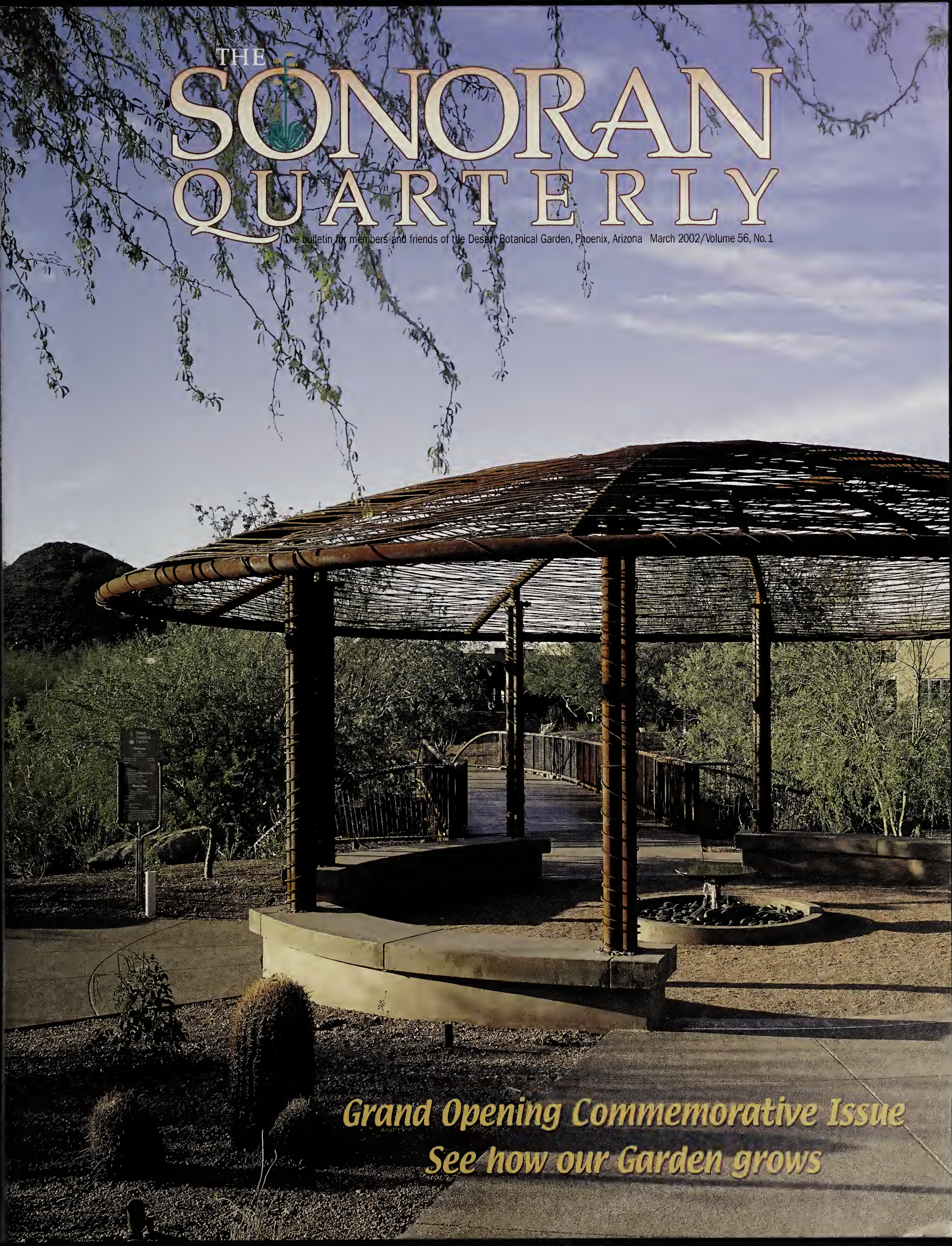
THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona March 2002/Volume 56, No. 1



Grand Opening Commemorative Issue
See how our Garden grows

DESERT JOURNAL

The Sonoran Quarterly SPRING
March 2002 | Volume 56, No. 1

House Warming

When I moved into Desert House in early December, I knew I would like living there. What I didn't realize is just how cool the house itself is or all the pleasant surprises that moving in would bring.

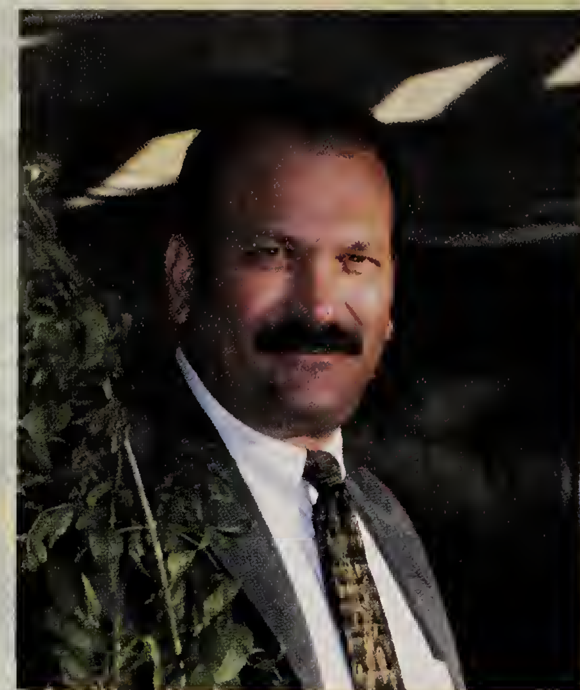
First, let me provide a little background.

Desert House opened in 1993 as a demonstration site for energy-saving and water-saving technologies. Primary among these were integrated passive heating and cooling designs, a hybrid heat pump and evaporative cooling system, highly efficient lighting and appliances, water conserving plumbing features, and a gray-water recycling system.

To see how well these various technologies worked, researchers measured the energy and water consumption of the families who have lived in Desert House from 1993 through 2001. They compared this data to average utilization by families of the same size living in traditional houses. This research showed, on average, that the new technologies incorporated into Desert House reduced typical water and energy consumption by more than thirty-five percent.

The research performed at Desert House also demonstrated that gray-water recycled from bathtubs and the washing machine could be safely and effectively used to supply the drip irrigation system that waters all the plants around Desert House. In fact, the data from the research performed at Desert House played an important part in the Arizona Legislature's recent decision to permit individual homeowners in the state to install gray-water recycling systems.

Before moving into Desert House, I had imagined that a home so effective at saving energy and water must require some serious sacrifices from its residents. But it doesn't work that way at all. And that was my first big surprise—Desert House is just as pleasant and comfortable as any other house. Most of the energy-saving and water-saving technologies and designs aren't even noticeable, and those that are—like the high ceilings and clerestory windows—are differences that I find preferable to traditional designs.



Photograph by Jennifer Johnston

Ken Schutz

There is much that Desert House has already taught homeowners, homebuilders, and other visitors in the eight years since it was built, and I encourage all Garden members who haven't yet visited to stop by this spring. The technical exhibit in the garage area and the nearby information center are open every day, and contain a wealth of data about the house and the technologies it utilizes. The house itself is open every Sunday (except Easter) from 1 to 3 p.m., October through April. Well-informed volunteers are always on site during these hours to answer any questions you might have.

And what were the other surprises when I moved into Desert House?

Never did I dream when I decided to move to a metro area of more than three million people, that I could sit on my own patio drinking morning coffee and see nothing in any direction but natural desert, including three mature saguaros, Kreigbaum Knoll, a multitude of birds, and even an occasional coyote! Nor did I fully appreciate that the only rush hour traffic I would have to contend with is the bevy of quail that often crosses my path as I walk to the office each morning. And finally, I did not expect to be adopted by one of the Garden's two resident watch cats, named Kenya, who now comes by each night after making his appointed rounds, to curl up on the couch and watch the ten o'clock news with me.

There's no place like home.

Ken Schutz
The Dr. William Huizingh Executive Director

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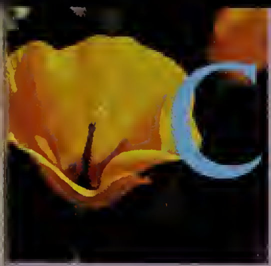

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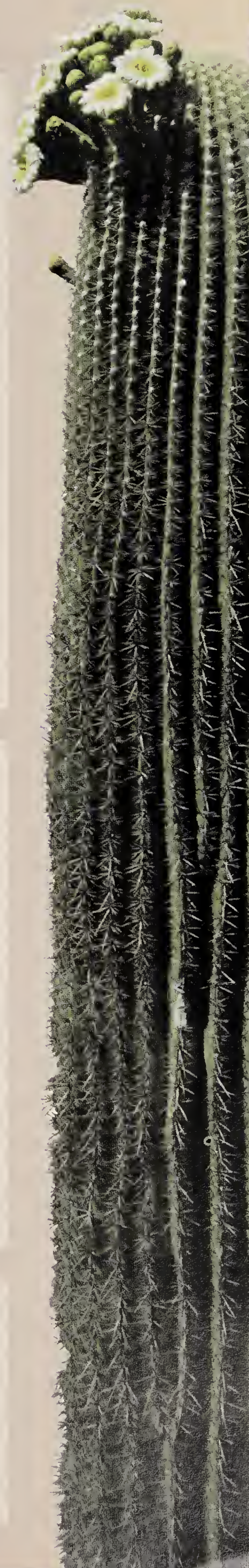


ARTICLES

FEATURES

ON OUR COVER

A NEW WELCOME to the Garden visitors is the Schatt Entry Arbor which embraces a beautiful fountain dedicated to the Garden's volunteers. The entry arbor is a part of the major improvements recently completed at the Garden.

Photograph by Jerry Portelli Photography

Two new departments hard at work

Two new departments have been created at the Desert Botanical Garden; an exhibits department and a visitor services department. They are trail markers for the Garden's path into the future.

"This botanical garden has grown in stature," said Ken Schutz, executive director. "We are opening seventeen million dollars' worth of new facilities this spring. The local community has generously supported us and the global community is getting to know us better. The staff is invigorated. People have reawakened to our presence, and we are ready to move into the next level of museum excellence."

The departments promise to make the Garden an even more enticing and pleasant experience for visitors and members.

Exhibits Department

Elaine McGinn directs the new exhibits department. Her department will bring special traveling exhibits to the Garden, as well as guide the Garden in developing new permanent exhibits. They are already at work incorporating the Spanish language into all signage, making the Garden bilingual.

The exhibits department is also in charge of all publications, including *The Sonoran Quarterly*, the quarterly Calendar of Events, and all brochures, trail maps, and event postcards. Jennifer Johnston is publications manager within the department.

Elaine, formerly the Garden's exhibits coordinator had orchestrated the design and installation of the Harriet K. Maxwell Desert Wildflower Trail, a project that involved cooperative planning and collaboration among all Garden departments.

At the top of the "to do" list last August when the exhibits department came into being were the Dave Rogers' Big Bugs special exhibition and the Garden's new butterfly pavilion, both of which are open now and will remain on display through Mother's Day in May.

The Big Bugs exhibit includes ten giant insects crafted by sculptor Dave Rogers from wood, metal, and other natural materials. Towering over human forms, the enlarged insects are not only beautiful but produce an interesting sensation of role reversal. Their gargantuan size reveals the exquisite beauty and efficiency of these "hidden gardeners," who work among the world's plants as engineers, soldiers, weightlifters, hunters, stalkers, gatherers, and even royalty.

In contrast to the massive insect structures, Garden visitors can also experience the delicate lightness of being in the butterfly pavilion where hundreds of colorful butterflies and moths will flutter and feed amid myriad flowering plants. This exhibit will display as many as a thousand butterflies (from fifty-six species) and moths (eight species). All are native to North America, and many are native to the Southwest.

Photo by Jennifer Johnston

Elaine McGinn, director of exhibits

"These exhibits are all about connections," Elaine said, "connections within Nature and within the Garden. Our Harriet K. Maxwell Desert Wildflower Trail, which opened last year, has a butterfly garden. We also plant areas along the trails to attract butterflies. And, of course, our desert plants attract not only the butterflies and moths, but other insects such as those represented in Dave Rogers' sculptures.

"It's all interrelated. We have produced interpretive signs and other programming about pollination and the other roles of insects in building a garden, as well as the plants that are closely related with particular insects. There are many interesting stories to tell about how plants and insects interact.

"These stories and relationships are part of our mission to exhibit, study, and educate. Our challenge in this new department is to create new ways to share the message of our love and knowledge about the desert as well as our conservation work and research.

"Our goal is to attract new visitors to the Garden with the traveling exhibits and bring them back again and again, we hope as members."

Elaine said the new department is a continuation of the Garden's history of educational exhibits, which emerged in the late 1980s when Ruth Greenhouse (now the Garden's director of educational services) came to do ethnobotanical research and wound up designing the

Photo by Jennifer Johnston

Marcia Bosio directs visitor services

Plants and People of the Sonoran Desert Trail with the Garden's first interpretive signage.

In 1996 the Garden trail system underwent a dramatic restructuring under then-Education Director Kathleen Socolovsky with the help of a $634,000 grant from the National Science Foundation. "This created the Garden we have now," Elaine said.

The work of the exhibits department is characterized by cooperation and communication between all the departments at the Garden. All other departments will help conceptualize and design a five year schedule of visiting exhibits, as well as develop the Garden's own permanent exhibits.

"Once you have a blockbuster exhibit, you have to keep on having them," Elaine said. "The Garden has already purchased the butterfly pavilion which will go up seasonally. Meanwhile we're developing several smaller exhibits for the future such as a display reflecting the work of Wendy Hodgson and Liz Slauson as they develop a flora guide for the Arizona Trail.

"Other exhibits under development include the gray-water project going on at Desert House, a medicinal-plant exhibit, and something reflecting our work in plant conservation—we have many plants we can't display outside the greenhouse because our climate will not accommodate them. Or possibly a children's trail," she said.

The department also must think about upgrading and maintaining present displays and trails. "But whatever, it's going to be fun and interesting and creative," Elaine said.

Visitor Services Department

"The visitor is king—or queen," said Marcia Bosio, who heads the Garden's new visitor services department. "We have a responsibility to our visitors and members to insure they have a pleasurable experience here and that they want to return."

A Garden visitor's first—and sometimes only—contact with a human being is with one of the seven full- or part-time or seasonal visitor services representatives (formerly called "admissions staff") at the admissions booth.

"It is their job not only to collect fees or sell memberships," Marcia said, "but to put a friendly face on the Garden experience. They also must have a vast knowledge of everything about the Garden, because they get all the questions. The person in the admissions booth is in many ways the most important person at the Garden. And we are providing the right training for them," she said.

The Garden's new facilities offer many more amenities for visitors. In addition to wheelchairs, visitors may now rent strollers and electric scooters. There are more restrooms, as well as a roomful of vending machines offering drinks for persons coming into the Garden. The new admissions entry area also includes a first-aid room and ranger station. A new exit plaza features the Garden Shop along with tables and food carts.

Crystal Stump-Savittieri is the facility rental coordinator. She helps people find the right Garden site for meetings, retreats, parties, weddings, and receptions. With the new facilities which have opened this spring, the Garden has beautiful indoor and outdoor rooms for groups of all sizes.

Located all over the Garden, rental spaces include historic Webster Auditorium with its adjacent Elliot Patio and nearby Ullman Terrace. Pratt Ramada offers a grand view of the Garden, while the Amphitheater is nestled in the heart of the trail system. The Binns Wildflower Pavilion is embraced by the desert wildflower trail. The new Dorrance Hall will accommodate three to four hundred persons. Nearby is the new Boppart Courtyard with its view of the succulent house. Two indoor and two outdoor classrooms are available in the Weisz Learning Center, and the Whiteman Conference Room will open this summer near Webster Auditorium.

Additional information about rental facilities is available from Crystal at 480-481-8109.

Another key member of the visitor services department is Elaine Anthonise, who coordinates special events and group services. She helps plan and stage the Garden's special events such as the Music in the Garden and Jazz in the Garden series, Art in Bloom, and the present Grand Opening festivities. She will also be planning new events and helping expand established special events. Elaine also books adult group tours, which account for about five thousand visitors each year. She may be reached at 480-481-8104.

Marcia, who created a similar visitor services department at the Denver Botanic Gardens, said she and her staff strive to make the Garden easily accessible to groups and families within the community as well as a pleasant, memorable experience for all visitors.

A new entry and Boppart Courtyard...

Article and photographs by Kirti I. Mathura

We are fortunate to have not only spacious new facilities, but also enticing plantings to enjoy in our newly developed areas at the Garden.

The first thing you see at the new Schatt Entry Arbor is a sculptural rusted metal dome that will soon be intertwined with yellow orchid vines (*Callaeum macroptera*), providing masses of brilliant yellow blooms in the spring and cooling shade in the summer.

Yellow Orchid Vine

Thanks to our creative landscape architect, Christy Ten Eyck, clumps of side oats gramma (*Bouteloua curtipendula*)—a native perennial bunch grass seldom found in local landscapes—dance in the breeze and invite you along the path as suddenly you come upon the monumental spiraling agave terrace. Filled with Weber's agave (*Agave weberi*) and other agaves, this plant and stone sculpture will be even more impressive after a few years of growth.

Side Oats Gramma

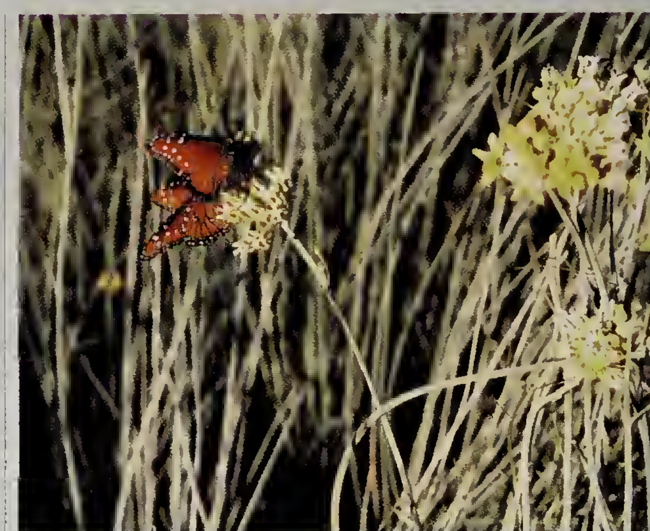
We will still enjoy graceful palo breas (*Cercidium praecox*) as we did in the former entry area (which is now the exit), along with palo verdes (*C. floridum, C. microphyllum*) and mesquite (*Prosopis* spp.).

Under the shelter of the entry ramada, velvety kalanchoes (*Kalanchoe beharensis*), tender agaves (*A. desmettiana*), and smooth sansevierias (*Sansevieria hyacinthoides*) flow into the Steele Entry Plaza, where smooth desert spoons (*Dasylirion longissimum*) are mixed with contrastingly round golden barrels (*Echinocactus grusonii*), branching chollas (*Cylindropuntia sp.*), and knobby totem pole cactus (*Lophocereus schottii* forma *monstrosus*). Masses of slipper plants (*Pedilanthus macrocarpus*) are highlighted against contrasting, earthy walls.

Slipper Plants

Along the exit path of the Garden you pass under our stately old palo breas near which you can visit the Harriet K. Maxwell Desert Wildflower Trail, which will be spectacular this spring, and then wind past the sunken spiral garden filled with more agaves, desert spoons, desert milkweed (*Asclepias subulata*), and fabulous, gently swaying deer grasses (*Muhlenbergia rigens*).

As you approach the Garden Shop, you will notice the copper flumes which harvest rain water from the roof. The rain spills into the stone flume below, traveling through the downward spiral, past yerba mansa (*Anemopsis californica*) to the center cistern. For the hummingbirds there are Mexican honeysuckles (*Justicia spicigera*) sheltering near the Garden Shop.

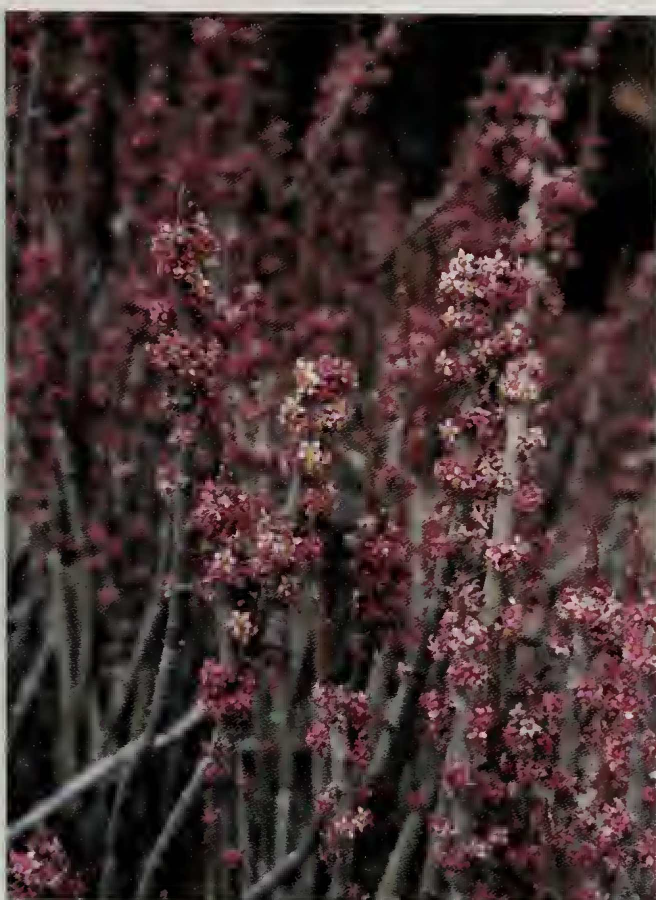


Desert Milkweeds

The new Boppart Courtyard is located between Dorrance Hall, Marley Education & Volunteer Building, the William J. & Barbara B. Weisz Learning Center, and the Nina Mason Pulliam Desert Research & Horticulture Center. There our visionary Christy preserved in place some of the existing plants such as impressive creosote bushes (*Larrea tridentata*) and blue palo verdes (*C. floridum*). Christy enhanced these with additional palo verdes so that eventually all of the central courtyard area will be dappled with inviting shade. Christy also created mass plantings of sculptural succulents and textural grasses to delight the eye.

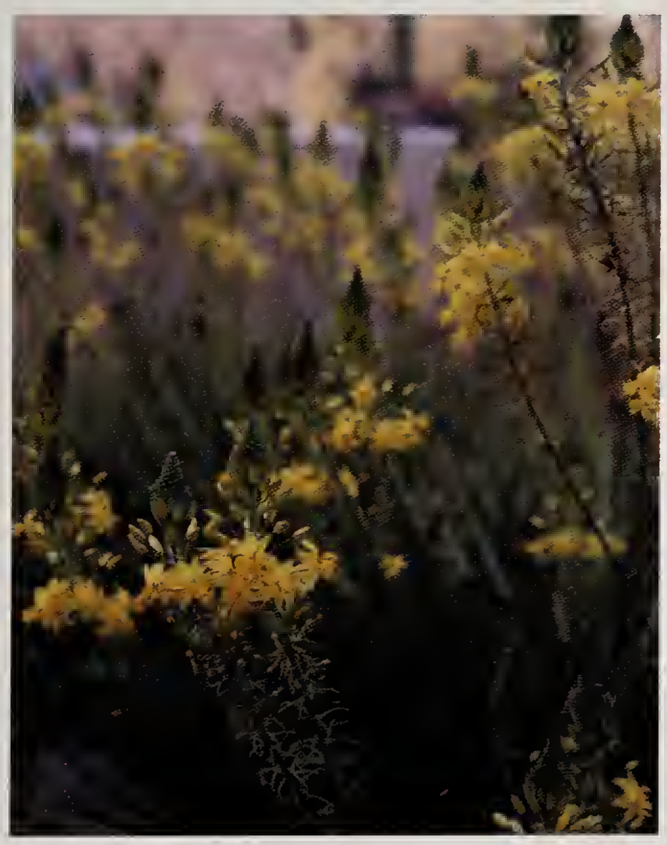
Numerous different species of agaves are showcased, complementing the nearby agave beds. Hedgehog cacti (*Echinocereus* spp.) are nestled beside lichen-spotted boulders. Indian fig prickly-pears (*Opuntia ficus-indica*), now small and innocent, will become tall and statuesque with age. Desert milkweeds (*A. subulata*) will entice butterflies to the courtyard, while red salvias (*Salvia coccinea*) and penstemons (*Penstemon spp.*) will attract hummingbirds.

beautiful new landscapes



Candelillas

Masses of upright succulent candelillas (*Euphrobia antisyphilitica*) will produce small candy-pink flowers and slipper plants will offer intriguing red blooms on and off through the warm season. Fleshy grasslike bulbines (*Bulbine frutescens*) will give us yellow blooms to brighten in cooler months. The texture of the deer grass planted behind the waterfall feature will complement the soft sound of flowing water.



Bulbines

An existing Kearney sumac (*Rhus kearneyi*), a specimen in the Center for Plant Conservation collection, is now flanked by perky trixis (*Trixis californica*). Trixis shrubs generally grow two to three feet tall and wide. Being tough desert natives, they are drought tolerant and perform well in full sun or with light afternoon shade. Yellow flowers appear in springtime, and sometimes again in fall after nourishing monsoon rains.

Photo by Michael Gardner

Trixis

Not everyone notices the fantastic Mexican buckeye (*Ungnadia speciosa*) near the restrooms at Ullman Terrace, so I was happy to see one in the new courtyard. These large, deciduous shrubs, ten to fifteen feet tall and wide in our area, have purplish and rosy-pink fragrant blooms in the spring just as new foliage emerges, followed by interesting buckeye-like seeds and a dazzling display of golden yellow foliage before leafdrop in late fall.

Mexican Buckeye

We have new Texas olives (*Cordia boissieri*), one of which you may have noticed previously on Quail Run Path. These large bushes (ten to fifteen feet tall and wide) are dotted with yellow-centered white flowers through the warm season, attracting curious carpenter bees.

Texas Olive

Two large tree species are new to the Garden. A few kapoks (*Ceiba acuminata*) are planted in the lower courtyard. These deciduous trees begin their yearly cycle with large white blooms on bare branches, followed by elongated oval fruits that produce the cottony-clad seeds at maturity. The bright green foliage peaks with summer rains. Floss silk trees (*Chorisia speciosa*), although not true desert plants, have adapted well to our arid climate. You will notice these deciduous trees on the upper courtyard level when they put on a show-stopping display of deep pink blooms through the fall, before dropping their foliage for the winter.

Desert staples such as brittlebush (*Encelia farinosa*), bursage (*Ambrosia deltoidea*), and desert marigolds (*Baileya multiradiata*)—all beautiful in their own right—are dotted here and there through the courtyard, tying everything together.

One delightful surprise to longtime Garden members will be the new view of the Succulent House. Actually it's the same "behind the scenes" view we always had from the old plant sale yard, but now, suddenly, the Succulent House looks dressed up and elegant across its wall from the courtyard.

Kirti I. Mathura is a horticulturist at the Desert Botanical Garden.

Special Events in the Grand Opening Celebration

February 16 & 17, 2002	**Members' Only Preview Weekend** All Garden members invited to preview the new Garden facilities, the Butterfly Pavilion, Dave Rogers' Big Bugs and special activities.
February 20 & 21, 2002	**Appreciation Events** for *Growing a Legacy for Generations* donors (by invitation)
February 23 & 24, 2002	**Community Festival Weekend** (free with Garden admission) Members of the community are invited to enjoy the new Garden facilities and view the Butterfly Pavilion and Dave Rogers' Big Bugs. (Space in the Butterfly Pavilion is limited and guests must call 480-481-8188 in advance for timed entry reservations.)
March 2, 9, 16, 23 & 30 April 6, 13, 20, & 27 May 4 & 11, 2002	**Family Saturdays** sponsored by Target Stores Family-friendly activities designed to delight young and old. In addition to the Butterfly Pavilion and Dave Rogers' Big Bugs, guests will be entertained during this ten-week Saturday series. Activities are insect- and butterfly-themed and include butterfly gardening, make-and-take butterfly activities, storytelling, puppet shows and discovery games. (Space in the Butterfly Pavilion is limited and guests must call 480-481-8188 in advance for timed entry reservations.) 9 a.m. - 5 p.m.
May 12, 2002	**Special Music in the Garden Concert** Enjoy wonderful music during this special Mother's Day Concert with Esteban, famed classical and flamenco guitarist. Concert at 11 a.m. - 1 p.m. Limited seating. Call 480-941-1225 for details. Advance tickets are $26.75. Arcadia Farms' Taste of the Desert serves brunch and lunch for an additional charge.

