

—Fred Dortort
BOOK REVIEWS

Children’s Books

During the last few months the collection of children’s books in the Visitor Center has been growing. Here you will find books on botany, natural history, and naturecraft, as well as fiction with a plant orientation. We encourage you to come up and browse through our delightful selection. Here are some of our favorites.

FICTION
Amanda and the Magic Garden, John Himmelman. Ages 3-8. Amanda the Witch grows a giant vegetable garden with Greenmoss the Troll’s magic garden seeds, and strange things begin to happen. Soon Amanda’s animal friends are turning into giants too.

The Flower from Outer Space, Saviour-Pirotta and Sarah-June Stewart. Ages 7-9. Joe brings home an unusual new plant from the flower shop one day, and overnight the most amazing changes take place — not to be described in earthly terms.

The Case of the Gobbling Squash, Elizabeth Levy with illustrations by Ellen Eagle. Ages 7-10. When Kate advertises for a mystery, she gets more than she expected. This is a warm and funny story of magic and mystery, complete with four mystifying tricks from Max’s magic kit.

The Snail’s Spell, Joanne Ryder, illustrations by Lynne Cherry. Ages 3-8. A young boy in a bush garden feels himself becoming smaller and smaller. He takes an imaginative look at the micro-world and pictures himself as a soft gray snail.

NON-FICTION
Counting Wildflowers, Bruce McMillan. Ages 3-6. Children practice counting from one to twenty as they name flower colors and learn to recognize many common wildflowers.


State Birds, illustrated by Arthur Singer and Alan Singer, text by Virginia Buckley. E.P. Dutton, New York, 1986. 64 pp. The birds designated by each of the 50 states are shown in typical habitats while the text tells of the birds’ origins, characteristics, and significance.

—Elly Bade
CONTRIBUTIONS

New Members

The Friends of the Botanical Garden welcome the following new members:

Phyllis J. Anderson Julia Anne Link
Kat Anderson Leonard C. Maudens
Kent Asmussen Nancy Nelson
Jeri Chandler J. Chris Pires
Anmita Clark-Weaver Peter Popin
M. Jason Dewees Linda H. Price
Sylvia M. Fox Robert W. Read, Jr.
Lee M. Goldman Warren G. Roberts
Martin A. Grantham David Sheppard
Patrick Houck Christopher Simon
Henry & Susan Kahn Norman H. Smith
Michael & Paula Keiser Barbara Stevens
Beverly Leftwich Lillian Tail
Mark Libby

Grateful Thanks

The Friends wish to thank these donors who have made a substantial gift over and above membership, including two gifts earmarked for the Alpine Rock Garden:

David Coronado and Family David Coronado
Elizabeth Crowder Stan Osofsky
Eleanor and Jack Higson Richard Spitzer
Stella May Knouse Eleanor Ely Wakefield
Errol Mauchlan Myrtle Wolf

Our thanks also for these donations given in memory of:

Robert Tetlow, from Kathleen and Harry Heckman
Ana Ibarra, from Ken Bogen, Deborah Rose, and Miranda June Fox Warren, from Barbara Reno.

If you would like to make a special gift to the Garden on behalf of a friend or colleague, please send your contribution to: Friends of the Botanical Garden, University of California, Berkeley, CA 94720

Major Gifts for 1987-88

The Major Gifts Committee is happy to report that in fiscal year 1987-88, the Friends have received quite a number of substantial gifts. One gift of $10,000 and one of $4,000 were dedicated to the new Tour Orientation Center. We also received ten gifts of $1,000 each, some of which were earmarked for the endowment funds. A longtime Friend of the Garden has established a living trust in an amount exceeding $35,000.

Two more benches have been donated in this fiscal year, bringing the total number of donated benches to 19. A group of donors has given a study table in memory of a fellow worker. Donations for benches and study tables go into the endowments which presently total $37,556.75. In addition, many other gifts of $100 or more were contributed, including those of a board member who receives donations for tours of his spectacular garden which he passes on to the Friends.

Over the year we held a series of picnic luncheons for prospective donors and others who had helped to fund specific projects. The annual President's Reception to which we invite all donors who give $100 or more took place on Sunday, September 11. At this time we held a ground breaking for the new Tour Orientation Center which is now under construction.