How the Garden is Growing:

The improvements add beauty, comfort, space for study and gatherings.

Here's what's new at the Garden

Entry and admissions area:

- The Schatt Entry Arbor, gateway to the Garden, a hogan-like ramada with a woven metal roof and a bubbling fountain dedicated to the Garden's volunteers;
- Two stone spirals, one rising upwards toward the sky, the other winding downward into the Earth, planted with various agaves which are the Garden icon;
- Steele Entry Plaza, just inside the admissions area, with beautiful plantings, a tribute to campaign donors, benches, and a drinking fountain;
- Admissions booth with four lines and turnstiles, as well as a large canopy to provide shade for these people waiting in the area;
- Visitor services center, two buildings with restrooms and vending machines, a first-aid station, rangers' office and security station;
- Exit plaza with the new Garden Shop offering plants and garden-themed gifts.

Desert Studies Center

- Nina Mason Pulliam Research and Horticulture Center, with a new library and new herbarium, offices for library, herbarium, horticulture, visitor services and research staff, as well as a conference room, volunteer lounge, and two laboratories;

- Dorrance Hall, an elegant reception hall which can accommodate four hundred persons in theater seating or three hundred in banquet seating, and flanked by the Kitchell Patio to the north and the Ottosen Gallery at the entrance;
- William J. and Barbara B. Weisz Learning Center, two large indoor classrooms and two large outdoor classrooms and the new home of the *Luminaria* office;
- Marley Education and Volunteer Building, housing offices for exhibits, educational services and headquarters for the Volunteers in the Garden with a teaching kitchen.
- Boppart Courtyard, the lovely hub surrounded by the four buildings which make up the Desert Studies Center.

Growing a Legacy for Generations:

a history of the capital campaign

- In January of 1999, the Desert Botanical Garden launched a capital improvements campaign, *Growing a Legacy for Generations*, headed by Bennett Dorrance and Pamela Grant.
- In May of 1999 work began on the site of the future Harriet K. Maxwell Desert Wildflower Trail, the first portion of the Garden's master plan for new development, created by the Board of Trustees over a three-year period.
- In September of 2000 Kitchell Contractors moved their trailers into the Garden and began the huge construction project. Garden staffers Kayla Kolar, Bob Martin, and Elaine McGinn, along with Trustee Ken Allison, worked as project managers with Kitchell staff, architect John Douglas, and landscape architect Christy Ten Eyck.
- By January of 2001 the campaign had raised $17 million in gifts and pledges.
- On December 14, 2001,the Garden received its official Certificate of Occupancy from the City of Phoenix and took possession of the new buildings. Kitchell Contractors had completed the construction on time and within budget.

More Space Indoors and Outdoors

The construction project more than doubles the amount of space under roof at the Garden, adds nearly four times the amount of outdoor "living" area such as plazas and courtyards, and almost doubles the length of paths and trails.

A few specifics

Buildings	*Existing*	*New*	*Total*	*Increase*
Square footage	35,121	48,648	83,759	138%
Fixtures				
Toilets	18	52	70	289%
Lavatories	17	42	59	247%
Drinking fountains	10	12	22	120%
Showers	1	2	3	200%
Outside areas				
Pratt Ramada	1,000	–	1,000	
Ullman Terrace	4,000	–	4,000	
Amphitheater	3,000	–	3,000	
Desert House court	2,000	–	2,000	
Admissions plaza	–	24,000	24,000	
Boppart Courtyard	–	8,000	8,000	
Kitchell Patio	–	2,000	2,000	
Entry Pavilion	–	1,000	1,000	
Wildflower Pavilion	–	2,000	2,000	
Total	10,000	37,000	47,000	370%
Trails				
Desert Discovery	1,400	–	1,400	
Sonoran Desert	1,300	–	1,300	
Plants & People	1,400	–	1,400	
Desert Living Center	800	–	800	
Wildflower Trail	–	1,333	1,333	
New paths/trails	–	2,800	2,800	
Total	4,900	4,133	9,033	84%

Photography by Jerry Portelli and Jennifer Johnston

West entrance of the Desert Studies Center

Nina Mason Pulliam Research and Horticulture Center

The Garden's New Facilities

Inside the Garden Shop

Detail of Boppart Courtyard

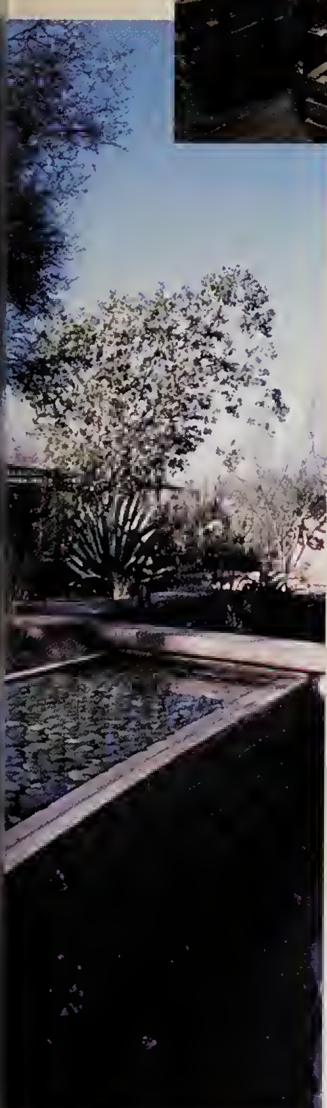
Agave spiral


Boppart Courtyard


Garden Shop


Inside the Garden Shop


Downward Spiral



Admissions

THE GARDEN THANKS THESE GENEROUS FRIENDS...

Growing a Legacy for Generations

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Pamela Grant

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Project Managers
Kayla Kolar
Robert Martin
Elaine McGinn

Project Credits
Douglas Architecture & Planning
Kitchell Contractors
Ten Eyck Landscape Architects, Inc.

Honor Roll of Donors

The Desert Botanical Garden Board of Trustees gratefully acknowledges those who generously invested in the *Growing a Legacy for Generations* Campaign.

Named here are those who made gifts and pledges of $100 and more to the campaign as of November 2001.

$2 Million
Dorrance Family Foundation

$1 Million and above
William Huizingh, Ph.D.
The Kemper & Ethel Marley Foundation
Nina Mason Pulliam Charitable Trust
The Steele Foundation
Barbara B. Weisz, *in tribute to William J. Weisz*

$500,000 and above
Oonagh and John Boppart, *in memory of Louise & John Boppart*
Harriet K. Maxwell Foundation

$250,000 and above
Anonymous
APS
The Arizona Republic
Bank One
Jim & Connie Binns
Alberta B. Farrington Foundation
Hazel Hare
Betty & Sam Kitchell
Steven G. & Lois Mihaylo and daughters Sarah & Emily
The Ottosen Family Foundation, *in memory of Harriett and Donald L. Ottosen*
SRP
The Whiteman Foundation

$100,000 and above
America West Holdings
Anonymous (2)
Arizona Diamondbacks
Billie Jane Baguley
Bank of America Foundation
Lee and Mike Cohn
COMPAS (Combined Metropolitan Phoenix Arts and Sciences)
Del Webb Corporation
Deloitte & Touche, LLP
Marilyn & Cliff Douglas
Michael & Sheila Geddes
Globe Foundation
Michael & Heather Greenbaum
G.R. & Katherine K. Herberger Trust
Mr. & Mrs. Denison Kitchel, *in memory of Mrs. Walter Bell Douglas*
Dorothy Donnelley Moller
Phoenix Suns
Pivotal Group
The Rodel Foundation
Carol Peden Schatt
Marilyn G. & Jon A. Shomer
The Stardust Foundation
SunChase Holdings, Inc.
Bob & Nancy Swanson
Volunteers in the Garden
Wells Fargo

$50,000 and above
Anonymous
BlueCross BlueShield of Arizona
Marilyn & William Boyce
Laurie & Drew Brown
Evans Charitable Foundation
Insight Enterprises, Inc.
J.W. Kieckhefer Foundation
Honeywell
Edith W. Huizingh
Julie & Tim Louis
Margaret T. Morris Foundation
Microsoft Corporation
Target Stores
Pearson & Company, *in honor of clients and friends*
PETsMART, Inc.
Nancy M. & Frank E. Russell
Irene & Alan Weinberg

$25,000 and above
Alvan & Sara Adams
Anonymous (2), *in memory of Walter C. & Nell O. Davis, Joseph Edgar & Mildred Davis Drake, and Scott Oliver & Mildred "Mittie" Littleton New*
Arizona Cardinals
Christine & John Augustine
Bashas'
Ernst & Young, LLP
Albion & Lynn Fenderson
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The Sonoran Quarterly SPRING
March 2002 | Volume 56, No. 1

A former teacher, she now leads the Volunteers

By Barbara Long

Pat McKenna first visited the Desert Botanical Garden about seven years ago, to attend her husband's company's Christmas party. New to the Valley, she remembers thinking, "I couldn't believe how gorgeous it was."

She also realized that the Garden was right up the street from their Arcadia neighborhood, so Pat decided to take the volunteer training and put her twenty-two years of teaching experience to use as an interpreter.

Photo by Jennifer Johnston

Pat McKenna, President, Volunteers in the Garden

A native of Long Island, New York, Pat graduated from Auburn University in Alabama. While raising a family, she taught in the primary grades in Georgia, Virginia, and North Carolina. When the couple relocated to Arizona, their two sons were grown (one now lives in New Zealand; the other in New York City).

"When we moved here, I was going to take a year off and go back to teaching. But I liked the opportunity to travel with my husband, so decided volunteer work might be a better way to go. I volunteered in the local school system, which was rewarding but didn't give me a chance to make friends. The Garden supplies that."

The education staff at the Garden encouraged Pat to volunteer as a Sonoran Adventure Guide (SAGE) and give tours to schoolchildren. Pat soon was chair of that program.

"I really like being a SAGE. I get to do the pure teaching in this beautiful outdoor classroom. Then I put the kids back on the bus and eat lunch with friends here at the Garden!"

Pat also served two years as vice president and as cookies-and-cider chair for *Las Noches de las Luminarias*, the popular winter fundraising event hosted by the Volunteers in the Garden (VIG). She was elected president of the VIG in April, 2001.

She said her biggest challenge as president is "to keep the same intimacy and spirit that the Volunteers now have while transitioning to larger facilities and more programs."

With her great sense of humor and down to earth manner, that shouldn't be hard to do.

Barbara Long is a docent at the Garden and has served two terms as president of Volunteers in the Garden.

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to these sponsors of *Las Noches de las Luminarias 2001*

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The Garden opens doors for Project ChalleNGe teens

By Cheryl Andersen

Six high school students have completed a certification course in the Garden's Desert Landscaper School (DLS) this March on their way to future job opportunities in desert landscaping.

The students are from Project ChalleNGe, a highly structured, five-month residential program for 16- to 18-year-old men and women who have dropped out of traditional high schools. Project ChalleNGe, which is administered by the Arizona National Guard, emphasizes academics, builds future employability skills and requires each student to perform forty to one hundred hours of community service.

Their accelerated landscaper training program was designed especially for them by DLS coordinator Diane Barker. It is a condensed version of the thirty-week DLS course and runs from January 22 through March 1. Seven adult students also participated in the program.

By attending classes Tuesday through Friday from 8 a.m. to noon, the students will complete all DLS requirements including the design and installation of a home landscape at Habitat for Humanity.

"I'm optimistic about seeing these high school students get on their way to a vocation in which they are truly interested," Diane said. "Participating in this program helps them do their part to improve our community landscapes as well."

The DLS course is a stage in a growing partnership between the Garden and Project ChalleNGe, which began with Project ChalleNGe students earning community service hours by helping the Garden. First they wore the Sammy Saguaro costume at Garden outreach events in the community. Then, encouraged by the Garden's development and horticulture departments, they began to assist in horticulture at the Garden moving granite, planting baby saguaros, gardening in the Australia section and helping at a plant sale.

Last fall the Garden's development and horticulture departments organized a "Planting Challenge" project for the teenagers at their

Photo by Rich Szatkowski

A group of teens work as a team in last fall's Planting Challenge event of Project ChalleNGe.

new Queen Creek facility. Twenty-five Project ChalleNGe teens helped install drip irrigation and planted more than a hundred desert plants to beautify a 6,900-square-foot unlandscaped area. Students worked alongside seven DLS graduates, Garden staff and volunteers, with supervision by the Garden's director of horticulture, César Mazier.

Arizona National Guard Col. Charles McCarty, director of Project ChalleNGe, said, "Every visitor who comes here asks, 'Who did your landscape?' I give the Desert Botanical Garden my highest accolades."

As a result of this desert landscaping collaboration, Project ChalleNGe financed the $7,200 tuition fee for the six students who enrolled in the DLS course.

Project ChalleNGe provides one year of mentorship after teenagers finish their five-month program. Students are encouraged to attend community college classes and some receive financial assistance for specialized job training. Eighty-four percent of the graduates since 1993 have received their GED and eighty-eight percent are employed or pursuing higher education.

George Abbott, vocational coordinator of Project ChalleNGe, said, "I look forward to fostering this relationship with the Desert Botanical Garden."

Cheryl Andersen is the Garden's development outreach associate.

A night to remember

Dinner on the Desert, April 27, 2002

"This is an evening not to miss," says Bill Smith, event chair. "What really makes this year special," says Smith "is for the first time we'll begin the evening with cocktails, conversation and a silent auction in the Valley's hottest new venue – Dorrance Hall. After the auction, guests stroll the beautifully lit pathways to Ullman Terrace for a culinary masterpiece catered by Michael's. The evening concludes with entertainment and dancing under the stars."

"This is the Garden's major fundraiser to support arid-land plant research and conservation," says co-chair Tahnia McKeever. "The raffle includes a beautiful bee brooch donated by Tiffany & Co. and three exciting live auction components, including a John Cosby plein air canvas, a Christy Ten Eyck architectural landscape package, and an exclusive Dinner in the Garden for ten people, catered by Michael's." For information and tickets, call Joyce Melter at 480-481-8147.

John Cosby painting.

Photo by Jennifer Johnston

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Garden supporters receive top philanthropy awards

Jacquie and Bennett Dorrance were honored with the Philanthropist of the Year award by the Association of Fundraising Professionals Greater Arizona Chapter.

The Association of Fundraising Professionals Greater Arizona Chapter (AFP) named Jacquie and Bennett Dorrance jointly as Philanthropist of the Year. Their award was presented at AFP's annual Philanthropy Awards Dinner held last fall. The Dorrances have made significant contributions in the community and have given generously of their time to many organizations.

Carol Schatt, editor of the Garden's *Sonoran Quarterly* and a long-time supporter, was also honored with a Spirit of Philanthropy award.

Desert Botanical Garden is honored to have nominated these special individuals for their well-deserved awards!

DLS honored for Habitat landscape

The Desert Landscaper School (DLS) received an Arizona Excellence in Landscaping award in December from the Arizona Landscape Contractors' Association (ALCA).

The award, in a special category for humanitarian contributions, was presented for a project in which DLS students designed and installed a landscape around a house in a Habitat for Humanity community. The homeowner, Mrs. Juana Luna, attended the awards ceremony in Tucson with Diane Barker, DLS coordinator, and Jaime Toledano, DLS assistant.

The students spent thirty weeks studying all facets of desert landscaping and completed their course with this project. Mrs. Luna had asked for a "natural" landscape with year-round color and a sense of peacefulness. The students "were able to create this landscape from a blank yard and a blank palette and start the project from grading all the way to fine-tuning the granite and staking the trees," Diane said.

"It completed their certification program and gave Mrs. Luna a beautiful landscape for her enjoyment and relaxation," she said.

DLS is a five-year-old program that certifies its graduates as professional-level desert landscapers and horticulturists. The fifth class will graduate this spring.

Brownies had a grand day at the Garden

A total of 760 Brownie Girl Scouts worked toward earning nature patches last fall at the Desert Botanical Garden in the Garden's first Brownie Girl Scout Day.

Along with 240 of their leaders, the Brownies worked on discovery activities to earn their Eco-Explorer Try-It patch, part of their Outdoor Adventure Try-It patch, and a special "Discover the Desert at the Desert Botanical Garden" event patch. The girls looked for desert plants and wildlife, made food chains, designed habitats, and experienced the smells, touches, and sounds of nature.

Brownie Scout Day was planned and implemented by Barbara Hofflander in the educational services department with the help of thirty-three volunteers, staff, senior Scouts and Scout leaders.

Brownies drew animal habitats as a part of their day at the Garden.

Art Auction Benefits Garden

An auction of art pieces created by local celebrities will be held Saturday, March 23, from 2 to 4 p.m. at the Celebration of Fine Art event in the big white tent on Scottsdale Road at Mayo Boulevard.

Community leaders and personalities will be paired with artists to make the art pieces. A portion of the proceeds from the auction is donated to the Desert Botanical Garden. Last year more than $10,000 was raised for the Garden.

A Garden membership card gets the member a two-for-one admission to the Celebration of Fine Art exhibit. Admission is $7 for adults, $6 for seniors.

What's The Buzz?

Wednesday Twilight Lecture Series

An informative and lighthearted look at the remarkable niches that bugs fill in the natural world. Taste "Beetle Juice" and cookies.
Wednesday evenings, 6 – 7:30 p.m.
$5 each lecture; for reservations call 480-941-1225

March 6
Amazing Arthropods
(families and adults)
Join Steve Prchal from the Sonoran Arthropod Studies Institute for this interesting look at the arthropods of the Sonoran Desert and Costa Rica. See and compare two tarantulas, a Sonoran Desert native and one from Africa.

March 20
Beautiful Butterfly Gardens
(families and adults)
Entomologist Roberta Gibson discusses how to recognize common Arizona butterflies and how to encourage them into your garden.

March 27
Sex and Violence in Desert Insects
(adults)
Dr. John Alcock, ASU regents' professor of biology and author of *Sonoran Desert Spring* and other books for general audiences, will present this fascinating slide show on desert insect life.

April 3
Through Butterfly Eyes
(family oriented)
Dr. Ron Rutowski, ASU biology professor, uses color transparencies and a butterfly display to illustrate his presentation on how butterflies view the world.

April 17
The Buzz on Bees
(family oriented)
Dr. Steve Buchman of Beeworks, Tucson, and co-author of *Forgotten Pollinators*, shows fascinating bee "artifacts" and discusses the importance and beauty of bees and their lifestyles.

April 24
Hoppin' Hoppers
(family oriented)
Join ASU biologist Dr. Jon Harrison in this interactive presentation about the survival strategies of desert grasshoppers.

May 1
Celebrating Caterpillars
(family oriented)
Jim Brock, lepidopterist from the Sonoran Arthropod Studies Institute, will discuss remarkable shapes, sizes, colors, and appetites of caterpillars.

May 8
Butterflies of Arizona
(family oriented)
Priscilla Brodkin presents a stunning slide show of butterflies from her new book, *Butterflies of Arizona-A Photographic Guide*, co-authored with Bob Stewart and her husband Hank.

CALENDAR OF SPECIAL EVENTS

Dave Rogers' Big Bugs sculpture exhibit throughout the Garden
Feb. 23 - May 12, 8 a.m. to sunset
free with Garden admission

Live Butterfly Pavilion
Feb. 23 - May 12
weekdays: noon to 5 p.m., weekends: 10 a.m. - 5 p.m.
free with Garden admission
reservations strongly recommended: call 480-481-8188

Music in the Garden Concert Series
Ullman Terrace
Sundays, Feb. 24, March 3 & 10
11:30 a.m. - 1 p.m. (optional brunch available)
for advance ticket purchase call 480-941-1225

Family Saturdays
Saturdays, March 2 – May 11, 9 a.m. – 5 p.m.
for information call 480-941-1225

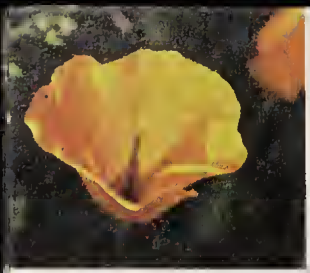
"What's the Buzz?" Lecture Series
Wednesdays, March 6, 20, 27; April 3, 17, 24; May 1, 8
6 - 7:30 p.m.
$5 per lecture; reservations required: 480-941-1225

Spring Landscape Plant Sale Festival
Members' Preview: Friday, March 15, 9 a.m. - 5 p.m.
& Saturday, March 16, 8 - 9 a.m.
open to the public: Saturday & Sunday, March 16 & 17
9 a.m. - 5 p.m.

Garden Conservancy OPEN DAYS
Saturday, March 23, 10 a.m. - 4 p.m.
for information, call the Garden Conservancy at 1-888-842-2442

Celebration of Fine Art Celebrity Art Auction
Saturday, March 23, 2 - 4 p.m.
Scottsdale Road at Mayo Boulevard
for information call 480-443-7695

(continued on page 19)



IOS Comes to the Garden

Scores of professional and amateur cacti and succulent scholars and enthusiasts will converge at the Desert Botanical Garden April 7 through 14.

They will be participating in the 27th Congress of the International Organization for the Study of Succulent Plants (IOS).

The Garden is proud and honored to host this renowned symposium, thanks in large part to the efforts of the late Dr. Edward "Ted" Anderson, past president of IOS and senior research botanist on the Garden staff. The IOS Congress met at the Garden in 1992.

Papers presented will highlight research on the Euphorbiaceae, Mesembryanthaceae, Agavaceae, and other succulent groups. The program will include a day-long symposium on the Opuntioideae with invited specialists, as well as an extended symposium on the Cactaceae with papers from many contributors.

The Congress will also host a meeting of the Cactus and Succulent Specialist Group of the Species Survival Commission of the International Union for the Conservation of Nature (SSC/IUCN), which Dr. Anderson also chaired. On the same day speakers will discuss current problems in succulent plant conservation in a conservation symposium. In addition, a progress report will update information of the IUCN Red List of Threatened Plants, a project in which Dr. Anderson was involved after assessing rare plant populations in Mexico.

A special dinner and program will honor Dr. Anderson, who died in March of 2001.

The Garden welcomes the IOS Congress to see and use its extensive succulent collections, and also to experience new trails since their last visit: the Harriet K. Maxwell Desert Wildflower Trail, the Center for Desert Living Trail, and the Sonoran Desert Nature Trail. Meetings will be held in the new Dorrance Hall with its excellent acoustics and audio-visual equipment. IOS delegates may also use the new library and herbarium and visit the new Garden Shop and visitor center.

A number of Garden volunteers will be needed to help with this event. Volunteers will be able to participate with their $100 registration fee waived.

New this summer: Kids' Garden Camp

One-week sessions, Monday – Thursday; weeks of June 10, 17, 24 and July 8, 15, 22

Imagine a week filled with a variety of fun indoor and outdoor activites including gardening, cooking plants that "campers" harvest, and creating arts and crafts with plants. Register now for the Kids' Garden Summer Camp. Each session is one week long and takes place in the morning. For more information call the educational services department at 480-941-1225.
Limit: 20 per session.

Children grind mesquite beans into flour while learning how native plants can be used in food.

IN APPRECIATION
Annual Giving

The Desert Botanical Garden is grateful for the support of all 9,665 members. This special edition of In Appreciation recognizes our members and friends who made gifts or pledges of $50 and more to the Garden's 2001 Annual Giving Campaign, as of December 31, 2001. We thank every individual who helps the Garden conserve Arizona's desert flora, maintain a world-renown plant collection and provide a "compelling attraction" for the community.

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Kathy & Bob Winder
Susan Wiseman & Bruce Nelson
Eleanor & Howard Wulsin
Mrs. Robert Zicarelli

CALENDAR OF SPECIAL EVENTS

(continued from page 17)

Jazz in the Garden Concert Series

Ullman Terrace
Fridays, April 5 & 19; May 3, 10, 17, 24, 31; June 7, 14, 21, 28
7 - 9 p.m.
except May 3 at 6:30 - 8:30 p.m.
for advance ticket purchase call 480-941-1225
$6 members/$13.50 non-members

Central Arizona Cactus & Succulent Society Annual Show

Webster Auditorium
Friday, Saturday & Sunday, April 5 - 7
free with Garden admission

Phoenix Home & Garden: A Grand Tour of Gardens

Sunday, April 7, 10 a.m. - 4 p.m.
for information and tickets call 602-234-0840, ext. 132

Dinner on the Desert Fundraising Event

Saturday, April 27, 6:00 p.m.
for tickets call 480-481-8147
$250 per person

Mother's Day Concert and Optional Brunch featuring Esteban

Ullman Terrace
Sunday, May 12, 11 a.m. - 1 p.m.
advance tickets are $26.75,
$28.75 (if available) on day of concert
call 480-941-1225

Annual Meeting for Members

Dorrance Hall
Thursday, May 23, reception at 4 p.m.,
meeting at 5 p.m.

Photo by Jennifer Johnston

Spring Wildflowers: Now Opening!
at the Harriet K. Maxwell Desert Wildflower Trail

The Sonoran Quarterly
Desert Botanical Garden
1201 N. Galvin Parkway
Phoenix, AZ 85008
480-941-1225

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The mission of the Desert Botanical Garden:

"The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge about arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."
–Articles of Incorporation, 1937

THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona June 2002/Volume 56, No. 2

The Sonoran Quarterly | SUMMER
June 2002 | Volume 56, No. 2

THE SONORAN QUARTERLY
June 2002
VOLUME 56, NO. 2

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Noisy Spring

I can remember the first Earth Day.

It was 1970 and I was a sophomore in high school. To mark that day, my civics class read *Silent Spring*, published by Rachel Carson eight years earlier, and my budding ecological consciousness came into full bloom.

Ms. Carson, now widely recognized as the founder of the American environmental movement, wrote persuasively in *Silent Spring* about the perils of using highly toxic insecticides, such as DDT, in agricultural and land management programs. Her metaphor for what could go wrong, and hence the title of her book, was the passing of a silent spring–one in which the absence of any sound replaces the normally boisterous activities of the natural world during the annual season of renewal.

Ms. Carson used the following words, written about a hypothetical American town, to challenge her readers to imagine what a silent spring would be like:

There was a strange stillness. The birds, for example–where had they gone? Many people spoke of them, puzzled and disturbed. The feeding stations in the backyards were deserted. The few birds seen anywhere were moribund; they trembled violently and could not fly. It was a spring without voices. On the mornings that had once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices there was now no sound; only silence lay over the fields and woods and marsh. . . The apple trees were coming into bloom but no bees droned among the blossoms, so there was no pollination and there would be no fruit. . . The road-sides, once so attractive, were now lined with browned and withered vegetation as though swept by fire. These, too, were silent, deserted by all living things.

Rachel Carson's words still haunt me, and her main assertion–that the level of noise in the springtime can serve as a barometer for how well the natural world is doing–has always stuck with me. And so, each spring I make a mental inventory of what I hear the natural world saying.

Photograph by Jennifer Johnston

Ken Schutz

This year, my first in the desert, I paid particularly close attention to the sounds of spring, and I am pleased to report the noise was deafening. The calls of birds filled every day. I heard each of the following species: Gila woodpecker, gilded flicker, ladder-backed woodpecker, cactus wren, Gambel's quail, mourning dove, great horned owl, hummingbirds (I'm still working on identifying individual species), black tailed gnatcatcher, mockingbird, cardinal, and countless sparrows and finches. The birds also made their presence known through other noises: the ladder-backed woodpecker tapping in the acacia tree outside my living room; the gnatcatcher who pecks at his reflection in my office window; and the cardinal who bangs into the windows of Desert House hundreds of times each day when she sees her reflection. Other springtime noises by desert wildlife included young coyotes calling in the morning near Desert House, hundreds of crickets "singing" each night, and countless carpenter bees and honeybees rumbling around the Garden pollinating the collection.

It was a noisy spring indeed, and may it always remain so.

Ken Schutz
The Dr. William Huizingh Executive Director

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ARTICLES

FEATURES

ON OUR COVER

In the Sonoran Desert we love our native Arizona queen of the night (*Peniocereus greggii*). Through most of the year the plant exists as a stem, sometimes branched, dusty green and four-sided with small spines that feel like a cat's tongue, growing most inconspicuously amid the branches of a creosote bush or other desert native. In June, however, one bud (or more) emerges and opens slowly to become a large, white, trumpet-shaped flower that broadcasts a sweetly pervasive fragrance. The flower opens in the late evening and begins to close with the sun's rising, leaving for the beholder one glorious night's memories.

Photograph by Jennifer Johnston

WOW! The new Library

Story and photos by Carol Schatt

Users of the Desert Botanical Garden Library in its new, bright, open, light and airy space take a look around the shelves, find something new, and say: "Wow! I didn't know this was here!"

That delights librarian Beth Brand, whose management goal for the library is for staff, volunteers, and visitors to enjoy a personal discovery of the treasures in the Garden's library. "I am always ready to help them," she said, "and I am excited when people come in and learn about what we have."

What we have is one of the finest collections of books, journals, prints, papers and rare books related to arid plants of the world, especially those of the Southwestern United States. The library contains more than six thousand volumes. In the collection are rare prints and books dating from the sixteenth to nineteenth centuries, as well as more recent books, journals, magazines, manuscripts, photographs, maps and other research materials.

The new Desert Botanical Garden Library offers a large, airy reading room with a beautiful view.

The new library more than triples the space of the old Richter Memorial Library. Housed in the new Nina Mason Pulliam Desert Research and Horticulture Center, it includes a study area with tables and chairs near large windows and the main stacks, a large reading foyer with the old Mexican library table and nearby open display shelving, an archives room with controlled temperature and humidity, and an office for the librarian as well as a workroom. The Shomer Resource Room is also located in the new library.

The Garden's original library, dedicated in 1939, was about the same size as the new library, but was a multi-purpose facility (now called Webster Auditorium). From 1939 to 1970, it was the Arizona Cactus and Native Plant Society's meeting room and library. The large table in the new library's foyer is one of three designed and built in 1939 for the Garden library.

There's plenty of shelf space for books, journals, and magazines in the new library which houses the Garden's specialized collection of literature on arid land plants.

The Garden's second library, the Max Richter Memorial Library, was dedicated in 1970.

Beth's first task, when she was hired last winter, was to coordinate the move and choose the furniture for the new library. In late November and early December, she and volunteers boxed the books from the rolling, compact shelves–about half the collection–so that the shelving could be moved to the new Beaker Library Archives.

The process began by carefully packing the rare books. Former librarian Jane Cole and volunteer Shirley Weyand helped.

"It was during *Luminaria*, an intensive, festive holiday event which involves the entire Garden, so in the beginning we were unusually affected by lack of help and equipment to move the books," she said. With volunteers Paul Dygert and Mahasin Saleh, Beth packed hundreds of boxes assembled for them by another volunteer, Charlie Brenner. "It was exhausting," she said. "We, along with temporary workers, made countless trips across the Garden carting boxes, file cabinets, and map cases to their new home." Working against a tight deadline, Beth hired professional movers to finish the job. Mary Jo Almendinger, Cathy Mullan, Jean Hogg, and Kathy Rice helped them unpack the boxes when shelving was finally installed in the new building. "I am grateful for the generosity and stamina of the volunteers and staff who helped. It would have been impossible without them," Beth said.

The library collection–one of the Garden's three collections, which also include the herbarium and the Living Collection of plants–began in 1939. When W. Taylor Marshall became the Garden's third director in 1947, he donated his personal library of about five hundred books–reportedly the largest collection on succulent plants in the country–and continued to add to them during the next decade until his death.

Other small but important collections came from Gustav Starck, a co-founder of the Garden, and from Rose Collom, a Southwestern U.S. botanist.

In the 1950s the book collection filled five shelves in Hubert Earle's small office. Earle had succeeded Marshall as director, and he deepened the relationship that Marshall had developed with Max Richter, a Santa Barbara (California) book dealer, persuading Richter to bequeath his prestigious collection of botanical books and five hundred rare botanical prints, as well as photographs, paintings, and scrapbooks, to the Garden. Richter's collection

and what's in it

Volunteer Mary Jo Almendinger demonstrates the resources available for the Garden's Plant Hotline, through which horticulturists as well as volunteers answer plant and gardening questions over the telephone. A bookcase of especially selected reference materials as well as a computer with access to resources away from the Garden help the Hotliners locate answers quickly. The Hotline is available on weekday mornings from 10 to 11:30a.m. by calling 480-941-1225.

also included the personal library of cactus scholar Scott Haselton, who founded and edited the "Cactus and Succulent Journal of America." The Garden built a new structure adjacent to Webster Auditorium that became, with the new collection, the Max Richter Memorial Library.

In 1995 the library was enriched by the collection of Lyman Benson, a foremost scientist among cactus taxonomists. Dr. Benson wrote three of botany's major reference books, *Plant Classification* (1957), *The Cacti of the United States and Canada* (1982), and *Trees and Shrubs of the Southwestern Deserts* (1945, 1954, and revised in 1981). Professor Benson's sons gave their father's books and archives, including

Paul Dygert, a volunteer in the library, uses a computer to create a shelf list of all volumes in the collection.

correspondence, manuscripts, and research notes, to the Desert Botanical Garden. They were friends of Dr. Edward "Ted" Anderson, the Garden's senior research botanist, who arranged for the donation.

Dr. Anderson, who had studied for his doctoral degree under Lyman Benson, was one of the world's most noted cactus taxonomists. He too had given a large collection of his books and herbarium materials to the Garden. In March of 2001, Dr. Anderson had just seen the publication of his magnum opus, *The Cactus Family*, when he died unexpectedly. His wife, Adele, presented to the Garden all the remaining botanical materials in his collection. Containing books, research materials, manuscripts, slides, field notes, photographs, and scanning electron microscope negatives, along with maps and

The library collection includes a number of old and rare books, now housed in a secure archives room with controlled temperature and humidity.

research notes for a CITES study of endangered cacti in Mexico, as well as his collection of journals and reprints of his articles, Dr. Anderson's collection makes a major addition to the Garden library.

Beth Brand hopes to increase the exposure of the Desert Botanical Garden Library to the local public. One way may be to affiliate the Garden library with a larger system such as the Arizona State University Library or the Phoenix Public Library. Listing the Garden's

Librarian Beth Brand holds a botanical print from an earlier century, another important part of the Garden's library collection.

collection in a larger catalog system would reach many more people, she said. Alternatively, the Garden catalog might be listed on the Garden's website.

She also plans to develop public events such as book signings and lectures and prepare interesting displays from the Garden's collection.

One particular project stands out: To organize, preserve, and archive the numerous photographs, maps, and other materials relating to the Garden's history.

Beth, a native of Phoenix, earned a bachelor of science degree from Arizona State University. She spent twelve years in television broadcasting, but began her second career several years ago at Phoenix Public Library system. In addition to working thirty hours a week with the Garden library, she continues to work part-time as a reference librarian for Phoenix Public.

The Desert Botanical Garden Library is open from noon to 4 p.m. weekdays. Come in and discover our wonderful collection.

Leaving Archer behind
Volunteers move to their new home

By Barbara Long

It's Grand Opening Weekend and the Volunteers in the Garden are busy with normal and special activities: organizing staffing for the butterfly pavilion, face painting, guided tours, and open house in the new volunteer headquarters.

And what a wonderful facility! The Marley Education and Volunteer Building has spacious rooms with high ceilings, a huge kitchen, front and back courtyards, and modern restrooms. We scurry around finding things we need, constantly admiring all the space.

In the backs of our minds, however, we also wonder if this new building will change what we cherish most, our camaraderie.

To fully understand this bond that binds the Garden's volunteers, we must step back a few months and take a peek into Archer House, our previous headquarters for many years.

ARCHER HOUSE, December 4, 2001

A cold, drizzly rain, interrupted with blustery showers, drives the Tuesday volunteers into Archer House. The school children have cancelled their visits and any other potential visitors to the Garden are at the mall instead. The Garden is deserted, "resting" in this unusual weather.

Inside Archer House is a different scene. Twenty interpreters and several staff members chat as they pursue routine duties, welcoming this chance to catch up on jobs and prepare for future tours.

The old Mexican table is covered with photos of the new construction. A docent, issued his own hard hat as required on construction sites, has photographed the construction of the new buildings and entrance. He is attaching the pictures to poster board for display at the Grand Opening.

At the same table several volunteers are cutting prickly-pear candy into bite-sized pieces. Others are tying agave fibers into small bundles so that each school child can try a hand at braiding rope.

Docents are affixing labels to brochures; it's a boring job but they appreciate it as a way to help the Garden and participate in the camaraderie. Throughout the morning more volunteers arrive and squeeze up to the table to help.

Sign-up sheets on the bulletin board–often bypassed in the haste to get out on the trail–are being carefully studied and signed.

Six or eight people occupy the small, thirty-two square foot kitchen. Some are baking cookies with mesquite flour. Others are replacing utensils used at *Luminaria*, happily remarking that the weather had been perfect for last weekend's annual, outdoor *Luminaria* event, and aren't we lucky that the rain waited until today.

A school-guide day captain comes in with a big bag of groceries, shoehorns herself into the kitchen and makes Rice Krispies marshmallow bars for everybody. We open the door because it is now too hot in Archer House.

We discuss details of the upcoming move to the new building, and volunteers offer to help the education department pack boxes to move from our old Archer House to the new Marley Education and Volunteer Building.

We know we can move boxes, but can we move the atmosphere of Archer House to the new building?

ARCHER HOUSE, MONDAY, January 7, 2002

Archer House is almost empty. A volunteer remarks that the contents of Archer House are like those sponges that are compressed until they meet water. When our boxes are moved to the new building, Poof!, they expand to fill twice the space. We are all astonished at how much "stuff"–papers, books, kitchen equipment, teaching aids and dried plant material–had been stored in that little two bedroom/one bathroom house.

Photo by Jennifer Johnston

Volunteers (left to right) Elizabeth Hubbell, Dan Rich, Sue Albue, and Dan Schnell (standing) organize their day's work of docenting and guiding tours. The volunteers have a new home in the Marley Education and Volunteer Building.

All that material made Archer House a place of learning and congeniality. Posters, brochures, baskets of agave fiber, and slices of dried saguaro are being arranged in the Marley Education and Volunteer Building. Will the congeniality move to the new digs along with the clutter?

One Archer House occupant still remains, amid the dust and debris and mismatched furniture. Kenya, a Garden cat, snoozes on a chair at the big table where he attended executive committee meetings of the Volunteers in the Garden and savored bits of chicken from docents' lunches.

MARLEY EDUCATION AND VOLUNTEER BUILDING, Saturday, March 23, 2002

Lunchtime and even though it is Saturday, Marley Building is busy. In the big room there is a SPROUTS class of thirty-five new volunteers, learning Garden protocol and procedures. In the interpreters' room, the Saturday docents move tables so they can all eat together. The SPROUTS break for lunch, and offer to share homemade brownies with the docents.

Blue-shirted butterfly pavilion attendants drop by before or after their shifts. Workshop aides look for signs and materials for afternoon demonstrations. The air buzzes with intelligent conversation. Nobody waits in line to use the restrooms.

Looking around the new headquarters with its cheerful posters, dozens of sign-up sheets filling with names, and fresh flowers on the table as a thank you from the staff, makes it obvious that there was no reason to worry about losing our camaraderie.

The Desert Botanical Garden volunteers are "at home."

Barbara Long is a docent at the Garden and has served two terms as president of Volunteers in the Garden.

Anyone interested in becoming a volunteer at the Garden may call Pat Smith, 480-481-8122.

Lillian Diven–Remembering a Garden Icon

The Desert Botanical Garden has lost a dear friend. Lillian Diven, beloved wife of 51 years to Liscum Diven, passed away on January 16, 2002. Her contributions to, and passion for, the Garden were immense.

Lillian and Liscum came to Phoenix from Massachusetts in 1964. An experienced New York editor, she soon found her niche at the Garden. With Garden Director Hubert Earle as editor, Lillian was the editorial assistant for "The Saguaroland Bulletin" (a publication for Garden members, which today exists as *The Sonoran Quarterly*) from the summer of 1964 until 1976. She worked at the Garden five days a week, six hours each day. Lillian was at the Garden so much that Jan Moats, comptroller at the time, asked Earle where Lillian's name was on the staff roster. She was astonished when he replied, "She's a volunteer." She was also a member of the Garden's Board of Trustees.

Lillian was instrumental in unpacking and cataloguing Max Richter's gifts to the library, particularly the rare botanical prints that she uncovered in a drawer in the library. With Rodney Engard, who succeeded Earle as director of the Garden, she realized the value and significance of these collections, calling an appraiser to assess the prints and also the rare books. The oldest original watercolor was done in 1795 and the oldest hand-colored print was published in 1735. With Rodney's help and her own extensive knowledge of rare books and prints, Lillian set forth not only to identify and catalog them, but to have them remounted on archival quality paper.

Realizing the significance of these prints, she and Rodney wanted to make them available for the public to enjoy and at the same time contribute to the Garden financially so she mounted an exhibition of them at the Garden. Elizabeth Fritz, another volunteer, writing about the history of the Garden, said that the exhibition was "not only an effort to attract more visitors and memberships, it would publicize the Garden's resources in books and art and thereby increase its stature as a research institution." Always thinking of the Garden, Lillian acquired additional rare prints during her many travels with Liscum to exotic places throughout the world.

Lillian was also interested in desert plants, developing a fondness for them after the Divens moved to their own unique desert home in Scottsdale. Many of her articles in "The Saguaroland Bulletin" were entertaining portraits of desert plants.

Our wonderful Garden agave logo originated, in a sense, with Lillian. She was inspired by Howard S. Gentry's work with–and love for–agaves, and provided the impetus for her good friend Geoffrey Bruce of Roberts Design Studio of Phoenix to design the logo.

Not only did Lillian write about and exhibit desert plants; she also collected seed of numerous species of plants from deserts around the world. The Garden still has seed from many species of Acacia that she brought back from southern Africa.

Those who had the privilege and pleasure of knowing Lillian remember her for her passion, kind heart, interest in other people's lives, love for the Garden, and her extraordinary bond with Liscum. We also remember her remarkable sense of humor. She always wanted to call up Andy Williams and ask him, "What the heck is a 'huckleberry friend'?" (from the lyrics to "Moon River"). That sense of humor and her love of cooking are evident in *Relatively Great Food*, which Lillian co-authored with her siblings as a compilation of their favorite foods while growing up.

I enjoy reminiscing about the wonderful times we had when I first started working at the Garden in the early 1970s. This time was made special by a small group of dedicated staff and volunteers, of which Lillian was a large part.

Wendy Hodgson is curator of the collection and director of the herbarium.

HOW THE GARDEN GROWS

Renovations wrap up the Garden's big construction project

Renovations to older Garden buildings were expected to be completed by May 1, bringing to a close the Garden's $17 million construction project.

Kayla Kolar, deputy director of the Garden, provided thumbnail sketches of the remodeling:

• The old Garden Gift Shop was re-fitted and turned over to the development department in December, making it a new sort of "gift shop." The building was for many years the Garden's main entrance as well as the gift shop.

• A huge, new maintenance building replaces the old, rundown garage/shed. The new facility is large enough for vehicles to be driven inside for maintenance. It also contains the facility director's office as well as a break room and office space for other departmental staff, and secure, indoor space in which to store tools and supplies.

• The old herbarium has become the business office–business staff can bid goodbye to their trailers.

• The old library has been transformed into the Whiteman Conference Room with state-of-the-art technology for small media presentations and corporate retreats and meetings.

• The reception area has moved into a former office next to the Whiteman Conference Room and has been enlarged. It is now the Herberger Reception Area.

• The former reception area will be the office of a new administrative assistant for the Garden.

• Archer House, former home of volunteers as well as the education department, is empty until plans are developed for its future.

Kayla also said the rabbit fencing is complete around the Garden perimeter.

Photos by Jennifer Johnston

The new maintenance building has plenty of inside space in which to work on Garden vehicles. It is a part of the final stages of the Garden's large construction project.

Especially for summer...for all audiences

Please see the Quarterly Calendar or call 480-941-1225 for more information regarding these and other summer programs.

Kids' Garden Camp (new this summer)
One-week sessions, Monday through Thursday; weeks of June 10, 17, 24 and July 8, 15, 22
Imagine your child's week filled with a variety of fun indoor and outdoor activities including gardening, cooking desert plants that campers harvest, and creating arts and crafts. Call the educational services department at 480-481-8164. Limit: 20 per session, ages 7-10 years old.

Flashlight Discovery Tours
Thursday evenings, 7:30 to 9 p.m., June and July
Visitors often see night-blooming cacti and other plants, nighthawks, bats, moths, snakes, toads, and other nocturnal creatures. Bring a flashlight and a spirit of adventure.

"Taste of the Desert" Summer Sunrise Tours
Saturday mornings, 7 a.m., June and July
Come take a cool morning walk with knowledgeable Garden docents who will share some of the secrets of survival in the Sonoran Desert. In June tours highlight the flowers and edible fruits of the saguaro cactus and in July the uses of the magnificent mesquite tree. After the tour, relax in the shade and taste some foods made from plants of the desert.

Sensational Summer Samplers
Wednesday evenings, 6:30 - 8 p.m., June and July
Visitors cool off and enjoy a variety of desert ecology demonstrations, including puppet shows by the Great Arizona Puppet Theatre, presentations by Arizona Game and Fish Department, and the Desert Storytellers, along with an ethnobotanical experience using plants from the desert for foods. Please see the Quarterly Calendar for details.

Desert Ecology Video Shows
Weekdays, 10 a.m., June through August
Visitors can relax and watch a 30-minute "Desert Speaks" video in the cool Desert House theater.

Workshops for Children and Adults
Look in the summer calendar for information on how to register for workshops in the areas of desert landscaping and gardening, natural history, art and photography, natural crafts, or ethnobotany.

Friday Family Specials
Every Friday morning, 8 to 9:30 a.m., June & July for children ages 3 - 10 with adult.
Each Friday morning is a different indoor/outdoor desert adventure featuring saguaros, flowers, birds and more.

Desert Web of Life Teacher Training
Training takes place Tuesday through Friday and is offered once in June and once in July (June 4 - 7, July 9 - 12)
This fourteen-hour workshop explores the Sonoran Desert environment and the adaptations of the plants, animals, and people that live there. Participants receive an extensive resource notebook, hands-on items for the classroom and re-certification credit.

Drought!

By Patrick Quirk

The Garden watered the entire collection early this year due to drought conditions.

We are now in a drought.

You may say, however, that this is after all a desert, where drought is the norm, is it not?

Partially right. By the standards of other regions in the United States, we are in a region of extreme dryness, but even here we can have droughts.

Life forms in the desert are well adapted to survive on an amount of water wholly insufficient to maintain most plants and animals from other regions. All life on Earth, however, requires some water to live, and even life forms of the desert require some rainfall in order to survive. In those deserts where no rain falls for many years, such as the interior Atacama of Chile, there are no perennial plants, only the seeds of short-lived annuals awaiting the next rain.

Winter here is one season in which there is a fair possibility of rain; the summer "monsoon" season is the other potentially rainy period. Normally we receive about 7.25 inches of rainfall in this area a year with two to four inches –and often more–during the winter months.

This winter the rains have failed. From October to April, the Garden has had only 1.28 inches of rain, much below normal. Worse yet, only one rain–.55 of an inch on December 4–was heavy enough to penetrate the soil to the roots of plants. Generally speaking, it requires .30 of an inch to make a difference to the plants.

During the winter we usually do little if any watering of the Collection except for the wildflower displays. Because of cool conditions and the resultant lower rate of evaporation, the plants, even those from wetter regions, need only the winter's rain to survive until temperatures rise.

This year, however, the plants were showing considerable stress by February; in a word, they were wilting. The well-established, native plants were fine, but they are some of the toughest desert plants in the world. Our other plants, however, were suffering. So, for the first time in twenty-four years, we did a Garden-wide watering of the Collection, to ensure their health as well as their beauty.

Plants in your home garden require similar attention. If you have not watered, it would be best to do so now, for chances of rain go from slim in April to practically none in May and June. It is a long wait until the July "monsoons," and they may fail as well. Should rain come, welcome it.

It is a peculiar cultural phenomenon here that many people feel a strong dislike for rain. This attitude cannot be explained by an over-frequency of rain, since here it is a novelty. Perhaps newcomers bring with them an attitude against rain, developed in the more rainy regions of the United States or influenced by the culture of western Europe where it is truly wet.

Dislike of rain is manifest even in our vocabulary (and perpetrated by our television weathermen). We talk of the "threat" of rain, "ugly" clouds, and of weather "improving" as the storm stops. Even U.S. Weather Service personnel, who should know better, do this.

I suggest that since we live in a desert where rain is in short supply most of the time, we refer to the "promise" of rain, and "beautiful" clouds, and so on. The peoples of the world's other desert regions feel this way; they rightly fear drought. In South Africa they truly appreciate rain, as expressed in a song by Ladysmith Black Mambazo:

Rain, rain, rain, rain, beautiful rain
Rain, rain, rain, rain, beautiful rain.
Long come, never come, long come, never come
Long come, never come, beautiful rain.

Patrick Quirk is the Garden's horticulturist in charge of cacti.

Thanks to SRP

On March 19 the Garden introduced teachers to the new Desert Studies Center. This wonderful reception was fully sponsored by SRP. The teachers saw Dave Rogers' Big Bugs sculptures and visited the Butterfly Pavilion. They also participated in activities where they learned about the desert and desert wildlife, enjoyed an excellent dinner, learned what the Garden and SRP can offer teachers, entered a raffle that provided more than one hundred prizes, and left with a big, red ladybug tote bag. Thank you SRP for helping the Garden provide this special event for our area teachers!

The Sonoran Quarterly SUMMER
June 2002 | Volume 56, No. 2

Enjoy all the senses in a moon garden

By Cathy Babcock

The trend in gardening these days is to designate areas within the yard as a specialty garden or a series of gardens, each defined by a single theme. Wildlife, butterfly, and hummingbird gardens have been the rage for several years. A theme gives a sense of enclosure to these gardens, whether they are actually fenced or hedged or not, and it can create a personal sanctuary for the gardener. Each gardener is unique, with his or her own strong feeling about certain plants, colors, and fragrances. A theme garden can be designed for any space and does not require great skill and expense to install and maintain.

Photo by Kirti Mathura

Sansevieria ssp.

One idea that is becoming increasingly popular is a moon garden. Many gardeners work, and long hours at that, and some don't return home until after dark. I don't know about you, but in the summer months here in the low desert I don't work in my yard until evening when the sun has gone below the horizon. What better way to unwind than by sitting in a garden that reaches its peak during the evening and night-time hours?

A moon garden, also called a starlight or night garden, is filled with plants whose flowers are white or light-colored, plants that are night-bloomers, and plants whose foliage is silver or white. The flowers of most night-blooming plants are white and extremely fragrant. These plants stand out at night, moon or no moon. Silver plants "glow" at dusk and early in the pre-dawn.

And the best part is that all you will see in your night garden are the wonderful shapes and silhouettes; you won't see the weeds or the work that needs to be done. You will notice as you sit in the dark that because you see less of what is going on around you, your senses of hearing and smell will intensify. You will hear every leaf crackle, every seed pod drop. I even hear the grasshoppers chewing at dusk in my

Photo by Cathy Babcock

Datura wrightii

garden! You can literally watch the sacred datura pop open and release its wonderful fragrance. There are no colors–just black and white and shades of gray. It is a fact that in dim light our ability to perceive red and green disappears, leaving us with blue and yellow, plus, of course, black, white and gray. As light continues to dim, we are left only with black and white vision.

The night garden is a summer garden. All night bloomers flower and release their fragrance during the warm months. Just as the heat of your skin releases the scent of your cologne, so the heat from the waning day causes the perfumes of flowers to waft to a distance of a hundred feet in the dusky air. Some flowers open at dusk, others between 10 p.m. and midnight. The best night garden viewing is about midnight. The sweet scents of night-blooming flowers attract bats and moths to pollinate them during the night.

There are many cacti species whose flowers open at night or that have white spination. Here's a word to the wise, however, about cactus in the moon garden. Because vision is decreased at night and there are lots of shadow pockets in a garden, be sure to plant cacti where they will not be stepped on or brushed against or where they may overhang walkways. This also holds true for trees or shrubs with spines or thorns.

Keep *contrast* also in mind. Not all the plants should have silver foliage. There should be a pleasant mixture of light and dark greens, grays, and silvers to provide the nighttime shades of white, black, and gray. And don't forget your hardscape–rocks, logs, and stepping stones. Use shiny quartz rocks, light-colored logs, stepping stones that will gleam in the starlight. And if space and finances allow, a dripping seep with yerba mansa (*Anemopsis californica*) is a must. Any water feature for a moonlight landscape must be quiet and musical with low melodious dripping; no rampant splashing noises are wanted here. It could include a small basin or pool to reflect the stars and moon. (Of course, a real water garden is an entire issue in and of itself, as there is a whole array of available night-blooming tropical water lilies.)

Bear in mind that although shady oases are desirable for a respite from summer's heat, too

Photo by Jennifer Johnston

Joshua Tree Bloom, *Yucca brevifolia*

much daytime shade will eliminate nighttime reflections. Only the airiest and most dappled shade will admit enough moonlight and starlight. Dense shade in the daytime will demand night lighting. Since the moon isn't out every night of the month, enough light should be provided to mimic the moon or to bathe the pathways with just a gentle glow so you or visitors don't trip and stumble. Many kinds of low-voltage garden lighting kits are available now at reasonable costs.

For added scents, you might consider plants


Photo by Jennifer Johnston

Anemopins californica

that release resins as you brush against them, such as the mints, salvias, and creosote bush.

It is ironic that I am writing a night garden article. I am totally a morning person and am generally in bed by 8:30 p.m. We morning people, however, have a new concept to check out: a dawn garden.

Following are a few of the plants that will do well in this area for use in a night garden. All are available commercially at nurseries, specialty plant shops or through collector's mail-order.

Foreground plants – night bloomers/ night-scented/ silver color

Sacred datura - *Datura wrightii*: This is the ultimate moonflower. These flowers are white, usually tinged with lavender. They open at dusk and you can literally watch them puff open and release their heavenly fragrance. The plants can become large, up to three feet tall, and will sprawl somewhat, although I have found they respond to judicious pruning when necessary. They grow from an underground tuber, appearing late spring and dying back with the cold. Keep your eye on this plant, for it will spread readily from seed. Also be aware that all parts of the plant are extremely poisonous when ingested. Plants bloom throughout the summer months, and take full sun and supplemental water.

Tufted evening primrose – *Oenothera caespitosa:* This plant has white three-inch flowers that open in the evening, closing in the morning. It will bloom sporadically all summer, although each flower is open for only one night. Evening primrose forms a mound approximately one foot by one foot. Plants are cold hardy, take full sun and supplemental water.

Yucca rigida


Photo by Cathy Babcock

Mother-in-law's-tongue – *Sansevieria spp.*: You are familiar with this plant as a common houseplant, but have you ever considered planting it as a landscape plant? Many species are hardy enough to plant in the ground provided they are given adequate shade and winter frost protection. Although flowering is almost unheard of for these plants in the house, once they are in the ground with free root run and higher light intensities, they bloom freely and sporadically from March through October. Their flowers occur on spikes, open at night, and are quite fragrant–a little-known fact. They are natives of various countries in Africa and should receive regular watering during the summer. Their succulence and vertical form, both in leaves and flower spikes, add a touch of drama to the softness of foliage of most night-bloomers.

Gaura – *Gaura lindheimeri*: This is an airy, attractive plant with sprays of white or pinkish flowers winding up and down long stems. This plant is in the evening primrose family, and flowers turn pink with age. It flowers throughout the warm months and tolerates almost any soil.

Background or silhouette plants

Yuccas – *Yucca spp.*: These are distinctive accent, silhouette, or specimen plants. They produce spectacular bell-shaped white flowers in great spikate clusters, often up to two feet long. The flowers open late in the afternoon so that the pollen is ripe and ready for transfer to the stigma shortly after dark, awaiting the arrival of a special yucca moth later in the evening for pollination.

Palo blanco – *Acacia willardiana*: This is a tall, slender, airy tree with a white trunk, good for a small space. This is a wonderful plant to use for height and texture without producing massive shade. The trunk is white with peeling bark–very appealing. Foliage is willowy and sparse without a lot of mass.

Cacti – either silver or night-blooming

There are several hundred species of cacti that bloom nocturnally. I'm sure there are several hundred more that have silver spination.

Arizona queen of the night – *Peniocereus greggii*: This is probably one of the best known of the night-blooming cacti. This slender and inconspicuous cactus appears like a dead stick within the branches of creosote bushes. Stems are erect or sprawling to several feet long and one inch in diameter, with small spines. Stems arise from a tuber that in very old plants can weigh over forty pounds. Large, white flowers occur primarily in late May or June with some also appearing sporadically throughout the summer. They open just after dusk, at which time the fragrance is also released and is at its strongest. Flowers close up early in the morning with the sun's arrival. (Note: our cactus horticulturist says flowers open around 10 p.m.).