It takes teamwork to raise funds, and I wish to thank the members of the Major Gifts Committee for their excellent work this year: Jim Affolter, Daniel Campbell, Elizabeth Hammond, Harland Hand, Jim Lattie, Bob Ornduff, and Bob Riddell.

—Gladys Eaton

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 ................. $7.50 □ Sponsor ................. $250
□ Individual .............. $20  □ Patron .................. $500
□ Family ................... $30  □ Benefactor .......... $1000
□ Contributing .......... $50  □ Friends' Circle ...... $5000
□ Supporting ............. $100 □ New □ Renewal

Name ________________________________
Address ________________________________
City/State/Zip ___________________________
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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

A NEW LOOK AT TREES  Sun-Mon, FEB 19-20
Lectures and workshops on tree care and new introductions, including guest speakers Alex Shigo, Alan Mitchell, Warren Dolby, Frank Almeda, Barry Coates, Robert Raabe, and Carlton Koehler. California Academy of Sciences auditorium, 9-5pm. Academic credit available.

TREE PRUNING  Fri, FEB 24
Peter Del Tredici, Arnold Arboretum, associate editor of *Arnoldia* and author of two books on hemlocks, will offer a free public talk on "Pruning and Tree Architecture". 12-1pm, Meeting Room.

CHINESE MEDICINAL HERBS  Sat, MAR 11
Principles of Chinese medicine including yin-yang and the five element theory. Herbalist and licensed acupuncturist Barbara Wilt offers sample medicinal teas and simple remedies for everyday health ailments using commonly available herbs. 9am-12:30pm, Meeting Room, $12 members, $15 non-members.

CHINESE HERB GARDEN TOURS  Sats, MAR 6-27
Free public tours of the Chinese Medicinal Herb Garden with an introduction to the main concepts of Chinese traditional medicine. 1:30pm, Visitor Center.

PLANT PARENTHOOD  Tues, MAR 21
Or do violets have blue genes? The Friends’ spring lecture is a slide program with Walt Anderson, naturalist, artist, and author of *The Sutter Buttes*. 7:30pm, Haas Club House, Strawberry Canyon. $3 non-members.

PHOTOGRAPHING TREES  Sat, APRIL 1
A comparative slide lecture on trees through the eyes of master photographers, and afternoon workshop exploring the compositional and expressive possibilities of trees in the garden. Instructor Richard Anderson, photo editor at Golden Turtle Press and past assistant to Galen Rowell, has photographed the ancient bristlecone pine extensively using conventional and experimental techniques. Limit 20. 10am-6pm, Meeting Room, $25 members, $30 non-members.

BIRDWALK AND BREAKFAST  Sat, APRIL 15
A walk through the garden observing the dawn birds with experts Barbara Bedayn and Dee Mitchell, followed by breakfast. Limit 20. 7:15am-10am, Meeting Room. $16 members, $20 non-members.

SPRING PLANT SALE  Sat-Sun, MAY 13-14
Members’ Only Preview Sale, 9am-12pm Saturday. Unusual and hard-to-find trees, shrubs, perennials, herbs, houseplants, and California natives propagated by Garden volunteers. Public sale 12-2pm Saturday, 9am-2pm Sunday.

WILDFLOWER PHOTOGRAPHY  Sun, MAY 21
Join John D. Smithers of DeHart Media in Texas at the peak of spring for a workshop on the art of wildflower photography. Film including student rolls donated by Fuji Film will be processed during the workshop for immediate review. Multi-projector slide lecture Friday evening at Strybing Arboretum in preparation. Workshop 9am-5pm, Meeting Room. $25 members, $30 non-members.

CACTUS PROPAGATION  Sat, JUNE 3
Demonstration of vegetative and seed propagation as well as grafting techniques for cacti and succulents with Fred Dortort and Kurt Zadnik. 10am-2pm, Meeting Room. $12 members, $15 non-members.

WILDFLOWER EXPEDITION  JUNE
A special trip with Roger Raiche, California section Garden staff. Area and dates to be announced.

For information on classes and events, call 642-3343. The Garden is open every day of the year except Christmas from 9:00am to 4:45pm. Public tours led by docents are given on Saturdays and Sundays at 1:30pm. Admission to the Garden is free.

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