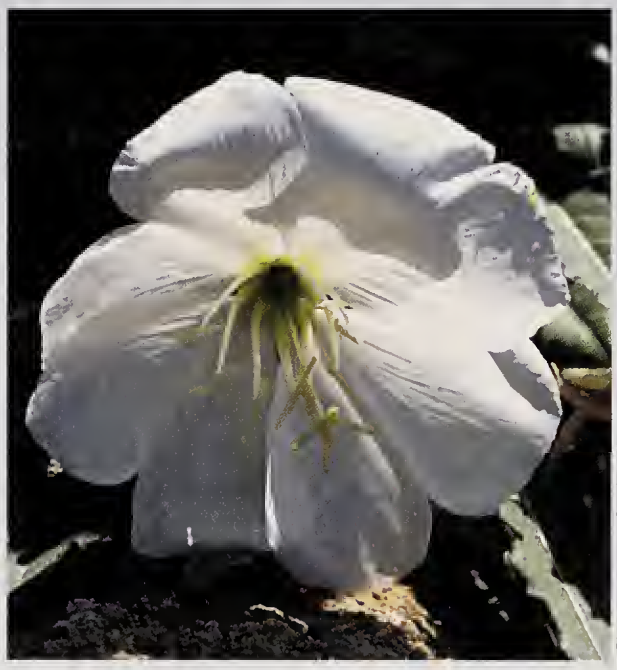
Photo by Jennifer Johnston

Tufted evening primrose – *Oenothera caespitosa*

Giant saguaro – *Carnegiea gigantea*: The other well-known night-blooming cactus is the signature cactus of the Sonoran Desert–the saguaro. Although probably too large for most night gardens, it has large flowers about four to five inches in diameter with heavy, waxy, white petals. This cactus flowers in May and June, opening late evening and closing by midmorning of the next day. Its major pollinator is bats.

Two cacti exhibiting a nice white color are *Mammillaria plumosa* and *Mammillaria candida*. *M. plumosa* is a globular, clustering plant covered with white wool. *M. candida* is also globular, but can be solitary or clustering and has woolly white areoles. Both need light shade.

Cathy Babcock is assistant director of horticulture at the Desert Botanical Garden.

Source: *The Evening Garden: Flowers and Fragrance from Dusk till Dawn* by Peter Loewer 1993. MacMillan Publishing.

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MESQUITE BEANS NEEDED

Beans collected from your mesquite trees and donated to the Desert Botanical Garden are used on the Plants and People of the Sonoran Desert Trail to demonstrate how people processed the ripe beans into flour. The Garden needs several fifty-five-gallon drums of beans to last all year so that visitors can experience grinding them into flour. Summer is the only time they are ripe and available for collecting.

If you would like to donate mesquite beans for this popular activity, please do the following:

- Collect, in a paper or plastic bag, dry, ripe, clean (without yard debris) beans from a mesquite tree. (We only use mesquite beans.) Ripe mesquite beans are tan (without green), dry and crisp.
- Bring the bag of beans to the Desert Botanical Garden and drop it in the designated can near the entrance to the Garden.
- Notify the staff in the admissions booth that you are donating the beans and please fill out the donation form from the admissions booth.

Thank you for helping to support our programs.

Echinopsis thelegona

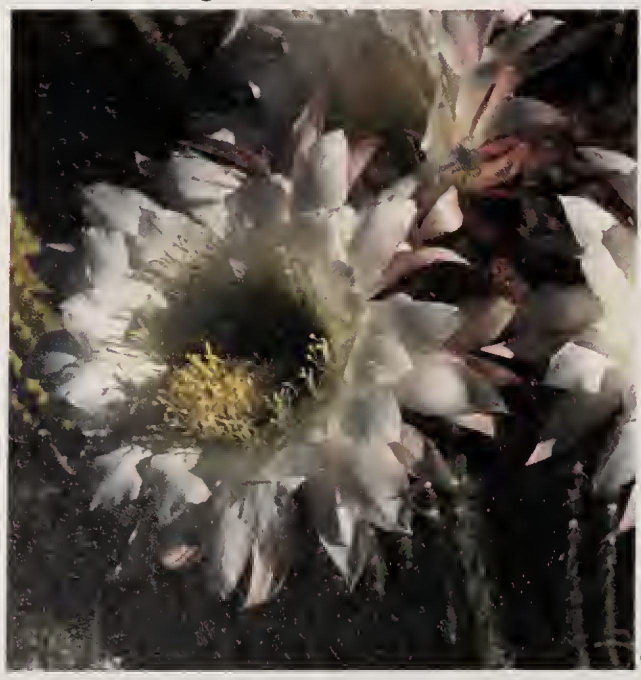

Photo by Jennifer Johnston

Call him a Master or Dr. Saguaro– we call him César

DBG Horticulture Archives

César Mazier

In March, César Mazier, director of horticulture was honored as a "Master of the Southwest" by *Phoenix Home & Garden* magazine. The magazine chose him as one of ten individuals "who have used their unique talents to elevate the lives of those around them."

Later in March, César was featured in an article in *The Arizona Republic* as "Dr. Saguaro" who has intensely studied the horticultural needs of saguaros and is attempting to help them survive the pressures of heat, drought, and increased urbanization.

Family Saturdays were great in Spring

Thanks to Target Stores, families enjoyed activities together at the Garden on Saturdays from March 2 through May 11.

They sang along in "Bug Tales," folded paper butterflies, met fascinating insects with teenagers from the Young Entomologist Society, enjoyed balloon creatures at "Balloon Storytelling," and learned about desert animals and plants through Great Arizona Puppet Theater presentations.

Garden visitors said the Target Family Saturdays were not only a "wonderful learning experience for children and adults," but also "lots of fun!" Thank you, Target!

A thank you to... Butterfly Pavilion volunteers

The Butterfly Pavilion, our new seasonal exhibit, was a huge success thanks to the many volunteers who participated. The twelve-week exhibit opened on February 16th and ran through May 12th. It took 172 four-hour shifts, or 688 volunteer hours to keep it running, and was a truly an amazing effort by our volunteers!

Special thanks goes to Gene Almendinger who chaired the pavilion volunteers. His diligence and sense of humor insured that the exhibit ran smoothly.

Thank you to all our volunteers. Your enthusiasm and support made a wonderful experience for all our visitors.

Two educational activities win national awards

Photo by Jennifer Johnston

Ruth Greenhouse (left), director of educational services, holds Spanish versions of "Desert Detective" while Jonathan Mann, Garden volunteer, shows the awards recently won by that series as well as "Sammy Saguaro's Scrapbook," an interactive web-based activity which he helped to develop.

The Garden has earned first place awards from the National Association for Interpretation (NAI), for "Sammy Saguaro's Scrapbook," an interactive web-based activity, and Spanish versions of the "Desert Detective" series.

"Sammy Saguaro's Scrapbook," co-developed by Garden member Jonathan Mann (while on sabbatical from Intel) and Garden staff, is an animated, interactive web site that helps people of all ages learn about the saguaro's adaptations, natural history, and connections with desert wildlife. "Best web site I've judged! Exactly the right amount of science and humor. Interactives are fantastic! Hope you win!" wrote one NAI evaluator. The site had more than 6,000 hits from 3,500 different visitors from July 2000 to July 2001. Visit the site at www.dbg.org/education/sammy/index/html.

The Desert Detective series in Spanish allows Spanish-speaking students, chaperones, and teachers to get the most out of their visit to the Garden by providing them with high-quality translations of the popular series. A donation from a volunteer interpreter funded the translation, design, and first printing of "The Mystery of Desert Plants," "The Plant and Animal Partnership," and "The Desert Plants and People Connection." "Excellent and creative publication!" commented one NAI evaluator.

The Spanish Desert Detectives were featured in *Roots*, a journal published by Botanic Gardens Conservation International education network in June of 2001. Kirstenbosch Conservatory in Southern Africa used the series to create a "Desert Detective Game" for its visitors, substituting Sam Strelitzia for our Sammy Saguaro mascot.

CALENDAR OF SPECIAL EVENTS

Kids' Garden Summer Camp
Monday – Thursday / Weeks of June 10, 17, 24; July 8, 15, 22

Birds in the Garden Tours
Mondays / June, July, August / 7 a.m.

The Desert Web of Life
Tuesday – Friday / June 4 - 7 OR July 9 - 12 / 8 a.m. - 12 p.m.

Sensational Summer Sampler
Wednesdays / June & July / 6:30 p.m.

Summer Flashlight Discovery Tours
Thursdays / June & July / 7:30 - 9 p.m.

Family Friday Specials
Fridays / June & July / 8 - 9:30 a.m.

Jazz in the Garden Concert Series
Fridays / May 3, 10, 17, 24*, 31; June 7, 14, 21, 28 / 7 - 9 p.m.
(* 6:30 - 8:30 p.m.)

"Taste of the Desert" Sunrise Tours
Saturdays / June & July / 7 - 8:30 a.m.

"Cactus Jack" Tours
Saturdays / June & July / 6 p.m.

A BIG contribution from the Volunteers

Maree Stone, chair of last winter's *Las Noches de las Luminarias*, and Susan Ahearn, co-chair, present a check for $102,902.19 to Ken Schutz, director of the Garden. The check represents money raised for the Garden by the Volunteers in the Garden, who stage the popular traditional event that was held last November 29, 30 and December 1. The check was presented at this spring's Volunteer luncheon, which honored the 484 volunteers who worked 51,163 hours in the year 2001 at the Desert Botanical Garden.

Photo by Don Berg

IN APPRECIATION

The Desert Botanical Garden is grateful for the support of all 9,809 members. Recognized here are members of the President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from ***January 1 to March 31, 2002,*** *for Ocotillo Club, Boojum Club, Agave Century Club, and Desert Council.*

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Peggy & Robert E. Withers
Barbara Zarlengo

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The Desert Botanical Garden is honored to acknowledge the following individuals who have included the Garden in their estate plans:

Anonymous (19)
Anonymous DBG Docent
Gail & John Allan
Sidney Allen
Lou Ella Archer*
Billie Jane Baguley
Kate & Greg Bakkum

Have you provided for the Desert Botanical Garden in your will or estate plans? If so, you may qualify for membership in The Sonoran Circle. For more information call Beverly Duzik, director of development, at 480/481-8111.

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Louis Barnard, Jr.*
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Nancy Wagner
Gertrude Webster*
Terry & Nancy Wilkosz
Terry & MaryAnna Woodworth
Eugenia I. Wright*
Karen Wyndelts
Sylvia D. Yoder

**Those whose gifts have been realized*

DESERT COUNCIL

A corporate membership category, Desert Council represents an alliance between the Desert Botanical Garden & the business community for donors of $250 or more.

Palo Verde ($10,000 +)
Blue Cross Blue Shield of Arizona
East Valley Tribune

Mesquite ($5,000 +)
Arizona Foothills
Intel Corporation

Ironwood ($2,500 +)
Arcadia Farms
Douglas Architecture and Planning
One Fish Two Fish Productions

Acacia ($1,000 +)
American Express
Desert Gardens Nursery
Desert Tree Nursery
Eco-Logic Foundation, Inc.
Tiffany and Co.

Desert Willow ($500 +)
Arizona Biltmore Resort & Spa
Bates Architectural Collection

Cascalote ($250 +)
Pearce Beverage Company
Phoenix Precast Products Inc.
Spectrum Graphics, Inc.

CORPORATE MATCHING GIFTS

AT&T Foundation
BP Foundation
ExxonMobil Foundation

Fidelity Investments
Gannett Foundation
IBM Corporation
Motorola Foundation
Nuclear Electric Insurance Limited
The Prudential Foundation Matching Gifts
Sempra Energy

ADOPT-A-PLANT

Desert Horticulturist ($1,000 +)
Connie & Craig Weatherup, *in honor of Linda Overby*

Desert Gardener ($100 +)
Maggie & Kurt Freund
Bill Meger
Mary & James N. Wurgler

Plant Parents ($25 +)
Keith Johnson, *in honor of Mr. and Mrs. Robert Sugar*

Classroom Caretakers ($25 +)
Brownie Troop 154

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Blue Cross Blue Shield of Arizona
Erma Bombeck Memorial Fund
Richard Bridges
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Sally & Richard Lehmann
Diane McCarrick
Linda M. Overby
Dona & Tom Purcell
Isabelle & Stephen H. Roman
The Steele Foundation, Inc.
Barbara Weisz

HONORARY & MEMORIAL GIFTS

Honorary & memorial contributions are used to provide for the ongoing horticultural, education & research programs of the Desert Botanical Garden from January 1 to March 31, 2002.

Contributions have been received in honor of:

William Huizingh
Higgins Foundation

Edith Rosskam
Elaine & Everett Warner

Helen B. Wooden
Dorothy Cleghorn
Fred Ferguson

Contributions have been received in memory of:

Nan Beyer
Nan & Charles Beyer

Joseph Drake
Bob Schumacher

John Foster
Wendy Franz & Bob Wirthlin

Warren Gaines
Erma & James Bird

Frances & Bill Harrod
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Francie Mallery
Mary Lou & P. J. Stevenson

William Weisz
Sue Ann Spahr & Richard G. Kinsler

GIFTS TO DINNER ON THE DESERT 2002

as of March 31, 2002

Arid Lands Greenhouses
Arizona Biltmore Resort & Spa
The Arizona Republic
Christine & John R. Augustine
Bates Architectural Collection
Tom Belden
Berghoff Design Group
Berridge Nursery
Blue Cross Blue Shield of Arizona
Ron Boland
David Bradley
Matt Cochran
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Kaori Fujitani
Galbut, Hunter and Conant
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Henry Isaacs
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Tiffany and Co.
Kelly McLain
Ed Mell
Steven Mihaylo
Ann & Tom Morrow
Naked Horse Gallery
Phoenix Precast Products Inc.
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Rain Bird
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Colorado Casualty
P. J. & Robert Davis
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Desert Tree Nursery
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June & Henry Dykstra
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ANNUAL APPEAL

Sontruf & Lawrence C. Duke
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Sherman Hazeltine
Robert L. Hendricks
Alice M. Koerner
Patricia & Joseph Samfilippo

We attempt to ensure the accuracy of our donors' names. If you note an error or omission, please contact Mary Rymarcsuk at 480/481-8193.

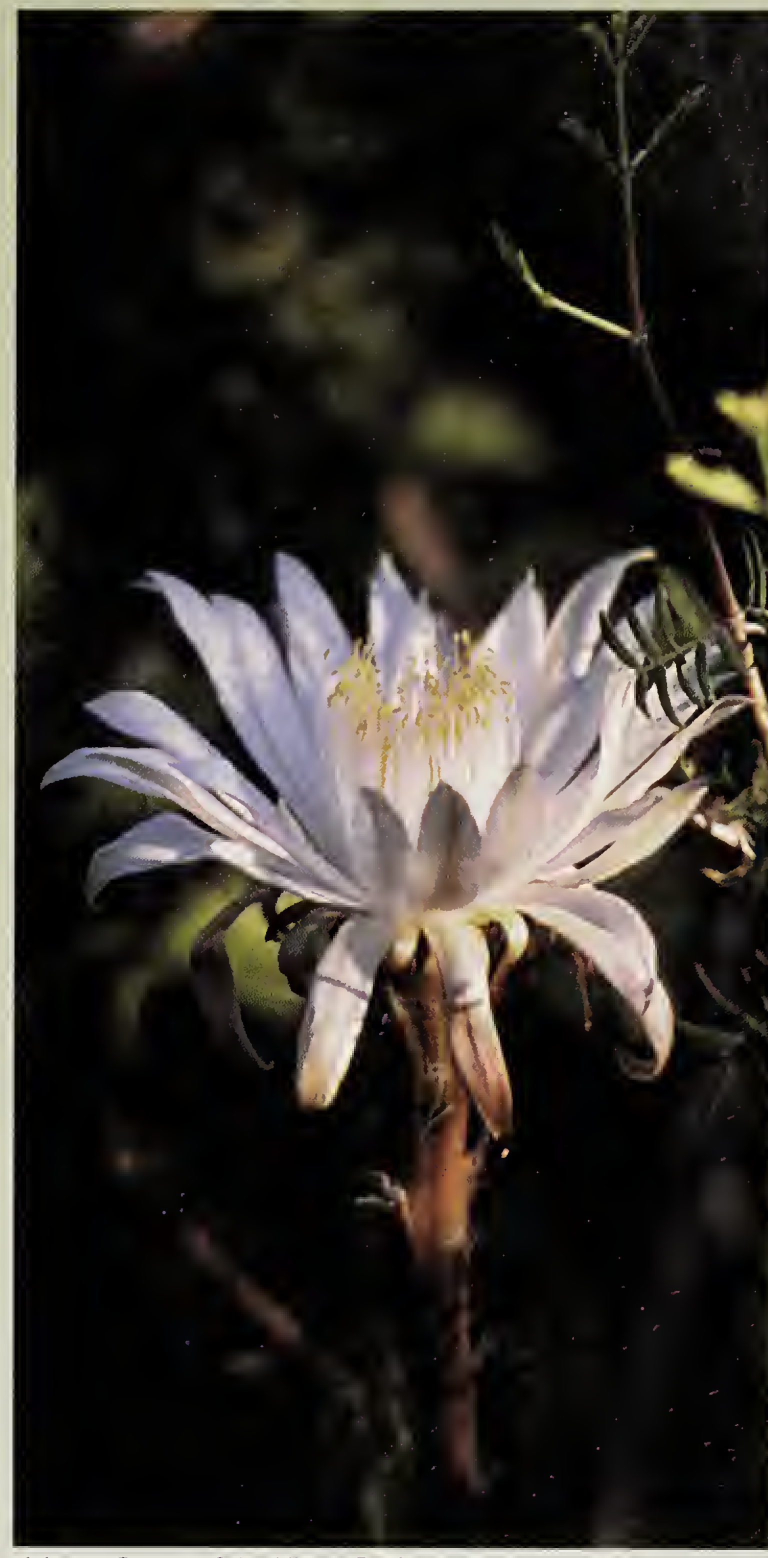


Photo by Jennifer Johnston

Arizona Queen of the Night (*Peniocereus greggii*)

CORRECTION

In the March 2002 issue of *The Sonoran Quarterly*, the Garden thanked our *Growing a Legacy for Generations* donors, and published an Honor Roll of Donors. We regret the inadvertent omission of several donors in the $25,000 and above giving category and we express thanks now to:

Shamrock Foods Company
Jeff Stinebiser & Robert Baily
Robert & Shoshana Tancer
John & Nancy Teets

Desert Botanical Garden 2001 ANNUAL REPORT

Desert Botanical Garden

Report to the Members

The year 2001 saw the launch of a new era in the life of the Desert Botanical Garden.

During the year the Garden wrapped up a major capital campaign, hired a new director, opened a new trail, and completed the largest construction project ever undertaken at the Garden. It was a year in which residents of the surrounding communities re-discovered the Desert Botanical Garden; the Garden went from being the area's "best-kept secret" to becoming known as the jewel of Papago Park.

A successful capital campaign
In January the *Growing a Legacy for Generations* capital campaign was completed. The campaign, headed by Bennett Dorrance and Pamela Grant, raised $17 million in two years.

A new trail
The Harriet K. Maxwell Desert Wildflower Trail opened officially in March. The trail, which had been installed a year in advance, features wildflowers of North America's four deserts and is the fifth thematic trail at the Garden.

Dinner on the Desert
This annual fund-raising event, held in April, was the most successful ever, raising $247,975 for the Garden.

Two major books
Staff members Edward "Ted" Anderson, Ph.D., senior research botanist, and Wendy Hodgson, M.S., senior research botanist and curator of the herbarium, published major books in the field of botany. Dr. Anderson's book, *The Cactus Family*, which was released only days before his unexpected death, is a comprehensive volume of cactus taxonomy. Ms. Hodgson's *Food Plants of the Sonoran Desert* describes edible native plants and their use by indigenous peoples of the Southwest. Both books are major reference works in botanical research.

A new director and new directions
In June, Kenneth J. Schutz became the Garden's tenth executive director, succeeding Carolyn Polson O'Malley and Interim Director Dr. William Huizingh. Under his direction the Garden reached out to local audiences, especially children and families, and the number of visitors from Maricopa County increased by more than 65 percent in just one season.

Improved accounting and financial procedures
New practices were instituted in the business office to improve accounting procedures and to maintain better control over Garden funds. They include greater separation of duties, strict new check-signing procedures, greater oversight of day-to-day financial operations, and unannounced spot audits throughout the year.

Anderson gift to the Library
Dr. Adele Anderson completed donating papers, photographs, books, manuscripts, and notes from the personal library of her late husband, Dr. Edward "Ted" Anderson, to the Desert Botanical Garden Library. Dr. Anderson had presented much of his research materials to the Garden library over the course of his nearly nine years on the staff.

Four new buildings and a new entry
On December 14, 2001, the Garden received its official Certificate of Occupancy from the City of Phoenix and took possession of the four new buildings and the new entry. That date marked the successful and remarkable completion of the Garden's largest construction project, which began in September 2000 and which was completed on time and under budget.

We kept our commitment
Throughout a year of construction the Garden kept its commitment to members and the public by remaining open and welcoming to visitors. The Garden paths were beautiful and serene every day of the year. The staff continued its regular work of maintaining the health of the plants, improving the scope of the collections, conserving desert plants and species, and offering educational programs to the public at large.

Martha Hunter
President, Board of Trustees

Kenneth J. Schutz
Dr. William Huizingh Executive Director

The Garden BY THE NUMBERS

Accredited by the American Association of Museums

"The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge about arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."
—Articles of Incorporation, 1937

Visitors

Total memberships (June 2001): 10,046
Total yearly attendance: 223,021

Living Collection

New plant accessions: 298
Total living accessions: 10,378
Total living plants: 20,817, of which 2,887 are seeds
New species added: 138
Total plant species: 3,305
Total taxa (includes varieties, subspecies, formas): 3,800

Rare and Endangered

(Center for Plant Conservation)
Total accessioned seeds and plants: 993
Total CPC species: 37

Herbarium

New herbarium accessions: 2,157
Total herbarium specimens: 47,300

Library

Number of library titles: 6,000

Volunteers

Number of volunteers: 484*
Volunteers working 100 hours or more: 194
Total volunteer hours: 51,163
Number of Garden Shop volunteers: 69
Number of horticultural volunteers: 107
Number of interpreters: 212
Number of outreach/envoy volunteers: 73
Number of research/collections volunteers: 48
Number of special projects volunteers: 163
Number of volunteers in other programs: 111
(*Some individual volunteers work in more than one program.)

Tours and Education

Number of tours: 964
Participants in tours: 16,664
Number of visitor interactions with docents, staff, or special demonstrators: 94,312
Workshops offered: 84
Participants in workshops: 1,157
Students on self-guided field trips to the Garden: 20,602
Students on guided field trips: 4,130
Number of students seeing outreach puppet shows: 11,800
Number of teachers attending Garden workshops or outreach programs: 83
Number of college students visiting as part of their studies: 1,940

Horticulture

Total acres at Desert Botanical Garden: 145
Acres under cultivation: 52
Number of plants in horticulture: 45,000
Number of plants planted this year: 6,000
Number of graduates of the Desert Landscaper School in 2001: 100
Number of graduates of the Desert Landscaper School (cumulative): 323
Number of calls to Plant Questions Hotline: 1,911
Number of annual plant sales: 2
Number of plants sold: 233,000

Staff as of April 2001

Full-time: 58
Part-time and/or seasonal: 27

How to reach us:

Write: 1201 N. Galvin Parkway, Phoenix, AZ 85008
Call: 480/941-1225 TDD: 480/754-8143
Fax: 480/481-8124 Website: www.dbg.org

Financial Statements

Information as of September 30, 2001

Fiscal year 2000-2001 proved to be another successful one for the Desert Botanical Garden. Despite the extensive construction funded by the capital campaign, activities and events in the Garden proceeded as normal without interruption. The Statement of Financial Position reflects an increase in Cash & Investments of over one million dollars from the proceeding fiscal year. Dinner on the Desert proved to be our major fundraising event producing revenue of $247,975, an unanticipated increase of $72,975 over budget. Admissions, memberships and gross profits from retail sales continued to surpass those from the preceding fiscal year. Contributions listed on the Statement of Activities include donations to the capital campaign and to annual operations. Because significantly more campaign gifts were made in the prior fiscal year, contributions revenue decreased overall in 2001.

The most exciting event during the fiscal year was the opening of the Harriet K. Maxwell Desert Wildflower Trail in March 2001. This event, the first segment of our capital campaign construction, anticipated the excitement of the grand opening that followed.

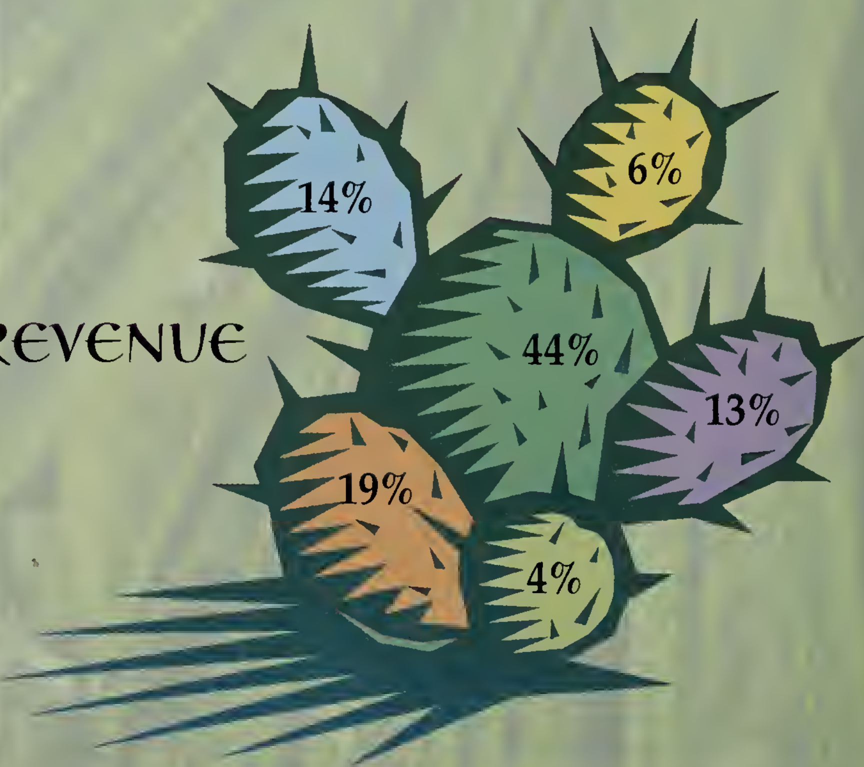
During the fiscal year, it was discovered that some funds were missing. Fortunately, most of these funds were recovered. Subsequently, a variety of safeguards in accounting and check signing procedures was installed. As a result of this unfortunate occurrence, our independent auditors required an adjustment of $151,950 resulting in a Change of Net Assets in the amount of $1,102,651.

Bob Tancer
Treasurer, Board of Trustees

STATEMENT OF ACTIVITIES

Revenue	2001	2000
Gross Profit on Retail Sales	$ 712,620	$ 621,170
Admissions	972,258	923,952
Contributions, Grants & Special Events	2,184,646	5,905,704
Investment Income (net)	310,100	406,225
Memberships	626,608	590,583
Other Revenue	200,856	377,300
Total Revenue	$ 5,007,088	$ 8,824,934
Prior Period Adjustment	$ 151,950	-0-
Total Revenue & Prior Period Adjustment	$ 5,159,038	$ 8,824,934
Expenses		
Program Expenses	$ 2,723,618	$ 2,794,019
Fundraising & Membership	464,111	431,890
General & Administrative	602,433	600,478
Retail	266,225	192,127
Total Expenses	$ 4,056,387	$ 4,018,514
Change in Net Assets	$ 1,102,651	$ 4,806,420

REVENUE



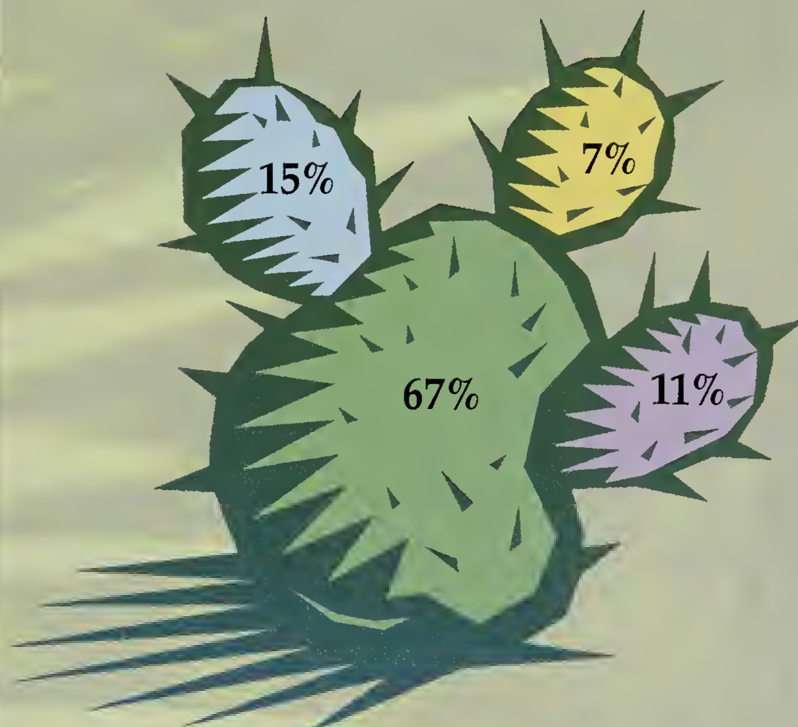
Contributions, grants and special events	44%
Admissions	19%
Gross Profit on Retail Sales	14%
Memberships	13%
Investment Income	6%
Other revenues	4%

STATEMENT of FINANCIAL POSITION

Assets	2001	2000
Cash & Investments	$ 5,954,853	$ 4,223,626
Pledges & Other Receivables	2,750,377	2,189,892
Inventories	100,925	106,262
Total Current Assets	$ 8,806,155	$ 6,519,780
Cash & Investments (noncurrent)	10,922,647	18,128,058
Pledge Receivables (noncurrent)	2,357,666	4,027,743
Property & Equipment	12,965,103	5,300,251
Bond Issuance Cost	233,009	198,507
Other Assets	113,605	64,782
Total Assets	$ 35,398,185	$ 34,239,121

Liabilities		
Accounts Payable	$ 145,727	$ 97,266
Accrued Expenses	107,100	126,893
Deferred Revenues	218,424	196,945
Accrued Interest	72,586	63,114
Capital Lease Obligations	443	3,649
Total Current Liabilities	$ 544,280	$ 487,867
Bonds Payable	$ 16,300,000	$ 16,300,000
Total Liabilities	$ 16,844,280	$ 16,787,867
Total Net Assets	$ 18,553,905	$ 17,451,254
Total Liabilities & Net Assets	$ 35,398,185	$ 34,239,121

EXPENSES 2001



Program Expenses	67%	Fundraising and Membership	11%
General and Administrative	15%	Retail	7%

Auditor's Opinion

The Garden has received an unqualified opinion from its auditors, Miller Wagner & Company, PLLC Certified Public Accountants, on the audit of its financial statements for the year ending September 30, 2001. A summary of the financial statements is provided here. Copies of the audited financial statements are available upon request from the Desert Botanical Garden Business Office at 480-481-8155.

Summer Activities

(see page 8)

Kids' Garden Camp

Flashlight Discovery Tours

"Taste of the Desert" Summer Sunrise Tours

Sensational Summer Samplers

Desert Ecology Video Shows

Workshops for Children and Adults

Friday Family Specials

Photo by Jennifer Johnston

The Sonoran Quarterly
Desert Botanical Garden
1201 N. Galvin Parkway
Phoenix, AZ 85008
480-941-1225

Desert Botanical Garden

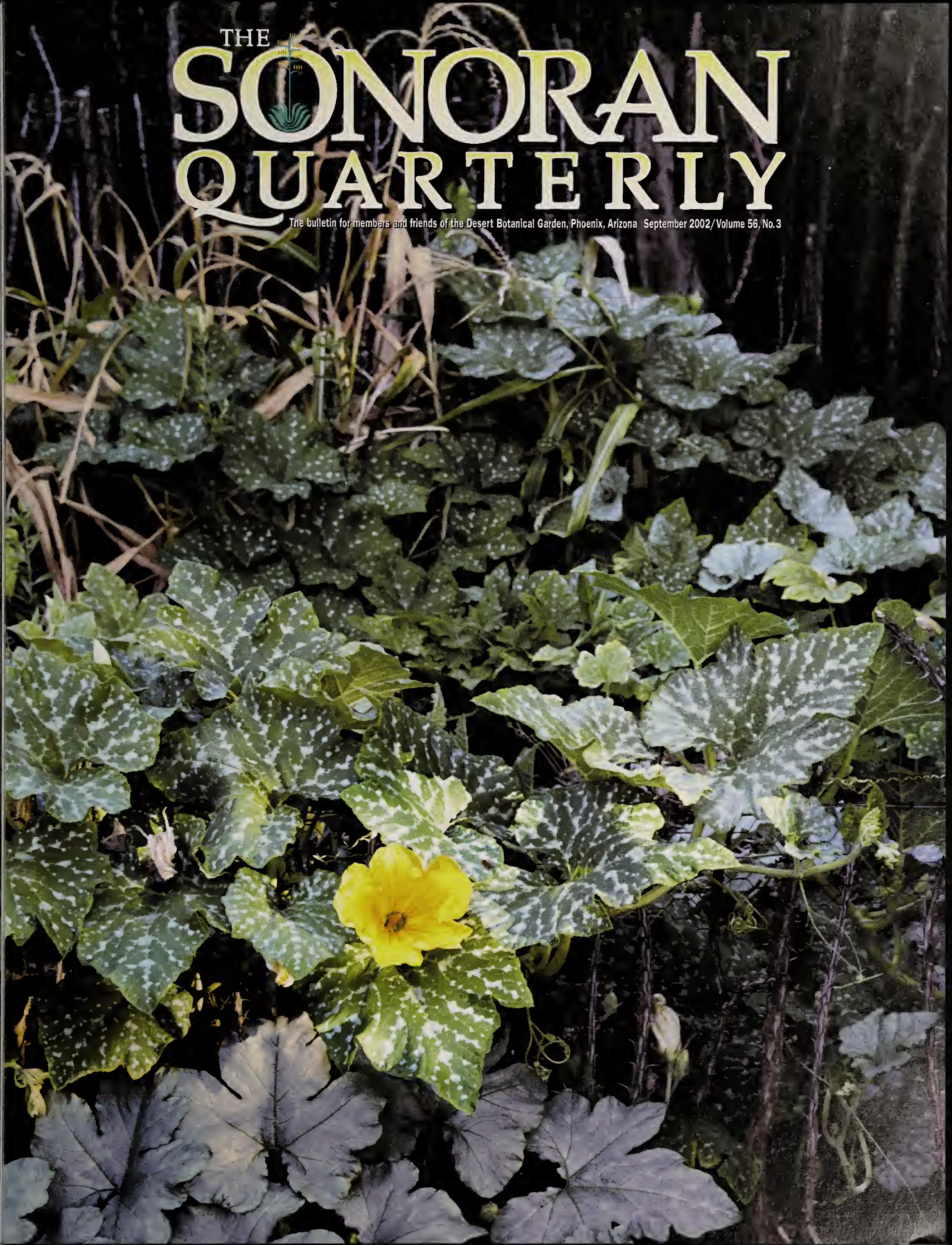
DON'T LEAVE HOME without sending us your forwarding address!

The mission of the Desert Botanical Garden:

"The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge about arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."
–Articles of Incorporation, 1937

THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona September 2002/Volume 56, No. 3



A NEW WORLD HARVEST

Photograph by Jennifer Johnston

Ken Schutz

The "New World" is what many European explorers called the continents of North and South America when they first encountered them in the fifteenth and sixteenth centuries. In fact, until just recently historians credited those explorers with "discovering" the New World—although we know better than that now. When the Europeans first arrived in this hemisphere, they didn't "discover" anything; instead they became the first citizens of their world, the "Old World," to bear witness to the remarkable richness of human, plant and animal life that had flourished here for many thousands and even millions of years. The vastness of our hemisphere as well as its diversity, its lush and exotic life forms, and its many different human communities must have been astounding and nearly incomprehensible to them.

In the more than five hundred years since the Old and New worlds met, there has been an incredible exchange between the two—of cultures, of people, of technologies, of knowledge and ideas, and of plants and animals—so much that sometimes the two worlds no longer seem distinguishable. And to the extent that such exchanges have produced mutual respect and advancement, harmony among peoples, and a better standard of living for all, they are welcome. But even so, shouldn't we worry that as our planet "shrinks" even further and the global community becomes more homogenized, we will lose sight of our own roots, our ecological heritage, and all those elements of the New World that make our lives unique?

To explore this very issue, the Garden will sponsor a two-month long series of programs and events this fall called *The New World Harvest—Celebrating the Plants and People of the Western Hemisphere.* Festivals will celebrate Native American and Latino cultures, other events will feature visual arts and live music, and still other activities will honor some of the most famous plants from the New World, including cacti, corn, chilies, pumpkins, gourds, and cocoa.

All of these activities are described in greater detail throughout this issue of *The Sonoran Quarterly*. I hope you enjoy reading about them. More important, I encourage each of you to visit the Garden often this fall and to take part in the bounty of opportunities our *New World Harvest* has to offer.

Ken Schutz
The Dr. William Huizingh Executive Director

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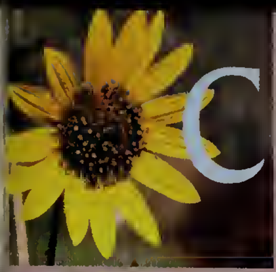

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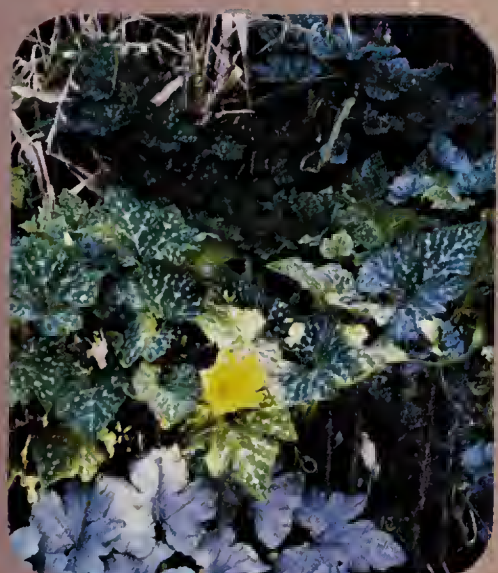


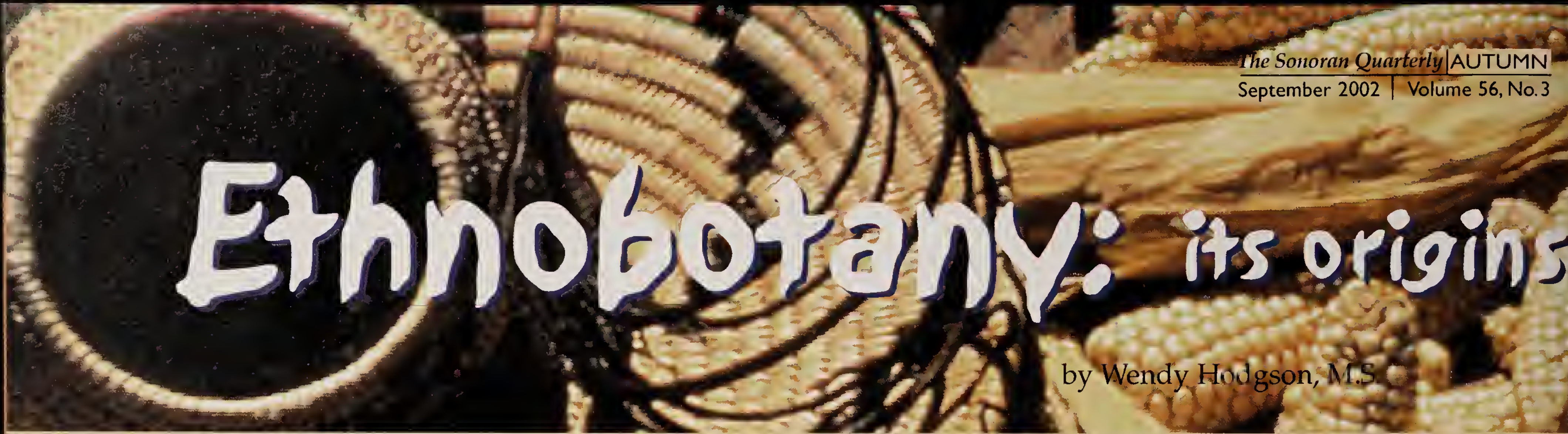
ARTICLES

FEATURES

ON OUR COVER

This summer flower of the Tohono O'odham striped cushaw squash (*Cucurbita argyrosperma*) is edible and will ripen into edible fruit. In the background is Tohono O'odham sixty-day flour corn. These are summer bounty in the Native Crop Garden along the Plants and People of the Sonoran Desert Trail.

Cover photograph by Gene Almendinger.



Ethnobotany: its origins

by Wendy Hodgson, M.S.

Ethnobotany is no longer merely the study of how people use plants. Today enthnobotany helps us understand how people relate to plants and their local environment and how plants respond to people. It also fosters cultural and biotic diversity.

Ethnobotany has always influenced and been influenced by other areas of study such as botany (including systematic botany), anthropology, ecology, horticulture, soil science, and economic botany. E. Wade Davis explains that at its inception, while botany was accepted as a serious discipline, ethnobotany was seen more as a point of view and was mostly fuelled by the prospects for economic gain through the commercial potential of its new natural products.

John Harshberger, a botanist at the University of Pennsylvania, coined the word "ethnobotany" in 1896, but as a practice ethnobotany has much earlier origins. In 1495 the Egyptian queen Hatshepsut sent an official to distant areas to collect living specimens of fragrant trees. In the New World at about the same time, Aztecs sent envoys to distant lands in search of new medicinal and ornamental plants.

The earliest known enthnobotanical work is *The Condition of the Flora of the Southern Region*, written at the end of the third century A.D. by Hi-Han. It discusses the introduction and use of numerous plants from Southeast Asia into China. Even earlier Dioscorides, the Greek surgeon, wrote his *de Materia Medica* in 77 A.D., describing the characteristics and medicinal properties of about six hundred plants. He carefully noted plant habitats, when and how plants were gathered, which were edible, poisonous or therapeutic, and recipes for their use. Dioscorides also noted exotic plants, particularly spices, that had significant economic potential. His work remained the source of botanical information for more than a thousand years in Europe, even in areas far removed from the Mediterranean, where his study was based.

During the Renaissance, botanists developed works based on their own original studies, rather than depending on the work of Dioscorides. These important herbals included Leonhart Fuchs's *De Historia Stirpium* in 1542, which, like other emerging works at the time, was beautifully illustrated with illustrations based on live specimens. Fuchs's herbal also included for the first time some of the exotic and strange plants from the New World.

Davis further explained how Christopher Columbus used his collected plants to prove that he had reached the West Indies. He thought that he had brought back the coconut described by Marco Polo, but it was instead an inedible nut. He presented aromatic plants as evidence that he had visited the Spice Islands. Other plants from the New World that proved economically important to European interests were maize, potatoes, manioc, chocolate, chilies, pineapple, and tomatoes.

What was more interesting and at the same time disconcerting to European botanists, however, were the thousands of plant specimens brought back that had never been catalogued or named. A system of classification was now called for in order to determine what was new, what was *meant* to be new, and how to catalogue these ever-increasing numbers of specimens. John Ray, an English naturalist, made the first attempt at a systematic organization in 1682. He recognized that a species was a group of individuals which, through reproduction, gave rise to new individuals similar to themselves. This was a new concept and did much to further a categorizing system.

It was Swedish botanist Carl Linnaeus who developed in the early 1700s the binomial system of nomenclature, which is the basis for the naming and cataloguing of plants today. Linnaeus's system of classification made the sorting and classifying of thousands of specimens more manageable, and helped spur further

Gary Nabhan, former director of research at Desert Botanical Garden, in a field of *Agave tequilana* in Valle de Tequila, Jalisco, Mexico.

and relevance in today's world

Ruth Giff, Gila River Pima, showing Ruth Greenhouse the art of sifting mesquite flour.

botanical and ethnobotanical exploration. Linnaeus's students traveled all over the world, bringing back not only a tremendous number of plant specimens, but also accounts of the cultures they had visited, the customs of the inhabitants, and the way indigenous peoples used their plants.

Information on plant use was often embedded in travel journals and reports of botanists, explorers, traders, missionaries, naturalists, anthropologists, and even pirates! A significant amount of information gleaned from such reports proved invaluable for my own research on how indigenous groups of Baja California, most of whom had become extinct by the early 1800s, used plants for food. Such reports and journals caught the attention of academicians who recognized the need for a more systematic approach to the study of indigenous peoples and plants. Stephen Powers coined the term

Maize through the Ages

Maize is the correct name for what Americans commonly call corn. The word "corn" was used in Europe to mean any edible grass seed, including millet, sorghum, barley, rye, oats, wheat, or maize.

About eight thousand years ago, in what is now central Mexico, astute plant gatherers began to select the most desirable seeds from the wild edible grass teosinte (*Tripsacum* spp.) and plant them far away from the wild grass stands so that their new "crops" wouldn't hybridize. The earliest maize was a type of popcorn in the primitive race called chapalote. The kernels were brown and the ears only 7.3 centimeters in length. Maize spread from Mexico to distant regions, reaching Peru about four thousand years ago and the United States about two thousand years ago.

After centuries of selection and isolation, primitive maize changed from easily detached, small, kernels of teosinte to the more than three hundred races of corn we have today. All of these races of corn are the same species: *Zea mays*. By the time of Columbus almost all of the major types of corn known today were developed and established throughout most of the western hemisphere. Within one generation of the introduction of maize to the Old World, it had spread throughout southern Europe. Within two generations it had spread around the world.

Because of its high productivity, appealing taste, and ability to grow in marginal conditions, maize is considered the most valuable food plant contributed by the New World. The volume of maize quickly surpassed that of the cereals bred by Old World farmers—wheat, rice, sorghum, barley and rye, and is today the second most plentiful cereal in the world.

Most maize is used for animal feed but other uses include human food, starch for industrial products, ethanol for engines, and syrup for sweetening. Four major types of corn are flint, dent, sweet, and flour.

Flint corn, also known as Indian corn, has a hard outer shell, is translucent, and comes in a range of colors from white to red. Today most flint corn is grown in Central and South America. Popcorn is a type of flint corn. It has a soft, starchy center covered by a very hard shell. When the popcorn is heated the natural moisture inside turns to steam that builds up enough pressure for the kernel to explode.

Dent corn, often called field corn, is often the main kind of corn used today when making industrial products and many kinds of food products such as tortillas, corn beer, and animal feed. It is white or yellow.

Sweet corn is usually eaten on the cob, canned or frozen. It contains more sugar than other types of corn. Sweet corn is seldom processed into feed or flour.

Flour corn is a soft grinding corn used for cornmeal and for roasting.

Did you know?
Maize is extraordinary for its advanced degree of domestication. No other cereal species has so completely lost its natural ability to disperse its seeds in the wild and thus to propagate itself without human intervention. If an ear fell to the ground and the kernels sprouted, the competition for growing space within the mass of seedlings would be so intense that not one of the seedlings would live long enough to mature and reproduce.
—Ruth Greenhouse, M.S., is the Garden's director of educational services.

"aboriginal botany" in 1874, which was replaced by Harshberger's term twenty-two years later. Much of the ensuing ethnobotanical work focused on the compilation of plant names and uses by indigenous peoples. Soon other scientists from other disciplines, most notably anthropologists, became attracted to this discipline.

Anthropologists brought a new dimension to ethnobotany with their belief that the study of plants and how people used them should involve more than a simple compilation of data. Although he acknowledges their importance, Amadeo Rea calls these compilations of data "no more than economic botanies: laundry lists of what the native people call a given biological species and how they use it." Just as anthropologists regard plants and humans as codependents, so the ethnobotanist should not only document plants and their uses, but also evaluate and understand the complex *interactions* of plants and humans in their cultural context. As Rea states, "an ethnobotany. . . should reflect the people's worldview and organization of biological phenomena. It should include the folk science of the people [local peoples' names and categorizing of plants as well as their folklore and stories about plants], not just some facts to fill the slots on an elicitation sheet of an academically trained Western investigator who comes from a culture that views the natural world basically as an exploitable resource."

The inclusion of anthropologic, or ethnographic, studies was obviously important, but few anthropologists were trained in botany and did not know how to make the voucher, or herbarium, specimens that are so critical to understanding precisely what species were used. Likewise, botanists were generally not adept at conducting productive interviews and often lacked sensitivity to the culture being studied. Botanists usually cannot spend long periods of time in one area, nor can they learn the culture's language; information is often significantly altered when it must be translated through one or more languages or dialects. For instance, while investigating medicinal plants used by the Wa tribe in Burma and Thailand, Ted and Adele Anderson, a medical doctor, and I recorded information that eventually passed through as many as three informants because of the different languages or dialects!

Obviously, ethnobotanic research is improved if the primary investigator, or one of the scientific team, is fluent in the native language. Best would be a multidisciplinary investigative team with a cultural native who is trained in botany as well as researchers in such fields as biology, anthropology, biochemistry, ecology, and soil science, and even linguistics, biomedicine, and entomology (study of insects). My own work investigating how agaves have been used and perceived by historic and prehistoric peoples has now incorporated anthropology, archaeology, ecology, soil science, ethnobotany, botany, plant geography, cytogenetics (chromosome studies), molecular analyses, and reproductive and pollination biology.

What can ethnobotany contribute in today's world?

As habitats are being destroyed at an alarming rate and loss of plants and cultures continues with each generation, ethnobotanical studies contribute much towards understanding and better management of ecosystems. Public policies, usually driven by economic incentives, should be influenced by sound scientific work that investigates past and present indigenous use of resources.

Numerous studies now show that indigenous cultures actually preserve biodiversity (the number of species within an area). Nina Etkin points out that this is a far cry from the commonly accepted adage that overexploitation and reduction of biodiversity is synonymous with indigenous practices.

Pima women carefully picking out cooked cholla buds.

Chocolate pods growing at Garfield Park Conservatory, Chicago, Illinois.

Indigenous people often have tremendous local environmental knowledge that is seldom taken into account by policymakers who are outsiders and far removed from the cultural area. As illustration, Etkin recounts how one indigenous people in Nigeria engaged in a complex system of sustainable agriculture, including the use of species for more than one purpose (food, medicine, cosmetics, etc.), which encouraged greater diversity of species. Indeed, those plants considered valuable are looked after and cared for. Gary Nabhan describes diversity that reflects indigenous sustainable land management practices in Mexico. There, instead of growing monocultural stands of maize, people practice intercropping where they plant a "collage" of greens and other vegetables with other kinds of plants in a mosaic pattern under an overstory of maize, shading vines and other plants.

Western scientists may also classify plant species differently from the way indigenous peoples do. For example, a culture may use and care for five different types of prickly-pears based on the characteristics of their fruits, but scientists see only one type. Etkin and others stress that studies such as hers and others should help guide policymakers toward profitable, environmentally sound, and sustainable multi-use land management programs. Policymakers

Ancient Aztec Drink Xocolatl Takes the World by Storm: The Story of Chocolate

During his conquest of Mexico, the Aztecs served Cortes the royal drink "xocolatl," meaning warm liquid. The Aztec recipe for xocolatl produced a spicy, bitter drink. It was made by roasting and grinding the seeds of the cacao (kah-kow') tree into a paste, mixing it with water and ground corn, flavoring the mixture with chilies, and beating the drink to a froth. The Olmec, Mayan and other ancient peoples also valued the seeds of cacao trees. The Mayans are credited with the first domestication of cacao trees and developing the first cacao beverage.

Cacao trees are found naturally only in the rainforests of Central and South America. In the sixteenth and early seventeenth centuries, cacao trees were planted in the Philippines, off the coast of Africa, and in other tropical lowland areas twenty degrees north or south of the equator. Most products since that time include beverages and desserts sweetened with sugar. When introduced to Spain, however, the drink was flavored with honey, ground nuts, anise, cinnamon, musk, and other flavorings.

The most common preparation of cacao seeds-still used today-begins with removing the mass of purple seeds and white pulp from the large pods. This mass is allowed to ferment, which develops the flavor and changes the color of the seeds to brown. The seeds are then dried and roasted until they turn a rich, dark brown. After the seed coats are removed, the seeds are ground into a paste of pure chocolate. Pure chocolate contains 53 percent cocoa butter (fat).

The twenty or so species of cacao trees, genus *Theobroma*, cross-pollinate freely. Food scientists are studying their genetic diversity in order to improve cacao as a crop and increase disease resistance.

Cacao trees have clusters of small white to pink flowers on the main trunk and larger branches. Pollination is by a small mosquito-like midge fly. Fewer than five percent of the flowers yield fully developed pods. The average tree has twenty to fifty pods. Each pod has as many as fifty seeds, enough to make a one-hundred-gram chocolate bar. Although the fresh beans are bitter and unpleasant, the sweet-sour flavor and inviting aroma of the surrounding white pulp attract birds, monkeys, and other animals that open the pods, eat the pulp and discard the seeds.

Did you know?
Cacao trees were named *Theobroma* by Linnaeus in 1753. *Theobroma* means "god food," or "food of the gods," for the Aztecs credited their god Quetzlcoatl for introducing cacao to humankind.

The word "cocoa" refers to products from the cacao tree. —*Ruth Greenhouse*

need to realize that the long-term benefits of relatively intact ecosystems are preferable to short-term gains from their destruction.

To those concerned about reduced biodiversity, the destruction of habitats and loss of local indigenous knowledge means a loss of potential medicines and food plants. Of an estimated 75,000 edible plants in the world, only 2,500 have been eaten with regularity, 150 have entered world commerce, and twenty—mostly domesticated grasses—"stand between human society and starvation," according to Wade Davis. Eighty percent of all medicines are based on plant products, yet only one percent of the plants in the tropics have been studied chemically, while ninety percent have not been been biochemically investigated to any degree.

It is only within the last decade or so that pharmaceutical companies have begun to study plants based on indigenous information rather than selecting them at random. Shaman Pharmaceuticals Inc., a San Francisco-based firm, was a pioneer in this endeavor. This company sponsored our trip to Burma and Thailand in hopes of finding plants that proved to be good candidates for use as antifungals and anti-immuno-depressants. They acknowledged Dr. Ted Anderson's ground-breaking work on the ethnobotany of groups inhabiting the area known as the Golden Triangle in Southeast Asia, of which Burma and Thailand are a part.

The major focus has been on habitat loss within tropical rain forests, yet other biomes are also experiencing such losses, with potential and undiscovered resources lost as well. Our own creosote bush, *Larrea tridentata*, has shown considerable promise in the treatment of certain types of cancer and herpes-related diseases. Plants for some of the early research originated from the Desert Botanical Garden. Selection of this plant as a target species stemmed from investigating the ethnographic literature regarding its numerous uses as a medicine. In another example, Shaman Pharmaceuticals has identified hypoglycemic compounds in the roots of Indian-plantain (*Psacalium decompositum*) which may prove useful for treating diabetes. This rather infrequently encountered plant is found in southeastern Arizona, southwestern New Mexico and Sonora, Mexico.

Recent, serious studies have investigated the important roles wild food plants play in the subsistence patterns of indigenous people. For example, within the last decade Jenny Brand and Gary Nabhan have showed how certain desert food plants such as mesquite, tepary beans and prickly-pears were important traditional foods in helping control diabetes-mellitus in desert peoples predisposed to the disease.

Photo by Gene Almendinger

Prickly-pears

New World pre-Columbian foods and genetic diversity have been significantly reduced since Columbus's time. Such a loss, as Gary Nabhan points out, has affected all of humanity and not only American cultures. Because there was no inventory of the crops and genetic variability in New World fields prior to Columbus, he says, we will never know how much has been lost, although he estimates fifty-five to sixty-five percent of the crop diversity in the U.S. Southwest has been lost since post-Columbus. A seed conservationist estimates that as much as seventy percent of the crop varieties are now extinct.

Greater genetic diversity minimizes the risk of total crop failure during climatic extremes or following pest predation. During the Columbian exchange initiated within the first half century following Columbus, dozens of Old World crops, hundreds of weeds, and some animal pests were dispersed to the Americas. Following the introduction of livestock, exotic (and some native) plants spread. Europeans farmed lands for the production of forage grasses in addition to other Old World crops, displacing native crops and all their varieties.

This "Europeanization" of the American landscape, as Nabhan calls it, has continued into this century. And, in addition, our own, well-intended efforts to provide relief by sending vast amounts of a few commercial foods (along with farm machines and pesticides) to other peoples in need may also encourage loss of native food knowledge and disruption of culture.

But why should we care? Personally, I cannot imagine going through life without chilies or chocolate, and wonder what other delectable tastes I will never experience because they were displaced by other crops, frequently ill-suited as transplants to other various climates and soils. Secondly, and more important, we should care because a tremendous diversity of plants and knowledge once lost is lost forever.

Photo by David Cavagnaro

We are also recognizing that indigenous peoples should be compensated for the knowledge and resources they have shared with institutions or individuals, resulting in the identification and development of a particular plant medicine. Appropriate and beneficial compensation might be in the form of services such as education and health programs. Shaman Pharmaceuticals donates a percentage of its research and envisioned profits to local communities.

Other examples of partnerships are the National Cancer Institute, which is studying a plant-derived drug to treat HIV and promises a large percentage of royalties to native healers or their governments. And Paul Cox, director of the National Tropical Botanical Garden, signed an agreement with Samoan chiefs to return a portion of financial benefits from this same plant that Samoan healers used to treat hepatitis.

Just when such partnerships and reciprocal programs are taking hold, another force may be afoot to break them down. Biotechnology programs producing genetically modified organisms (GMOs) may have far-reaching effects on traditional cultures and their knowledge of resources, namely their disruption and erosion. Nabhan points out that critical to the success of these programs are legislative and judicial acts that enable private firms to obtain property rights to plant genes, all genetically-manipulated plant varieties and even undescribed species. The courts have already shown favor towards corporations claiming rights over varieties or whole species if their gene modifications escape into the environment. People are rightfully concerned that traditional farmers might someday have to pay royalties to an agribusiness company just to plant their own seeds.

Ethnobotany is complex and fascinating. Despite its advances and discoveries,

Red Hot Chili Peppers

Columbus called the pungent fruit he tasted in the Caribbean Islands "pepper" (*pimiento*) because he thought he had found the valuable blackpepper (*Piper nigrum*) native to India. In fact, chili peppers (*Capsicum* spp.) are native only to the New World, and were the most common spice used by Native Americans. They have been readily integrated into Old World recipes for the past five hundred years, and today chili peppers are one of the most widely used spices in the world. Between two and three thousand varieties of the five original forms are grown worldwide. In addition to domesticated forms, twenty-three wild species are used in Brazil, Bolivia, Mexico, and the U.S. Southwest.

Domesticated chili peppers are frost-sensitive annuals or perennials that originated in South America. Their juiceless pods vary in shape and size and contain small white seeds. The pods are first green and then ripen to red, yellow or purple. They can be eaten fresh, cooked, or dried and ground to a powder. All hot chili peppers contain capsaicin, a natural substance that produces a burning sensation in the mouth. Capsaicin is found primarily in the pepper's placenta —the white "ribs" that run down the middle and along the sides of a pepper— and also unevenly distributed throughout the flesh.

At the time of Columbus, all five domesticated species of peppers were grown throughout MesoAmerica and the Caribbean including *Capsicum annuum var. annuum* (cayenne, bell, jalapeno) and *C. frutescens* (tabasco). For the most part, domesticated chilies didn't reach North America until after colonization by northern Europeans in the 1600s. But the wild chile known as chiltepin (*C. annuum var. aviculare*) may have been used in pre-Columbian times. It grows naturally from northern South America northwards into the southwestern United States and the Caribbean. In southern Arizona it can be found in canyons, often under the shelter of nurse trees like mesquite, oak, and palmetto which shield them from sun, heat, frost, and hungry animals. Today harvesters, or chiltepineros, pick an estimated thirty tons of chiltepines a year for salsa and stews, medicine and other purposes. Their pea-sized fruits are ranked as the third hottest chili in the world, behind only the habanero and Bahamian.

Did you know?
The chiltepin is valued because it is genetically the most closely related taxon to the domesticated species, *C. annuum*, which originated in southern Mexico. Scientists are interested in studying chiltepin genes for disease and pest resistance, or drought and frost tolerance. In 1999 a four-square-mile parcel in the Coronado National Forest, fifty miles south of Tucson, was officially dedicated to the preservation of the northernmost population of the chiltepines. *—Ruth Greenhouse*

E. Wade Davis points out, the ultimate challenge for the ethnobotanist "will lie not merely in the identification and extraction of natural products, but rather in the discovery and elaboration of a profoundly different way of living in the forest"—the forest, or other ecosystems and biomes, including our own Sonoran Desert. Ethnobotanists need to teach all of us that rather than transforming whole ecosystems to satisfy near-sighted goals, it is far better to understand ecosystems and live within them. We can better learn to do this by understanding how indigenous people used and perceived their environment.

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Wendy Hodgson is senior research botanist and curator of the herbarium at the Desert Botanical Garden. She is the author of Food Plants of the Sonoran Desert, *which describes edible native plants and their use by indigenous peoples of the Southwest and has been awarded the prestigious Klinger Award for 2002 by the Society of Economic Botany.*

Food Plants of American Origin

(a partial list, based on N. Foster & L. Cordell, 1998, *Chilies to Chocolate: Food the Americas Gave the World*, University of Arizona Press, Tucson)

Common Name	Scientific Name
achita, Queensland-arrowroot	*Canna edulis*
agave, century plant	*Agave murpheyi, A. delamateri, A. phillipsiana, A. angustifolia, A.* spp.
ahipa	*Pachyrrhizus ahipa*
allspice	*Pimenta diocia*
amaranth	*Amaranthus* spp.
avocado	*Arracacia xanthorrhiza*
beans (common, lima, scarlet runner, tepary)	*Phaseolus vulgaris, P. lunatus, P. coccineus, P. acutifolius*
bell pepper	*Capsicum* spp.
blackberry	*Rubus* spp.
black raspberry	*Rubus* spp.
black walnut	*Juglans nigra*
blueberry	*Vaccinium corymbosum*
Brazil nut	*Bertholletia excelsa*
cacao, chocolate	*Theobroma cacao*
Cape-gooseberry	*Physalis peruviana*
capuli cherry	*Prunus capuli*
cashew	*Anacardium occidentale*
cassava, manioc	*Manihot esculenta*
chayote	*Sechium edule*
cherimoya	*Annona cherimola*
chia	*Salvia hispanica, S. columbariae*
chili pepper	*Capsicum annuum*
chokecherry	*Prunus virginiana*
cocona	*Solanum sessiliflorum*
corn, maize	*Zea mays*
cranberry	*Vaccineum macrocarpon*
cupuacu	*Theobroma grandiflorum*
currants	*Ribes* spp.
custard apple	*Annona reticulata*
epazote, Mexican tea	*Chenopodium ambrosioides*
gooseberry	*Ribes* spp.
granadilla, passion fruit	*Passiflora* spp.
grapes	*Vitis* spp.
guava	*Psidium guajava*
hawthorn	*Crataegus coccinea*
hickory nut	*Carya ovata*
hog-plum	*Spondias* spp.
ice-cream bean, pacay	*Inga* spp.
jack-bean	*Canavalia ensiformis*
jaltomate	*Jaltomata procumbens*
Jerusalem artichoke, sunchoke	*Helianthus tuberosa*
jicama	*Pachyrrhizus erosus*
jojoba	*Simmondsia chinensis*
kaniwa	*Chenopodium pallidicaule*
maca	*Lepidium meyenii*
mammee apple	*Mammea americana*

Common Name	Scientific Name
manioc, cassava	*Manihot esculenta*
mashua	*Tropaeolum tuberosum*
mauka	*Mirabilis expansa*
Mexican oregano	*Lippia graveolens, L.* spp.
naranjilla, lulo	*Solanum quitoense*
oca	*Oxalis tuberosa*
Palmer's salt grass	*Distichlis palmeri*
palm-heart	*Euterpe* spp.
papaya, pawpaw	*Carica papaya, C.* spp.
passion fruit	*Passiflora* spp.
peach-palm	*Bactris gasipaes*
peanut	*Arachis hypogaea*
pecan	*Carya illinoensis*
pepino	*Solanum muricatum*
persimmon	*Diospyros virginiana*
pineapple	*Ananas comosus*
pinon pine nut	*Pinus edulis*
pinuelo	*Bromelia* spp.
potato	*Solanum tuberosum*
prickly-pear	*Opuntia ficus-indica, O.* spp.
quinoa	*Chenopodium quinoa*
quintonil	*Amaranthus retroflexus*
quito-palm	*Parajubaea cocoides*
raspberry	*Rubus strigosus*
sapote (black)	*Diospyros digyna*
sapote (white)	*Casimiroa edulis*
Sonoran panic grass	*Panicum hirticaule var. miliaceum*
soursop	*Annona muricata*
squash (crookneck, cushaw, winter, zucchini)	*Cucurbita moschata, C. argyrosperma, C. maxima, C. pepo*
star-apple	*Chrysophyllum cainito*
strawberry	*Fragaria* spp.
sugar maple	*Acer saccharum*
sunflower	*Helianthus annuus*
Surinam-cherry	*Eugenia uniflora*
sweet-potato	*Ipomoea batatas*
tamarillo, tree tomato	*Cyphomandra betacea*
tarwi	*Lupinus mutabilis*
tomatillo, husk tomato, miltomate	*Physalis ixocarpa*
tomato	*Lycopersicon esculentum*
topiro	*Solanum sessiliflorum*
ulluco	*Ullucos tuberosus*
vanilla	*Vanilla planifolia*
verdolagas	*Portulaca oleracea*
walnuts	*Juglans* spp.
wild rice	*Zizania aquatica*
yacon	*Polymnia sonchifolia*

Pumpkins & Gourds

Gourds, squashes, pumpkins, melons, and cucumbers belong to the family *Cucurbitaceae* (Cucurbit or Gourd Family). Both wild and cultivated members of cucurbits are found in most countries around the world, especially in the tropics. All cucurbits are warm season species and frost-sensitive. Of the 115 genera, four are of great economic importance: *Cucurbita* (squash and pumpkins), *Citrullus* (watermelon), *Cucumis* (cantaloupe, cucumber) and *Lagenaria* (white-flowered gourds). While cucumbers and melons are native to the Old World, squashes and pumpkins are native to the New World. White-flowered gourds are native to both hemispheres and have probably been domesticated several times in tropical countries.

GOURDS GALORE

Gourds that we are most familiar with include the hard-shelled white-flowered gourds, the colorful, knobby yellow-flowered gourds, and the wild gourds of the Arizona deserts and mountains.

The white-flowered gourd (*Lageneria sicerari*) is also known as bottle gourd, calabash, or pre-Columbian gourd. It has been in use for thousands of years for rattles, drums, stringed instruments, pipes, masks, hats, canteens, water jugs, dippers, and birdhouses. White-flowered gourds come in a variety of sizes and shapes and their shells vary in thickness from eggshell thin to over an inch or more. Some may reach 1.5 meters (more than four feet) in length! People decorate them by cutting and scraping images usingthe sharp edge or tip of a hot stick.

The white-flowered gourd was one of the first plants to be cultivated-more than eight thousand years ago-by native peoples in the Americas andsoutheast Asia. Scientists believe that ancestors of these gourds were from Africa and that it could have taken only one gourd to float successfully across the Atlantic to Brazil to establish this plant in the New World. The hard, dry skin of the mature fruit is impervious to water and the fruits are capable of floating on salt water for the better part of a year without any loss in seed viability.

The yellow-flowered gourd, a variety of *Cucurbita pepo*, closely related to the pumpkin, produces small, smooth or knobby fruits in several shapes and colors. These are commonly used as fall or Thanksgiving decorations in the United States.

Three wild gourds that grow in Arizona are the buffalo gourd (*Cucurbita foetidissima*), coyote gourd (*Cucurbita digitata*), and coyote melon (*Cucurbita palmata*). These perennial plants have trailing stems and large thick roots. They die back in winter, grow in spring, and produce flowers and fruits in summer. The shells of the wild gourds are generally thinner than the cultivated white-flowered gourds. The bitter fruit pulp has been used as a soap substitute and medicine.

PUMPKINS (SQUASH):
The Oldest of the Three Sisters

Pumpkins along with corn and beans are known as the "three sisters" in several American Indian legends. These New World crops were important sources of nutrition not only for native peoples of the American Southwest, but also for many other indigenous groups in the Americas including the Aztecs, Mayans, and Incas. The "three sisters" were first domesticated in Central America and spread from there. In the late 1990s archaeological evidence suggested that squash, not corn, was the "oldest sister"—the first crop domesticated by the indigenous peoples of what is now southern Mexico. The evidence indicated that people were raising the squash *Cucurbita pepo* four to five thousand years before they grew corn and beans. This suggests that New World farming dates back to the time when barley was first cultivated in the Middle East ten thousand years ago. Squash was introduced to the United States from Mexico around the same time as corn, about three thousand years ago. The earliest Spanish and French explorers from the 1500s introduced these plants to the Old World. They originally mistook them for melons.

The terms pumpkin and squash have no precise botanical meaning. If the fruits are harvested at an immature stage, they're called summer squash. If harvested at maturity they're called winter squash or pumpkin. Botanically, the "pumpkins" we carve on Halloween are a variety of *Cucurbita pepo*. When Irish colonists came to America, they quickly recognized the value of making their traditional jack-o-lanterns out of pumpkins instead of turnips, rutabagas, or other plants.

Other varieties of *C. pepo* are zuccini (developed in Italy in the 1700s), yellow crookneck, acorn squash, and the knobby, yellow-flowered ornamental gourds. The chief canning pumpkins used in the United States to make pie are the winter squashes of *C. moschata*, butternut or big cheese. Other types of squashes include: *C. maxima*—banana squash, turban, hubbard—and *C. agryosperma* (*C. mixta*)-striped cushaw.

CULTIVATED PUMPKINS BENEFIT FROM WILD GOURDS

Although the commonly cultivated species of *cucurbits* (squash, pumpkins, melons, white-flowered gourds) cannot cross with one another, they can cross with the wild buffalo gourd. For this reason researchers began using wild gourds such as the buffalo gourd as an intermediary, so that genes from one species can be brought into the buffalo gourd and then transferred to another species. Because the wild gourds of Arizona come from dry, hot natural habitats, their use may be desirable in developing cucurbits that can live under conditions where water is scarce and temperatures are high. —*Ruth Greenhouse*

CACTI: Unsung Heroes of the New World

Just as corn, beans, potatoes, chocolate, chilies and other New World plants spread all over the world, so have cacti. While some cacti were intentionally planted for food or horticulture, other cacti "escaped" and naturalized in Australia, Hawaii, southern Africa and other places. But essentially all of the two thousand or so species of cacti are native to the New World, and many have a long history of human use and importance here. In fact, cacti may have been one of the most important plant foods to the first peoples of North and South America more than twenty thousand years ago.

Many cacti produce nutritious, edible fruit and are useful for other purposes such as medicine, construction material, and dye. In Brazil, cave paintings more than twelve thousand years old appear to depict plants of the cactus *Tacinga inamoena*. Cacti seeds found in a cave in the central Andes of Peru have led archaeologists to believe that the cacti (mound-forming *Austrocylindroopuntia floccosa*) that currently grow there may have started by people who were camping there 11,800 years ago. In Mexico, trash mounds more than nine thousand years old contain seeds that were probably from prickly-pear cacti. In South America, thirty-five hundred to five thousand years ago, people made fishhooks from the spines of the cactus *Neoraimondia arequipensis.* And in the Sonoran Desert there is evidence that the fruits of the saguaro cactus (*Carnegiea gigantea*) have a continuity of use from the prehistoric Hohokam (two thousand years ago) to present times.

In earlier times, the saguaro cactus was a dietary staple of the O'odham, Seri, and other indigenous peoples of the Sonoran Desert. The delicious egg-sized fruit ripens in midsummer and can be eaten fresh or dried. The fruit pulp was cooked and strained to separate the seeds for storage. Seeds were ground into seed meal and used to make gruels and stews. Other traditional saguaro fruit products are syrup made by simmering and reducing the juice, wine made from the syrup, and jam made from the syrup and fruit fiber. The saguaro's woody ribs are used as building material and lashed together to create harvesting poles for the fruit.

Perhaps the cactus best known around the world today is the Indian fig prickly-pear cactus (*O. ficus-indica*). Its fruits (*tunas*) and young pads (*nopales*) were widely used throughout much of Mexico and the Caribbean. Botanists believe that indigenous people selected desirable forms and developed hybrids in pre-Columbian times. Its original place of origin is unknown, but probably was central Mexico. Taken to Spain by Columbus, the Indian fig prickly-pear was quickly introduced to other Mediterranean countries, and eventually to South America and southern Africa. By the seventeenth century it was cultivated widely as a source of fruit in colors of red, green, yellow, purple, and orange. In Mexico, peeled fruit that is dried is called *tunas secas*. Juice simmered until like molasses is called *miel de tuna* (prickly-pear honey), while a thicker product is called *queso de tuna* (prickly-pear cheese). A beverage made from the fermented juice is called *colonche*.

Another internationally used but less well known cactus is *Hylocereus undatus*, known as *pitahaya orejona* in Mexico. This fruit is very popular in Vietnam where it is known as "dragon fruit." The Vietnamese cultivate it and export it to much of Asia. This cactus grows naturally along the Caribbean coast and other tropical regions of Mexico and may be of cultivated origin.

The harvest of "dye" from *Opuntia cochenillifera* (formerly *Nopalea cochenillifera*) was once almost worth its weight in gold. Bright red dye made from cochineal insects that live on prickly-pear cacti was used by indigenous peoples of Mexico, Central America, and South America. The Spanish exported cochineal early in the 1500s and it soon became second only to gold as a commodity. Plantations of prickly-pear cacti were established in the Canary Islands, Africa, and other colonies. The Spanish monopoly on the secret ingredients of cochineal dye lasted until 1704 when the Dutch scientist Antoni van Leeuwenhoek used his newly invented microscope to discover insect remains in the dye. Until the advent of synthetic dyes in 1856, cochineal was the major source of red dye, used everywhere from the British "redcoats" to the early United States flags. Today color extracted from cochineal is used in fruit juices, lipsticks, fruit yogurt, and pill coatings. Peru and the Canary Islands are the main exporters of cochineal.

Although not part of world commerce, the uses of peyote cactus (*Lophophora williamsii*) extend far beyond its natural distribution. Peyote is used for ceremonial, therapeutic, and religious practices by many groups who live in and beyond its natural distribution in the Chihuahuan Desert of southern Texas and northern Mexico, including tribes in the United States who are members of the Native American church. The Huichol and Tarahumara of northern Mexico continue to use peyote as they have for generations.

Hundreds of other cacti have uses for food, medicine, containers, musical instruments, and construction. Most of these uses are local or regional. —*Ruth Greenhouse*

Native American Recognition Days at the Garden October 11-13

By Kirti Mathura

The Garden is proud to honor our Native American culture and contributions for the fourth year in association with the valley-wide Native American Recognition Days (NARD) on October 11 through 13. This year's theme, "Twenty Years of Celebrating the Beauty of Our Culture," gives the Garden the perfect opportunity to share a variety of family oriented activities with visitors, as well as showcase the ever-popular *Plants and People of the Sonoran Desert* ethnobotany trail.

During the weekend many talented people will visit and share the beauty of their culture, both traditional and contemporary, exhibiting the importance of plants and nature in every aspect of life, from food, clothing and shelter to ceremony, music and dance.

Photo by Thomas F. Smith

Apache women start to work on the beargrass installation on the exterior of a Wickiup.

Alex Maldonado playing the Native American flute.

On Friday evening, October 11, four accomplished authors will join us for "A Literary Night at the Garden," entrancing us on journeys into their worlds.

Visitors throughout the weekend can wander the *Plants and People of the Sonoran Desert* Trail to enjoy many intriguing activities such as renovations of the traditional Apache wickiup and Pima roundhouse structures, which occur only every few years. The processes offer visitors insight into the importance of plants for shelter. Visitors can also experience the beauty of plant fibers in basketry as Apache, Pima, and Tohono O'odham weavers demonstrate their techniques, and two Akimel O'odham groups share their traditional basket dances. Other exhibits include agave fiber net-making and cotton fiber weaving. Uses of cottonwood root for kachina carving and agave stalks for violins will fascinate visitors, as will flute making and shell etching.

In addition, the Garden has partnered with Pueblo Grande Museum to offer interactive pottery painting and gourd rattle activities. Visitors can also taste Apache acorn stew or sumac berry juice.

Storytelling will introduce you to the Akimel O'odham creation story and other disguised lessons from which we can all learn. Enjoy exhilarating hoop dancing, intricate fancy-shawl dancing, and enchanting flute music, all forms of honoring nature. A special Sunday Music in the Garden concert featuring Burning Sky sponsored by Canyon Records will round out the lineup of activities that we hope you won't miss. The Garden's participation in Native American Recognition Days has grown through the past few years, and we hope you will help us honor this important heritage, as well as our vital native plants.

Photo by Thomas F. Smith

Native Americans demonstate basket weaving.

For a detailed schedule of NARD at the Garden events, visit www.dbg.org. A full listing of valley-wide NARD events can be found at www.aznard.com.

Kirti Mathura is a horticulturist at the Desert Botanical Garden.

Celebrating *Día de los Muertos* at the Garden November 1-3

By Paty Wilson

Día de los Muertos (Day of the Dead) is an ancient festivity celebrated each year in Mexico on November 1 and 2. During this joyful holiday families honor their deceased relatives and celebrate the continuity of life. As part of its New World Harvest festivities, the Garden will host a series of family oriented activities centered around the traditions of this holiday.

Día de los Muertos is a time when family members reunite at cemeteries and honor loved ones' spirits by decorating their graves. At home, family members also build altars to honor their deceased relatives. Customarily, gravesites and altars are decorated with photographs of the departed, skeletons, intricate tissue paper cut-outs called *papel picado*, elaborate wreaths and crosses decorated with paper or silk flowers, candles and votive lights. Often, fresh seasonal flowers, particularly *cempazuchiles* (marigolds) and *barro de Obispo* (cockscomb), are placed at the site. The fragrances of these flowers are said to guide spirits home.

Edible goodies are offered, such as sugar skulls inscribed with the name of the deceased or sugar coffins, cocoa beans and special baked goods, particularly a sugary sweet roll called *pan de muerto*, and a selection of his or her favorite food and beverage. The offerings could include tequila, cups of *atole* (corn gruel), fresh water, as well as rice, beans, chicken or beef in mole sauce, and candied pumpkins or sweet potatoes.

Mexicans view death as a transition of life, a normal stage in the circle of life on Earth. This holiday is especially important as it gives families who have lost loved ones during the year a sense of closure. Embalming is not traditionally practiced in the Mexican culture; therefore, a burial must take place within twenty-four hours of death. Because of this, families have little time to accept the loved one's passing. By celebrating *Día de los Muertos* and preparing for the return of the spirit each fall, families remember and honor their dead, and it gives them a chance to heal.

Visitors to the Desert Botanical Garden can experience *Día de los Muertos* by seeing altars especially created for the weekend by Latino artists. Traditional Mexican cuisine will be available at the Patio Café. On Saturday there will be special crafts workshops as well as conversation with the artists. Tierra Del Sol will present a concert on Sunday from noon to 2 p.m. (Tickets available at the Garden.)

Paty Wilson is director of community programs at the Desert Botanical Garden.

Plants used for *Día de los Muertos* Celebrations

By Raul Puente-Martinez

Plants play an important role in the *Día de los Muertos* celebrations in Mexico. A number of species are used for several purposes including decorating altars, building material for altars and arches in homes as well as in churches, manufacturing "coronas" and garlands, and especially to decorate tombstones in cemeteries. One species, *Tegetes erecta L.* (marigold), a native of Mexico, is considered the most important flower of this celebration, as indicated by its Spanish common name *Cempazuchil* or *Flor de Muerto*, "Flower of Death." This flower can be used alone or with other flowers for decorating altars or in garlands. It is also planted around tombstones. A most common sight outside the cemeteries throughout Mexico are the stands of multicolored flowers being sold as offerings to the families honoring their deceased relatives. Other flowers commonly used include carnations (*Dianthus cardiophyllus*), gladiolus (*Gladiolus x covillei*), irises (*Iris* spp.), mums (*Chrysanthemum* spp.), and dahlias (*Dahlias* spp.).

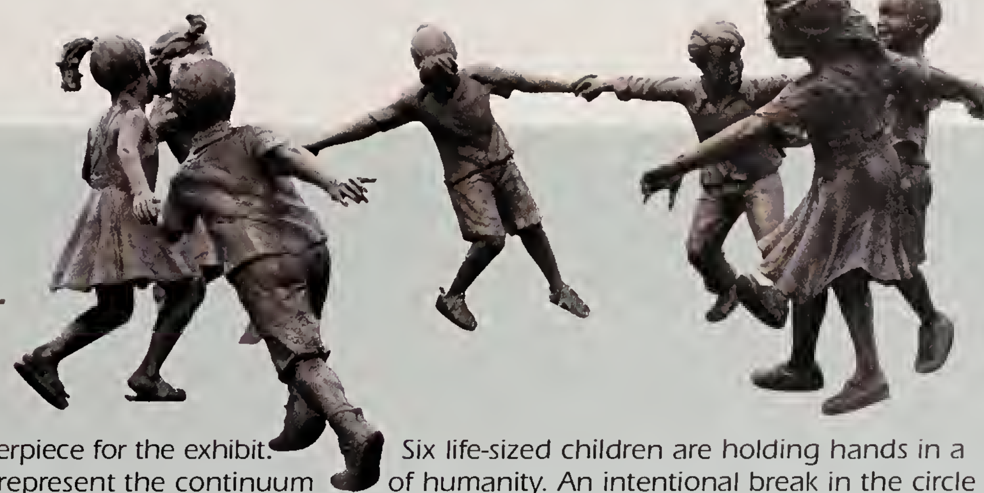
A number of flexible shrubs and trees such as reeds (*Arundo donax*) or willow (*Salix* spp.) are used to build arches in front of churches or streets. Fronds of palm trees (*Coccus nucifera*) are also used extensively to build arches and woven ornaments. In areas around the deserts it is common to see ornaments embellished with leaves of sotol (*Dasylirion acrotriche*) in the forms of crosses or garlands. In tropical regions, pieces of banana tree (*Musa paradisiaca*) stems are used as candleholders and the fronds of feather palm (*Camedoria tepejilote*) are used as green in bouquets. Many fruits are hung in altars as part of the offerings, such as oranges (*Citrus aurantiaca*), bananas (*Musa paradisiaca*), tunas (*Opuntia* spp.), and grapes (*Vitis vinifera*).


Photo by Raul Puente-Martinez

Cempazuchitl or Flor de Muerto (*Tegetes erecta L.*)

Raul Puente-Martinez is plant registrar at the Desert Botanical Garden.

Gary Lee Price Sculpture Exhibit

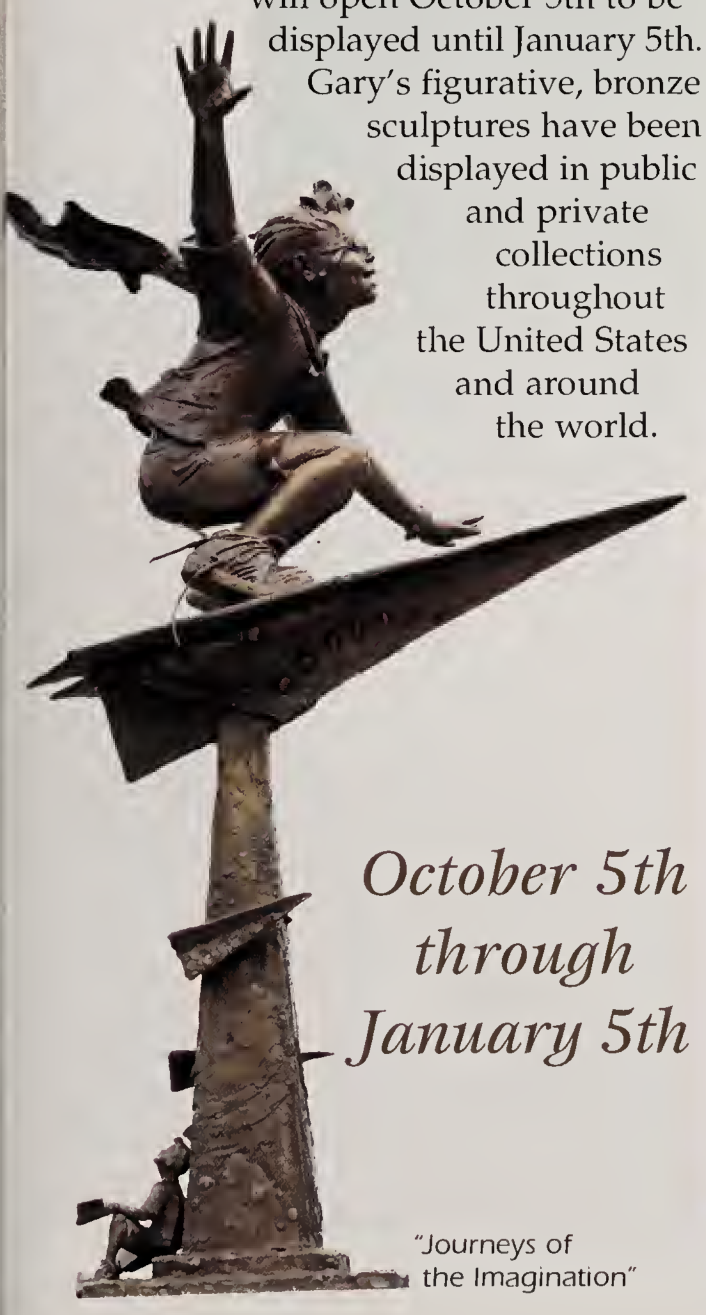


"Circle of Life" is the centerpiece for the exhibit. Six life-sized children are holding hands in a circle and are meant to represent the continuum of humanity. An intentional break in the circle invites visitors to become part of the sculpture and link hands with the figures.

This fall the Garden's trails will come to life with the award winning sculptures of Utah artist Gary Lee Price. "Lifting the human spirit through sculpture" is the theme of the exhibit. Many of the pieces depict children at play and capture the inspirational joy of childhood.

Sculptures of children flying on paper airplanes, jumping on pogo sticks and interacting through play will give visitors pause to remember childhood and all its wonders. Other sculptures such as a life-sized Mark Twain reading *The Adventures of Tom Sawyer* and whimsical frogs with golden crowns entertain young and old with whimsy and magic.

The unveiling of the twenty-five-piece exhibit coincides with Art in Bloom and will open October 5th to be displayed until January 5th. Gary's figurative, bronze sculptures have been displayed in public and private collections throughout the United States and around the world.



October 5th through January 5th

"Journeys of the Imagination"

Art in Bloom

WHAT: It's an art show!
It's a gourmet tasting!
It's a chance to bid on an art experience!
It's an exhibit of Gary Price's sculpture!
It's music and entertainment!
It's the splendor of the Desert Botanical Garden at twilight!

WHEN: Saturday, Oct. 5, 4 to 9 p.m.

TICKETS: 480-941-1225 visit www.dbg.org for more information
$75 non-members; $65 members
Food and beverages, including beer, wine, and margaritas are included with the price of a ticket. A no-host bar is available.

More than forty artists will be stationed along the Garden paths to exhibit and sell their creative works. Valley chefs and catering establishments will prepare and offer delectable samples of their culinary art.

Highlight of the evening will be an auction of "art experiences" donated by participating artists. Winning bidders can work at their studios, have a private class, or go on a photo shoot, learn their techniques and tricks and observe their creative process.

A silent auction featuring the works of many of our artists will be held in Dorrance Hall from 4 to 8 p.m. A variety of local musical entertainment, featuring Queen Creek Quartet, Pete Pancrazi, G-Force, Nuance, Trinidad Calypso, and Mark Zubia, will add to festivities.

Art in Bloom marks the opening of a major sculpture exhibit by noted Utah artist Gary Lee Price, featuring twenty-five life-sized bronzes of children at play.

Art in Bloom Family Sunday

Visit the Desert Botanical Garden on Sunday, October 6, from 9 a.m.-5 p.m. and enjoy an art show featuring the works of more than forty painters, sculptors, and craftsmen. Special family activities are scheduled throughout the day, including "make-and-take" activities, face painting, nature observation drawing, magical balloon storytelling, and caricature drawings. Enjoy lunch at the Patio Café while listening to the Swingtips from noon to 2 p.m., at the Music in the Garden concert.

ADMISSION: All Art in Bloom Family Sunday activities, except for the concert, are free with regular admission to the Garden: adults, $7.50; seniors, $6.50; students 13 to 18 and college with ID, $4; children five to twelve, $3.50; children under five, free. Visit www.dbg.org for more information.

The Sonoran Quarterly AUTUMN
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Luminaria—the silver anniversary

Thousands of luminarias will cast the same warm glow along Garden paths as they have for twenty-four years.

Las Noches de las Luminarias 2002 will be held December 5, 6, and 7. Visitors may enjoy complimentary cookies and cider and listen to a dozen musical groups stationed throughout the Garden. The Cactus Cantina will offer a limited menu.

This unique event started as a "thank you" from staff to volunteers. As the number of volunteers grew, they switched roles and the volunteers began to stage the event. Soon it expanded to include Garden members, and as the event's popularity grew, it became a fundraiser for the Garden.

When parking became difficult, buses shuttled visitors to and from the parking lot at the municipal stadium. As more people attended, cookies were purchased rather than baked by volunteers and commercial kitchens. To avoid crowding on the paths (and running out of cookies), we began to limit the number of tickets sold.

Fewer tickets are available for members' preview night, Thursday, December 5. Members will receive mail order forms in early September. This form includes details about purchasing personalized $5 and $25 luminary bags and kits as well as tickets.

The Garden Shop is open all three nights from 5:30 to 9:30 (member discount applies). The Volunteers' Mercado has CDs, a commemorative ornament and other items for sale (sorry, no member discount in the Mercado). *Luminaria* is a fundraiser that benefits the Garden, with 2002 proceeds designated for renovation of the *Plants and People of the Sonoran Desert* trail.

Another way to enjoy *Luminaria* is to volunteer. The Volunteers in the Garden welcome Garden members and community groups who work a two-hour shift and enjoy the event for two hours. Please contact our recruiting chair at 480-419-7110.

Enjoy meeting people?
Fascinated by desert plants?
Like to learn and work in a beautiful place?
Why not become a volunteer guide at the Desert Botanical Garden ?
Call 480-481-8122 for information

GARDEN PARTIES

Saguaro Society Tour at the Hulburd Gardens.

Connie and Jim Binns and Ray and Martha Hunter, Board President at the Gala opening of the Garden's new facilities.

Edith Huizingh, Rose Papp, Bill and Liisa Wilder at Saguaro Society's Luminaria Reception.

Richard and Robin Milne with Sallie and Francis Najafi at Dinner on the Desert.

Wendy wins the Klinger Award

Wendy C. Hodgson, curator of the collection and director of the herbarium, has been awarded the 2002 Klinger Book Award by the Society for Economic Botany (SEB) for her book *Food Plants of the Sonoran Desert.*

The book, published in 2001 by the University of Arizona Press in Tucson, presents information on nearly 540 edible plants used by people of more than fifty traditional cultures of the Sonoran Desert and peripheral areas. Drawing on twenty-five years of research including field work, Wendy synthesized the widely scattered literature and added her own experience to create an exhaustive catalog of desert plants and their many and varied uses. She also created the botanical illustrations in the book.

Food Plants of the Sonoran Desert can be purchased at the Garden Shop. The price of the book is $75. For more information, contact the Garden at 480-481-8113 or visit the website at www.dbg.org.

Wendy received her B.S. in wildlife biology and her Master's Degree in botany from Arizona State University under the mentorship of Dr. Donald Pinkava. Her thesis on edible plants of the Sonoran Desert north of Mexico served as the groundwork for her book.

She has been on the staff of the Garden for nearly twenty-eight years as botanical illustrator, research botanist, herbarium curator, and, currently, curator of the collection and director of the herbarium.

The Klinger Book Award is given to the author of an outstanding book at the SEB's annual meeting. The SEB was established in 1959 to foster and encourage scientific research, education, and related activities on the past, present, and future uses of plants. With more than one thousand members from the United States and 64 countries, the SEB serves as the world's largest and most respected professional society for individuals who are concerned with basic botanical, phytochemical, and ethnological studies of plants.

Fall is Fabulous For Field Trips!

This fall the Sonoran Desert Adventure school program will feature something new—a special edition teacher packet.

Teachers who schedule a field trip for their class to the Garden between October 1 and January 30 will receive a packet filled with unique, inventive activities and background information.

The focus of the packet will be the fall season in the desert, holidays, and New World plants. This packet will not be available for sale.

If you know a teacher, please let him or her know about this opportunity.

Desert Landscaper School Now Earns College Credits

Completing the Desert Botanical Garden's Desert Landscaper School (DLS) certification program now also earns for the graduate seven college credits from Phoenix College.

The credits are a result of a new educational partnership between the Garden and Phoenix College, one of ten Maricopa County Community colleges.

Upon enrolling in the DLS certification program each student will also be enrolled in Phoenix College. At the successful completion of the ten-month DLS program, DLS students will be certified by the Desert Botanical Garden and receive seven credits in the field of recreational resources and facilities management in Phoenix College's horticulture program.

Registration is underway for the DLS program in both English and Spanish classes. The four-hour classes are held one day each week, in English on Tuesday, Wednesday, Friday, or Saturday mornings and in Spanish, Thursday mornings and Saturday afternoons. The fall program begins the week of September 16.

The DLS certification program is in its fifth year.

Please contact Diane Barker, DLS coordinator, at 480-481-8161 for more information and enrollment.

PLEASE NOTE
Lillian Diven, profiled in the June issue of *The Sonoran Quarterly*, was not only a trustee of the Desert Botanical Garden but also a long time volunteer. Arriving from New York in 1951 with her husband Liscum, Lillian edited "The Saguaroland Bulletin" through 1979 as a volunteer.

IN APPRECIATION

*The Desert Botanical Garden is grateful for the support of all 9,972 members. Recognized here are members of the Founder's Circle, President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from **April to June 30, 2002**, for the annual fund (gifts of $50 and more to the "Wish You Were Here" appeal), the Ocotillo Club, Boojum Club, Agave Century Club and Desert Council. Memorial and honor gifts are recognized for the period of **October 1, 2001, to June 30, 2002**.*

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Have you provided for the Desert Botanical Garden in your will or estate plans? If so, you may qualify for membership in The Sonoran Circle. For more information call Beverly Duzik, director of development, at 480/481-8111.

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Calendar of Special Events

Art in Bloom: Saturday, Oct. 5, 4 - 9 p.m.

Art in Bloom Family Sunday: Sunday, Oct. 6., 9a.m.-5p.m.

Native American Recognition Days: Oct. 11 - 13

Fall Plant Sale Festival with cactus festival: Oct. 18 - 20

The Great Pumpkin Festival: Oct. 26 - 27

Día de los Muertos Celebration: Nov. 1 - 3

Gourds Galore!: Nov. 9 - 10

Ole' Mole–Chilies & Chocolate: Nov. 16 - 17

Maize Days: Nov. 23 - 24

Las Noches de las Luminarias: Dec. 5 - 7

Concert Series

Sundays Noon - 2 p.m.

October 6 Swingtips

October 13 Burning Sky
11:30 a.m. - 1 p.m.
(sponsored by Canyon Records)

October 27 Meadowlark

November 3 Tierra Del Sol

November 10 Nova Mundo

November 17 Sistah Blue

November 24 Desert Bells International BRONZEWORKS

Holiday Concerts

December 15 Estéban
(sponsored by Guitar Center and KYOT)

December 21 Matt Bachrach

Photo by Gene Almendinger

The Sonoran Quarterly
Desert Botanical Garden
1201 N. Galvin Parkway
Phoenix, AZ 85008
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The mission of the Desert Botanical Garden:

"The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge about arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States."
–Articles of Incorporation, 1937

THE SONORAN QUARTERLY

The bulletin for members and friends of the Desert Botanical Garden, Phoenix, Arizona December 2002 Volume 56, No. 4

Looking back to see the future: A new statement of mission

When the Garden was formed in the late 1930s, the Articles of Incorporation contained the following language that spelled out our reason for being:

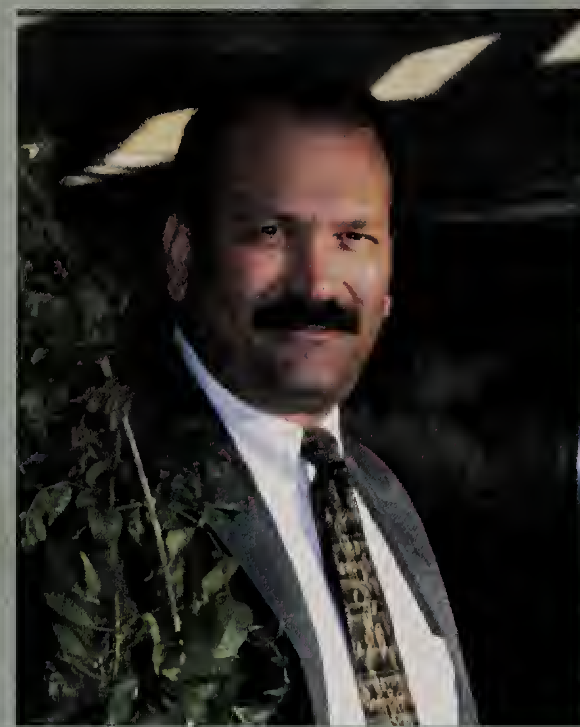
The purpose of the Desert Botanical Garden shall be to exhibit, to conserve, to study, and to disseminate knowledge of the arid-land plants of the world, with special emphasis on succulents and the native flora of the Southwestern United States.

That paragraph served as the Garden's mission statement until July 2002 when after more than a year of reflection and discussion among the Garden's staff and board, the following new mission statement was adopted:

The Garden's commitment to the community is to advance excellence in education, research, exhibition, and conservation of desert plants of the world with emphasis on the Southwestern United States. We will ensure that the Garden is always a compelling attraction that brings to life the many wonders of the desert.

Seeing the two mission statements side by side, you might wonder why it took a year to decide upon a revised statement that is so similar to the original. The reason is that we believe the process by which a mission statement is formulated or revised is often just as important as the final outcome, and the process we used placed a premium on collaboration, introspection and consensus building—all of which require significant amounts of time.

That we ultimately adopted a new mission statement so similar to the original one is a tribute to Mrs. Webster and the other founders of the Garden, as the vision they articulated then still serves us well today. The changes that were made, and our reasons for making them, are ones that we want our members, supporters and friends to understand:



Photograph by Jennifer Johnston

Ken Schutz

First, we adapted the wording to incorporate more contemporary vernacular, for example, substituting "education" for "dissemination of knowledge."

Second, we made explicit what had always been implicit in the original mission statement, namely that we strive to achieve excellence in all that we do and that we exist to serve everyone in our community.

Third, we added a concept from Mrs. Webster's speech at the dedication of the Garden in 1939, which called for the Garden to become a "compelling attraction" that both delights and informs all of our visitors.

The Garden's newly revised mission statement will begin appearing in all of our publications as soon as each one comes up for reprinting. It will guide us as we plan our future. It will allow us to better assess the effectiveness and relevance of all our current programs. And because it is so firmly rooted in our history, it will assure that we remain true to the purpose and vision that our founders laid out for us more than sixty years ago.

Ken Schutz
The Dr. William Huizingh Executive Director

THE SONORAN QUARTERLY
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ARTICLES

FEATURES

ON OUR COVER

Phoenix artist Ed Mell painted "Spirit of the Desert" to honor the 25th anniversary of the Garden's annual *Las Noches de las Luminarias* event. The 24" x 24" oil painting is featured in advertising materials, tickets, and the program for *Luminaria* as well as on notecards available in the Garden Shop. More information about the artist can be found on page 13.

Cover painting by Ed Mell.

Boom to bust and back again: Impacts of extreme droughts and floods in the desert

Story and photographs by Joe McAuliffe, Ph.D., Research Ecologist

This has been the driest single year recorded in southern Arizona since records began in the late 1890s. Little precipitation was received in last winter's "rainy" season and last summer's monsoon certainly did not make up the shortfall. In plainest terms, "drought" occurs when substantial precipitation is expected but doesn't arrive, and we are in a rather extreme drought.

This drought has affected all of us in some way. Last summer, the largest forest fire in Arizona's history—the Rodeo-Chedeski fire—charred 732 square miles of tinder-dry ponderosa pine forests. The fire destroyed hundreds of homes and impacted thousands of peoples' lives. Although the fires were ignited by humans, such a vast and rapid spread of the wildfire was possible only in the extreme drought conditions.

Reservoirs on the Salt, Verde, and Gila rivers are at all-time lows and raise concerns about the supply of water to city dwellers and farmers. Herds of livestock in many parts of the state have been hard-hit by the lack of forage and water. The Navajo Nation in northeastern Arizona has been most severely affected in this regard. From a human perspective, the impacts of this drought have been harsh, disruptive, and in some cases, catastrophic.

This is the most severe drought we've experienced in our own lives and collective memory. The perspective of historical and even pre-historical records, however, offers a better understanding of climate's unpredictability and the consequences of it. Recognizing and understanding these past "booms and busts" of precipitation is vital to wiser planning and living in the future.

A worse drought occurred one hundred years ago in Arizona

The first weather records taken in a handful of places in Arizona in the 1890s recorded a drought even more extreme than the present one. That drought lasted from the late 1890s through 1904.

Dramatic monsoon thunderhead over Sonoran Desert

Records of precipitation taken in Buckeye, Arizona, located thirty miles west of Phoenix, provide a picture of that drought's severity. Buckeye receives an average of slightly more than seven inches of rainfall a year, but starting in 1897 somewhat less than this average amount fell. This moderate drought continued the next year, and then worsened. In the six years from 1899 through 1904, an average of only 3.67 inches per year fell—just over half of the average yearly amount. In a couple of consecutive years, the summer monsoon barely materialized. The near absence of summer rains was coupled with an extreme shortage of winter rain. The drought was far-reaching, and extended over most of the American Southwest.

This drought had severe impacts. One of the most significant was the collapse of a cattle boom in southern Arizona that had started in the late 1870s and mushroomed with the arrival of the railroad in the 1880s. Many desert grasslands of southeastern Arizona were stocked far beyond the capacities of the grazing ranges. During the drought of the 1890s, an estimated fifty to seventy-five percent of cattle stocked on southern Arizona ranges died due to the lack of forage and water. In many places in southern Arizona, the vegetation changes caused by this combination of overstocking and drought more than a century ago persist to this day. Areas that were once grasslands, such as much of the Santa Rita range south of Tucson, changed at this time to mesquite- and shrub-occupied landscapes.

As harsh as the drought was in the late 1890s to early 1900s, it ended with a boom in 1905. The climatic pendulum swung from one catastrophe to another and more rain fell in 1905 than any year on record, up to the present day. The same Buckeye that had received little more than three to four inches of rain annually between 1899 and 1904 had a whopping 21.8 inches dumped on it in 1905!

The entire Southwest experienced this deluge. This much rainfall was far more than the land could absorb and the ensuing floods caused great damage. In February and March 1905, the flooding Colorado River south of Yuma, Arizona, cut into a hastily constructed canal leading to irrigated farmland in the Imperial Valley of southern California. The river continued its errant course northward and quit flowing to the Gulf of California, creating a new, inland sea—the Salton Sea—as it filled the long, narrow geological depression called the Salton Sink whose floor is 287 feet below sea level. As the level of the Salton Sea rose, railroads were flooded and re-routed. It took engineers many attempts over the next two years to re-divert the river's flow back to the Gulf of California.


Ancient bristlecone pine tree from the White Mountains

Although large dams now confine and regulate their flows, the Colorado, Gila, and Salt rivers have nevertheless gone on destructive rampages in modern times. Between 1977 and 1980, central and southeastern Arizona experienced seven region-wide floods. Phoenix was declared a disaster area three times, and eighteen people died in these floods that caused damages of $310 million. Even in the past decade, lesser floods on the Gila and Salt rivers during *El Niño* years have caused considerable destruction (including the collapse of a bridge under construction on Mill Avenue in the early 1990s).

Reconstructing the past: droughts and floods in ancient times.

Considerable evidence indicates that the big drought that occurred around 1900 was minor in comparison to even more prolonged droughts that occurred long before rain gauges were used. The reconstruction of past climates is the work of *paleoclimatologists*. These scientists use a variety of different natural records to reconstruct the history of past precipitation.

Some of the most reliable and detailed information about past climates is recorded in tree rings. The widths of yearly growth rings of many kinds of coniferous trees in the Southwest accurately reflect the amount of precipitation received during the year. Years with ample precipitation produce wider rings than years with less precipitation. *Dendroclimatology* is the special branch of paleoclimatology that uses the widths of tree rings to reconstruct past climates. This reconstruction is based on a statistical relationship between measured precipitation amounts at a particular site and year-to-year changes in tree ring widths for the period of historical weather records at that site. In cases where this relationship is strong, the widths of tree rings can be used to reliably estimate the amount of precipitation that occurred during any given year in the past, long before weather records were kept.

Growth rings of the world's oldest-known trees—the bristlecone pine trees of Nevada and California—provide records of annual precipitation for the last several thousand years. Some of the oldest bristlecone pines are in the White Mountains, located on the California-Nevada border between Las Vegas and Lake Tahoe. The White Mountains rise high above the sagebrush-filled valleys of the Great Basin Desert.

The oldest-known bristlecone pine tree in these mountains has been nicknamed "Methusela"; this tree is nearly 4,800 years old. Cores of living trees like Methusela together with cross-sections of trunks of dead trees that lived and died long ago have been used by dendroclimatologists from the University of Arizona's Laboratory of Tree Ring Research to reconstruct a nearly eight-thousand-year long record of annual precipitation. During this time period, eight extreme droughts occurred, each probably far more severe than any experienced during historical times. The two most recent of these big droughts occurred in the early 900s A.D. and the late 1200s A.D. The very thin growth rings produced by trees during these times indicate droughts that persisted for more than a decade. We have not experienced any droughts of this magnitude in historical times.

Aligned doorways in Pueblo Bonito ruin, Chaco Canyon

Drought and decline of the Anasazi in Chaco Canyon

One of the most impressive archaeological sites in the American Southwest is Chaco Canyon in northwestern New Mexico. The Anasazi people constructed many magnificent small towns or *pueblos* on the floor of this valley. The most spectacular of these is Pueblo Bonito, a high-rise for its time at four or five stories tall. Most of this grand pueblo was constructed between A.D. 1030 and 1079.

At its peak an estimated 1,200 people lived in Pueblo Bonito. Farming the alluvial soils of Chaco Valley provided the fundamental wealth that allowed such a grand society to flourish and build this and other impressive towns.

The pueblos are sophisticated in their architecture, construction, and the aesthetics of design. The builders of Chaco Canyon transported pine timbers from mountains more than forty-five miles away. It has been estimated that approximately two hundred thousand trees, mostly ponderosa pine, were required for the construction of ten of the major pueblos of Chaco Canyon. This was no small task, considering that the average primary beam used to support large roof areas was sixteen feet (five meters) in length, and weighed approximately six hundred pounds (275 kilograms). Teams of people on foot transported the beams. The considerable labor required to cut and transport these materials and to construct these grand pueblos certainly indicates a time when the agricultural basis of their society provided an abundance of food far beyond a marginal subsistence. This abundance fueled an amazing period of population growth and cultural expansion.

Despite its grandeur, however, the Anasazi occupation of Chaco Canyon was short-lived. A prolonged drought plagued the region between A.D. 1130 and 1180, and the large pueblos of the valley were mostly abandoned by the middle of the twelfth century. This drought would certainly have dealt a blow to dryland farming in this semi-arid location. Many archaeologists believe that this long drought was the major cause of the dramatic depopulation and collapse of the Chaco culture. The hardships and suffering these people must have endured at that time are scarcely imaginable.

Extreme floods and the Hohokam of southern Arizona

The Hohokam people of southern Arizona depended on irrigation. In this hot, dry, desert region, incident precipitation alone is insufficient to grow crops during the summer. The Hohokam were accomplished hydrological engineers and tapped waters of the Gila, Salt, and Santa Cruz rivers to irrigate their crops. These rivers once flowed year-round, potentially providing the Hohokam with irrigation water even during moderately dry years when local precipitation faltered.

Despite this buffer against drought, the Hohokam were affected by extended dry periods and large floods. Tree-ring records from the Salt

GUIDELINES FOR PLANT CARE IN A DRY WINTER

By Patrick Quirk

A rumor is circulating that winter is coming, although as of this writing no sign has yet appeared. The drought is nevertheless continuing. Occasionally there is a "threat" of rain, but so far little has materialized.

Winter is the season in which plants need the least effort due to relatively cooler temperatures and the fact that most plants are dormant at this time.

Wet winters require the least work from gardeners. The rain takes care of what watering is needed, and is rarely excessive; higher humidity also prevents most frosts. Most of our winters are dry and warm, however, with frequent mild frosts, so some monitoring of the plants is needed.

Even in dry winters plants need little watering. The exceptions are those plants that are not dormant which includes annuals and some cacti and succulents, and those extraordinarily warm winters (minor summers) that occur ever more frequently. Annuals must never dry out, and actively growing cacti and succulents need water at the time their soil is almost completely dry. So don't forget to check your plants weekly to see if they need anything.

Frost, especially severe ones (less than 28 degrees F.), is the biggest winter problem. It is hard to tell without experience who needs protection but plants who are actively growing and those from tropical regions, succulent or not, are most in need. Protect them with cloth covers (a special frost cloth is on the market), or plastic especially designed for frost protection (also for sale). Columnar succulents can be protected on their tips (the most vulnerable part) with Styrofoam cups.

In very dry winters spider mites may attack some plants, particularly succulents and cacti. They weave dense webs close to the body of a plant and eventually turn the skin a cigarette ash gray. To detect their presence, use a spray bottle to spray a fine mist of water over the plant to reveal the webbing. If you find them, re-load your bottle with the deadly pesticide dihydrogen monoxide (H_2O) and spray them hard; they hate this and it gets rid of them.

Although the calendar still says "winter" in early February, for some plants it is the beginning of spring, so watch for the start of new growth. At this time you may also begin planting frost hardy plants.

Patrick Quirk is a horticulturist and cactus specialist at the Desert Botanical Garden.

River basin provide detailed histories of times of drought as well as times of heavy precipitation and flooding. During extremely dry periods, the reduced flows and lower river levels were probably incapable of delivering sufficient water through the hundreds of miles of hand-dug canals that provided water to fields located as far as ten miles from the river.

On the other hand, extreme flooding, rather than extreme drought, probably had far more devastating impacts on Hohokam agriculture. Tree-ring data indicate that in 1358 A.D. the Salt River flooded; this flood was greater than any flood that had occurred during the previous 450 years. The river flooded again in the early 1380s, and these two floods may have irreparably damaged the extensive infrastructure of the complex canal system. Many archaeologists think that this severe flood damage is one of the principal contributors to the abrupt decline of the Hohokam.

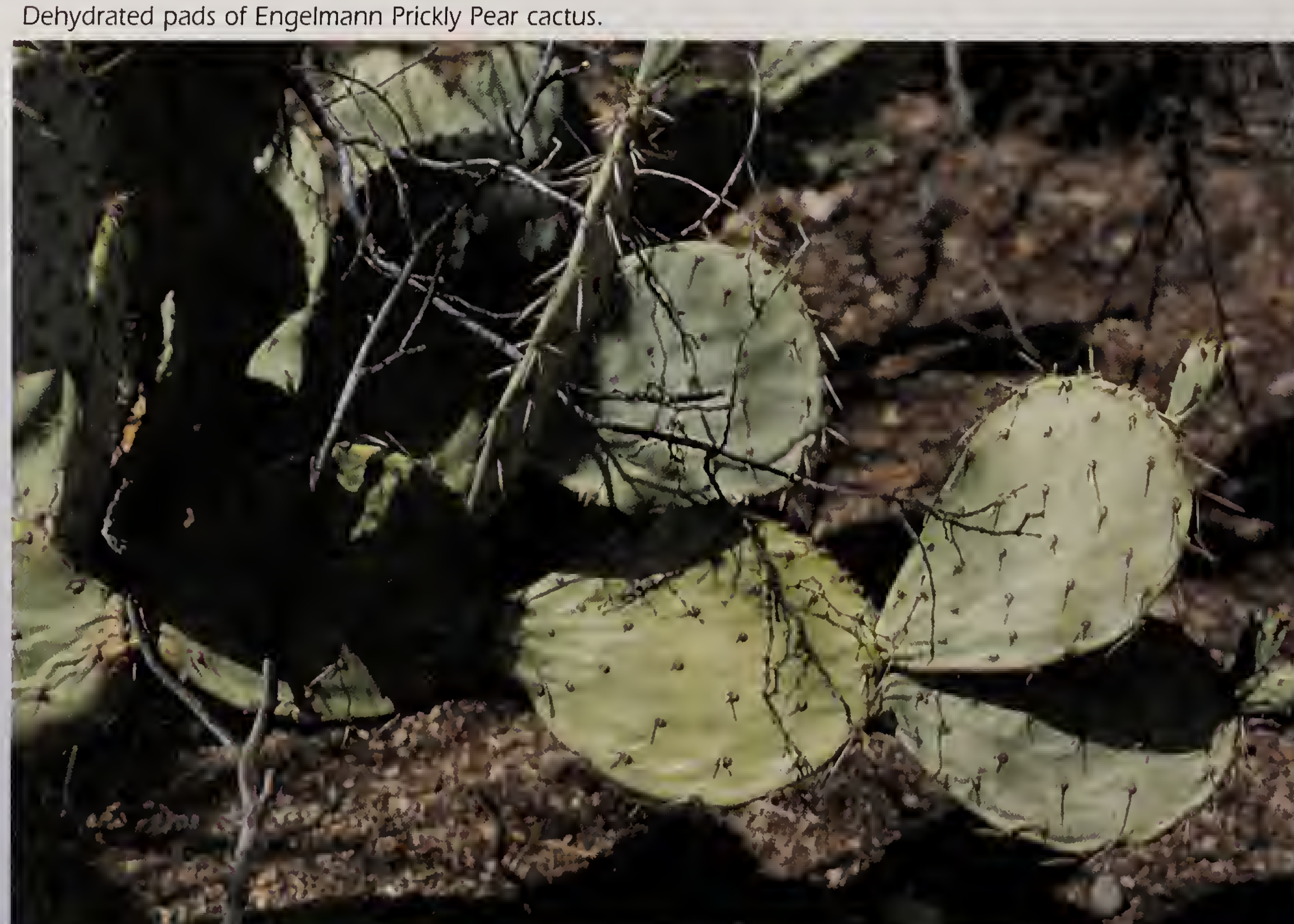
Desert plants and animals

Climate extremes also greatly affect the desert's native, non-human inhabitants. The many species of plants and animals have, however, different ways of coping. Some plants, like the giant saguaro, draw from stored reserves of water to carry on business as usual, even during a severe drought. Flowering and fruit development in the saguaro requires this stored water, and despite the extreme shortfall of rain last winter and spring, saguaros produced an abundant crop of fruit in 2002. Other desert life benefits from the abundance provided by the saguaro during lean times. The white-winged dove depends on saguaro fruit as a main food to feed their young; so if saguaro fruit is available, doves can successfully raise their young despite drought conditions.

Not all desert plants and animals are so well buffered from the impacts of drought. Many individual plants and animals do not survive these stressful times. My friends and colleagues Jan Bowers and Dr. Raymond Turner have studied the survival of foothills palo verde trees in plots near Tucson. These plots were originally established in 1906 by the pioneer ecologist of the Sonoran Desert, Dr. Forrest Shreve. Data from these plots have been periodically collected over the years and show that large, mature palo verdes sometimes die in response to long drought periods. The deaths of individual trees do not imperil the population. Seeds of the palo verde hold the potential for regeneration, and can remain buried in the soil for years until sufficient summer rains trigger their germination.

Populations of many desert animals go into a steep decline during long droughts. Dr. Yar Petryszyn, a mammalogist with the University of Arizona, has studied the ups and downs of rodent populations for twenty-three years at three sites near Tucson. Pocket mice and kangaroo rats eat dry seeds produced in abundance during wet years. During a lengthy drought, a declining seed supply eventually causes populations of these small rodents to crash. Once sufficient winter rains break the drought, seeds produced in abundance by desert wildflowers and other plants cause the rodent populations to skyrocket. Within half of a year after the end of a drought, populations of some of these small rodents can

Dehydrated pads of Engelmann Prickly Pear cactus.



Photograph by Renee Immel

increase ten-fold. For example, in one five-acre plot near Tucson, Dr. Petryszyn found the population of one pocket mouse species rebounded from a low of twenty-four individuals in March of 1973 to 202 animals six months later.

From month to month, year to year, decade to decade, the ecological heart-beat of drylands changes radically in response to whether it has rained. The unpredictable pulses of rain dictate the nature of arid lands, setting a stage for the demanding ecological play in which all living things, including human beings, must perform.

This long drought has temporarily quieted some of the bustle of life in the desert. Nevertheless, the rains will eventually come again in abundance.


Young palo verde seedlings, germination triggered by summer rains.

When they do, the desert will once again resound with the chorus of living things. From our human perspective, either too little rain or too much at one time can spell disaster. Understanding that the climate's tremendous ups and downs is indeed normal for this part of the world, we can better cope with the hard times that Nature pitches at us. Boom, bust, and back again is the way of the desert!

Dr. McAuliffe is currently studying how the ups and downs of precipitation over the past hundreds to several thousand years have affected populations of extremely long-lived desert plants like the creosote-bush in the Mojave Desert and piñon pines on the Navajo Reservation.

Luminaria, 25 wonderful years

Ed Mell, noted Arizona artist, created "Spirit of the Desert," the magical depiction of a Holiday Cactus by moonlight, to help celebrate the silver anniversary of *Las Noches de las Luminarias*. For twenty-five years the paths at the Desert Botanical Garden have been lighted by *luminarias*, candles in paper bags that are so popular in the Southwestern United States.

The sold out event will be held on December 5, 6, and 7. If you are lucky and have tickets, you may be interested in some relevant numbers:

- Six tons of sand.
- Eighty cases of candles.
- Twenty-nine buses.
- Several hundred flashlight batteries.
- Many thousands of volunteer hours accumulated throughout the year by thirty-five chairpersons.
- Nine hundred two-hour shifts, filled by volunteers from the Garden and the community.
- Funds raised and contributed to the Garden in 2001 were $102,902.19.
- Twenty-five years celebrating the priceless relationship between the Garden and its volunteers.

In Memoriam

We note with sorrow the passing of Dr. George Lindsay, first director of the Desert Botanical Garden, who died on July 16th at his home in Tiburon, California. He was 85 years old.

Dr. Lindsay, a botanist, planted the first cacti in the Garden. Many may still be seen in the Core Garden, and have reached impressive proportions. Dr. Lindsay went on eventually to preside over tremendous growth at the California Academy of Sciences in San Francisco and turned its Natural History Museum into a major institution.

A Report from the IOS Congress:
It was a real success at the Garden

By Wendy Hodgson, M.S.

The world's top researchers of succulent plants convened at the Desert Botanical Garden in early April for the biennual Congress of the International Organization for the Study of Succulent Plants (IOS).

The Garden was honored to host this symposium, thanks to the recommendation of the late Dr. Edward "Ted" Anderson, at which researchers pursued a week of scholarly papers, keynote addresses, and meetings involving conservation issues and goals of the organization.

It was not a week of all work and no play, however. When we were not gravitating to the food tables that featured endless arrays of incredible delicacies, participants were able to view the beautiful facilities and collections at the Desert Botanical Garden. They also had the opportunity to see cacti and succulent collections at the annual Cactus Show. They enjoyed a field trip to the Usery Mountain Regional Park and floated down the Salt River. After dedicating new DBG laboratories in Ted Anderson's honor, a special (and delicious) dinner and slide presentation by Dr. Rob Wallace honoring Ted Anderson was held on Ullman Terrace.

Authors signed their books: Dr. James Mauseth, *A Cactus Odyssey*; Dr. Richard Felger, *Flora of the Gran Desierto* and *Trees of Sonora* (with Matt Johnson); Mary Irish, *A Guide to Desert Gardening and Agaves, Yuccas and Related Plants*; Fred Kattermann, *Eriosyce*; Adele Anderson, Ted Anderson's *Cactus Family*; and me with my *Food Plants of the Sonoran Desert*.

All of these books, except Kattermann's, are available at the Garden Shop.

On the final day following the last presentation, IOS attendees traveled to Boyce Thompson Arboretum, where Pete Petrie, head horticulturist, gave us a special tour of the grounds. Finally, another beautiful dinner, followed by a brief meeting and presentation by Dr. Felger, ended an exciting week of botanical camaraderie.

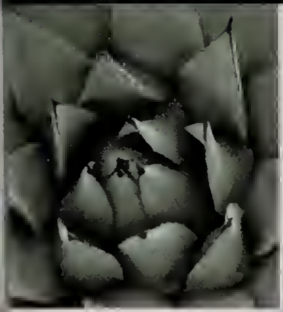
By hosting this IOS Congress, the Garden had the opportunity to display and reveal to others what we have and what we do. Participants were extremely impressed with our facilities, collections, herbarium and library. It was exciting to see the herbarium bustle with activity as so many people meticulously examined herbarium specimens. Some had never been to the Garden while others have not seen it since 1992 when we hosted an earlier conference. The presentations by Joe McAuliffe, Raul Puente, and me were well received, providing a glimpse of the research being done here at the Garden.

Conferences provide excellent opportunities to renew or make new contacts. The Garden, as a result of hosting this conference, achieved the following:

- Recognition as a botanical garden with a strong, important scientific collection.
- Increased awareness and recognition of our herbarium.
- Increased recognition as an important research institution.
- An invitation for the Garden to apply for Generic Reserve Collection, as recognized by the IOS, which will result in increasing the stature, awareness and use of our collection within the scientific community.
- Selected by Fred Kattermann to receive his entire living cactus collection upon his death. (We have already been receiving his numerous herbarium specimens over the years.)
- Collaboration with Dr. Abisai Garcia and other UNAM staff to do Agavaceae field research work with Garden staff in northern Mexico, beginning next year.
- Acquisition of the extremely valuable collection of 350-plus *Mammillaria* herbarium specimens from Betty and Fitz Maurice, San Luis Potosi; they selected our herbarium to deposit their specimens because of our commitment to specimen care.
- Annotation (correct identification) of all Mexican Agavaceae in our herbarium and identification of type specimens.
- Annotation of a number of cacti specimens in our herbarium.
- Correct identification of our living collection of *Furcraea* in the Garden by Dr. Abisai Garcia.
- Invitation to Raul Puente-Martinez and me to become members of the IOS. Membership is only by application and board approval.

The success of the IOS Congress was due to many individuals, including the participants themselves, some of whom (including one scientist from St. Petersburg, Russia) traveled thousands of miles on very tight budgets to participate. Special thanks go to the committee: Rob Wallace, Paty Wilson, Marcia Bosio, and Elaine Anthonise, as well as to Adele Anderson, Liz Slauson, Jennifer Johnston, John Colby (Cimarron River Co.), and the Central Arizona Cactus and Succulent Society. I would also like to thank all of those who helped in many other ways, such as driving vans, photographing the sessions, leading tours, managing the audiovisual equipment, and making sure participants were always well-fed, well-hydrated and content.

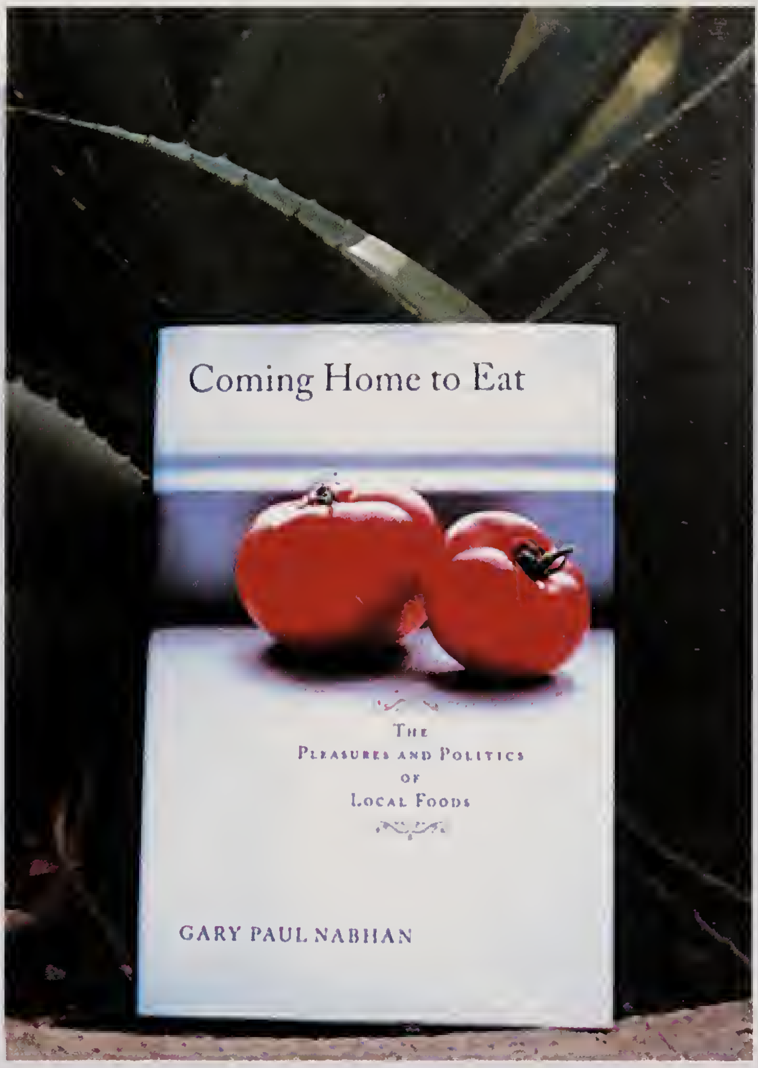
Wendy Hodgson, M.S., senior research botanist and curator of the herbarium, is director of the Garden's research department.



Coming Home to Eat: The Pleasures and Politics of Local Foods

By Gary Paul Nabhan
330 pp., New York: W. W. Norton & Company, 2002. $24.95.

Reviewed by Beth Brand



Open your fridge, freezer or pantry and read a few of the labels on the food inside. C'mon, reach way back there and pull out those jars of pickled something or other. What you'll probably find are foods from every place but here—and by "here" I mean Arizona. In my case the one exception was a bag of locally made tortillas (Arizona brand, not to be confused with the AriZona Rx brand of teas—they're from Lake Success, New York).

Most of us already know that our food is brought here from places far away. The modern, mobile cornucopia provides us with all our nutritional needs. Or does it? Former Garden researcher and MacArthur award winner Gary Nabhan suggests otherwise in *Coming Home to Eat: The Pleasures and Politics of Local Foods*. In his book Nabhan not only shares the contents of his pantry, but his intimate knowledge of native foods and the negative impact those mobile, global foods have on the health of our bodies and communities.

The journey begins in Lebanon. There Nabhan experiences the foods of his family: lovingly prepared, richly flavored, fresh and home grown, and such a contrast to the overpriced, flown-in foods he sampled in one of Beirut's most exclusive restaurants. This juxtaposition of local to global, fresh to flat, sent the author on a remarkable quest: to eat only, or at least mostly, foods that were locally grown, gathered, raised, and traded in the Sonoran Desert. "This ritual is simple in its intent: to make me a direct participant, as fully and as frequently as possible, in the making of the bread and wine that sustain not only my life but the lives surrounding me as well."

With pen and "Arizona Highways" map in hand, Nabhan circles a 250-mile radius around his Tucson home. This area would be the food shed from which he endeavored to glean sustenance. Now begins the odyssey—one that is alternately enlightening and sobering.

We are along to sow seeds, raise turkeys, harvest saguaro fruit, roast agaves, and search for the elusive sand food. We share in the goodness of each freshly picked meal and at the same time are told the unsettling history of corporate agriculture and why corn, genetically engineered to kill corn pests, may now be poisoning monarch butterflies. Nabhan's exceptional knowledge of agriculture, conservation, and the politics involved, allow him to share this and other important information while keeping the journey interesting and on course.

Coming Home to Eat is the perfect dessert to the Garden's New World Harvest festivities, held this autumn. It too is a celebration of the plants and people of our parched and unique corner of the world. Whether you want to learn about our community's food traditions, or better understand the effects of the global food industry, this book appeals to the tastes of both.

Beth Brand is librarian at the Desert Botanical Garden.

Dinner on the Desert

What better way to enjoy a spring evening than savoring the ambiance and magic of the Garden's *Dinner on the Desert*? This year's 17th annual *Dinner* is scheduled for April 26, 2003. Please save this date on your calendar now. Invitations will be mailed in March.

Dinner on the Desert is an annual celebration intended to raise awareness of and funding for the Garden's many programs and exhibits. This year the evening will begin with a reception on Boppart Courtyard, followed by a silent plant and art auction in Dorrance Hall. Guests will then stroll the beautifully lit paths to Ullman Terrace to enjoy a culinary delight, live auction, entertainment and dancing under the stars.

Seating at the *Dinner* is limited and early reservations are always recommended. Please call Joyce Melter at 480-481-8147 for additional information.

New Garden Members Go "Behind the Boojum"

By Cheryl Andersen

When new Garden members call to RSVP for the *Behind the Boojum* tour, they're not quite sure what a "boojum" is or even how to pronounce the word, but they are intrigued enough to want to learn more.

Going "behind the boojum" is not mysterious or frightening; it takes new members to some fascinating, non-public places in the Garden, introduces them to interesting staff and volunteers, and highlights the Garden's programs, events and opportunities.

Executive director Ken Schutz gives welcoming remarks

This event is a recent membership benefit initiated by Beverly Duzik, director of development. "We thought a behind-the-scenes tour would be a great way to really connect with our new members," she said. "The tour helps showcase many different facets of the Garden."

The first *Behind the Boojum* tour, in May 2001, received rave reviews. Subsequent tours have been offered in September, January, and April. More than six hundred and eighty Garden members have enjoyed the intimate and informative experience of going *Behind the Boojum.*

Forty-three Garden volunteers and twenty-six staff members have participated in producing the tours. One new member attendee noted, "Staff and volunteers were enthusiastic and passionate about their work and about sharing it with us."

A *Behind the Boojum* tour begins in the Binns Wildflower Pavilion where new members enjoy refreshments and mingle with Garden volunteers. Executive director Ken Schutz gives welcoming remarks and answers questions.

Volunteer guides gather new members into small groups and lead them to areas of the Garden not often seen by the general public. Garden docent Gene Almendinger has participated in seven *Behind the Boojum* tours. "The members learn a lot and it makes them feel special. This tour is a chance for us to tell them about the classes and events going on in the Garden," he said.

Lowell Bailey, another volunteer guide, agreed. "Many members don't have any idea about the extent of the programs here or the national and international status the Garden has. This tour gives them an inside peek at the staff, exposes them to volunteer opportunities and gives them pride in the Garden."

Each group visits several behind-the-scenes sites where they hear presentations by staff or experienced volunteers and have an opportunity to ask questions. Tour sites have included the Garden's seed room, herbarium, volunteer head-quarters, library, Desert House, demonstration garden, Australian section, composting area, pond, and the agave, cactus and wildflower propagation greenhouses.

Garden staff members appreciate the importance of taking new members *Behind the Boojum.* Kathy Rice, curator of rare & endangered plants, said she loves "the opportunity to expose members to the Garden's conservation program and to show them what their membership is supporting."

"New members ask really good questions," said herbarium presenter Ed Turcotte. "They want to know how the herbarium fits into the Garden's mission."

Tree horticulturist Scott McMahon finds the new members quite appreciative. "They feel privileged when they get the V.I.P. treatment and are allowed to see behind-the-scenes places and activities."

At the conclusion of the tour, new members receive a special one-day-only twenty percent discount on the purchase of gifts or plants in the Garden Shop. They are also encouraged to complete a short exit survey asking them to rate the tour, share their opinions and offer suggestions. Seventy-one percent of the attendees have provided exit survey feedback. Of those, eighty-four percent rated their tour "wonderful" or "spectacular." Exit survey comments have been extremely positive.

"This was a fabulous, friendly way to get acquainted with our Garden."

"You treated us like dignitaries."

"Great fun, extremely interesting and well worth the time."


Volunteer Peter Combs measuring Boojum trees

"I'm amazed at the new facilities and what they offer to the scientific and research community!"

"The most interesting thing I learned was how involved volunteers can actually be in Garden activities."

"I had no idea all this research went on here."

"I'm glad I'm a member and want to attend more events."

"There are far more plants that do well in the desert than I ever imagined."

"What IS the correct pronunciation of that weird plant?" new members ask. "Beau-jum" or "Boo-shum" or "Boo-jume?" According to Garden cactus guru Patrick Quirk (dubbed "the cool greenhouse guy" by one admiring new member), "The correct pronunciation is BOO-jum."

"Boojum" is one of two common names given to *Fouquieria columnaris*. This Dr. Seuss-like "tree" can grow fifty feet tall and live to be eight hundred years old. It resembles a skinny, upside-down carrot. The plant is indigenous to Sonora and Baja, California, where natives use its common name *cirio* (Spanish for "candle"). Early Jesuit priests thought it looked like a lighted taper when the yellow flowers at the top were in bloom. Lewis Carroll coined the term "boojum" in his 1876 poem, "Hunting the Snark," which tells of the search for a mysterious, rather frightening, mythical creature that lived on a far-off shore. Forty-six years later when British ecologist Godfrey Sykes was exploring Baja, California, he focused his telescope in the distance and observed the strange looking *Fouquieria columnaris* for the first time. He immortalized Lewis Carroll's creature by responding, "Ho, ho—a boojum, definitely a boojum."

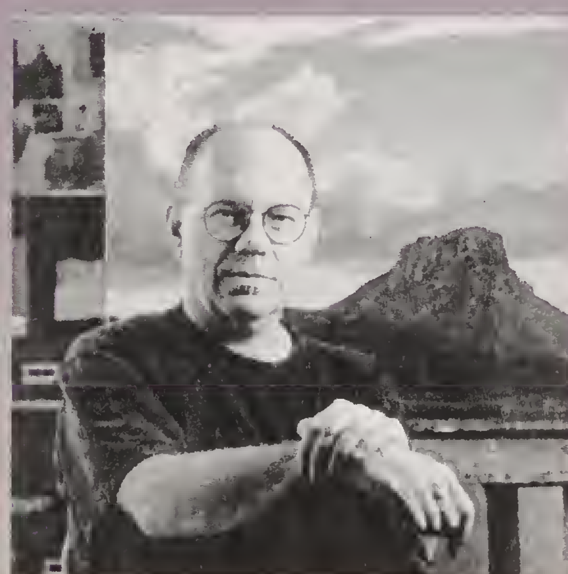
Thirteen percent of Garden members who joined since January 2001 have taken advantage of this new member benefit. If you are a member and would like to be included in the next available tour, please call 480-481-8179 to make your reservation.

For more behind-the-scenes experiences, check out an exciting new Garden program called "Walk with an Expert." For details, call 480-941-1225.

Cheryl Andersen is development outreach associate at the Garden.

MORE ABOUT OUR COVER ARTIST: ED MELL

Ed Mell is a native Phoenician whose artistic prowess started early in life and has earned him international acclaim.



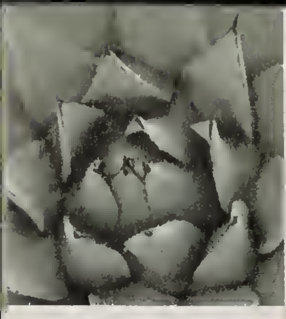
After graduating from Phoenix College with an associates art degree and the Art Center College of Design in Los Angeles with a bachelor of fine arts degree, Mell spent six years in New York as an advertising art director as well as the owner of an illustration studio.

While living in New York, he took an opportunity to spend two summers on the Hopi Indian Reservation at Hotevilla, Arizona, teaching children's art programs. The time on the Hopi Indian Reservation recalled him to his roots, and he returned to live in Phoenix in 1973.

Mell has become a world-renowned artist who specializes in oil painting and bronze sculpture. His paintings usually are of Southwestern landscapes and other subjects that depict the West. His three-dimensional bronze sculptures, like the oils, often feature Western themes such as cowboys, horses, longhorn cattle and cacti. His sculpture, the fifteen-foot-tall "Jack Knife" which depicts a cowboy riding a bucking bronco, sits in the center of the gallery district in Scottsdale, Arizona.

Mell has been a longtime supporter of the Desert Botanical Garden. In recent years, his painting "corona de sonora" was featured on *Dinner on the Desert* 2000 invitation and program; his artwork was used on the packaging of the Desert Queen fragrance that debuted at the Garden in February 2002; and he painted "Spirit of the Desert," the cover illustration of this issue of *The Sonoran Quarterly*, especially for *Las Noches de las Luminarias 2002*.

Alyse Vordermark is a development associate at the Garden.



Free poster for teachers including homeschoolers

The Garden has recently produced a wonderful poster for educators. The artwork, by Tucson artist Paul Mirocha, features desert animals and plants in beautiful full color drawings. On the reverse side is information about all programs and resources that the Garden provides to teachers. This poster is available free of charge to all educators, including homeschooling parents. Quantities are limited, so call 480-481-8146 right away for your copy.

Teddy Bear Tea for the holidays

Start a holiday family tradition by attending the Garden's "Teddy Bear Tea" on Saturday, December 14, at 12 p.m. in Dorrance Hall.

Enjoy an afternoon tea and a delightful menu specially created by Atlasta Catering sure to please both children and adults. Enchanting children's entertainment to follow tea.

Tickets for members are $25 for adults and $20 for children. Non-members may purchase tickets for $30 for adults and $25 for children. The event is recommended for children from three to twelve years old. Children are encouraged to bring their favorite teddy bear and dress in holiday attire. Advance reservations required. Please call 480-941-1225, as this event is sure to sell out!

César Mazier Releases CD

After fifteen years of singing at *Las Noches de las Luminarias*, César Mazier, the Garden's Director of Horticulture, has recorded a CD of his favorite Latin American songs. Over the years, these songs have become popular with Garden visitors and volunteers who appreciate his talent as a musician as well as horticulturalist. The CD will be available at the Mercado during the *Luminaria* event December 5-7, and was made possible by the generous support of the *Volunteers of the Garden*.

"Romeo & Juliet"
A Forbidden Romance

Saguaro Society members and their guests are invited to preview the romantic story of forbidden love, "Romeo & Juliet," on Thursday, January 30, 2003 from 6:30 to 8:30 p.m., when Ballet Arizona performs in Dorrance Hall.

Choreographer Ib Andersen presents the language of romance through ballet with music by Sergei Prokofiev. The evening includes a reception and opportunity to meet the dancers. Please call Joyce Melter at 480-481-8147 for more information.

Garden to sponsor Galapagos trip

June 20th departure scheduled

Giant tortoise

Building on the success of this year's East African safari, Garden Director Ken Schutz will lead a second wildlife expedition for Garden members early next summer. The destination this time will be the Galapagos Islands, situated on the equator six hundred miles west of Ecuador.

Ken first visited this spectacular wildlife viewing spot—often called the Enchanted Isles—more than twenty years ago, and he went back this August in order to plan the upcoming trip for Garden members. He reports that little has changed in the two decades since he was first there—which is exactly what we want to hear when it comes to the status of one of the world's most important wildlife sanctuaries.

Brachycereus

According to Ken, the cactus viewing (large stands of opuntia and brachycereus) is even better than before. And the populations of sea birds (including waved albatross, blue and red footed boobies, frigate birds and penguins), sea mammals (most notably the sea lions and dolphins), reptiles (especially land and marine iguanas, lava lizards, and the giant tortoises), and tropical fish (too numerous to mention) all remain abundant and healthy—and just as unafraid of people as ever.

Marine iguana

Ken attributes this ecological success story to the Ecuadorian government and its National Park Service for their careful management of this fragile environment. Their wildlife management program stipulates that no one can set foot on any of the islands unless accompanied by a nationally licensed naturalist and—for this reason—selecting the right tour operator is especially important. For the Garden's trip to the Galapagos Islands we have chosen Lindblad Expeditions and its flagship vessel, the *M.S. Polaris*.

The ten-day itinerary begins in Miami on Friday, June 20th, with a late afternoon flight to Guayaquil, Ecuador. Friday night is spent in the Hotel Hilton Colon, with a departure the next morning for the Island of Baltra, where the *M.S. Polaris* will be waiting. Once all are on board, the ship begins a weeklong voyage to seven separate islands. Each day will be as different as the islands themselves, but will in some way resemble the following daily schedule: early morning trip to the nearest beach for wildlife viewing, photography and hikes; breakfast; snorkeling and/or glass-bottom boat ride before lunch; a short cruise to a new location; and an afternoon visit to a new beach for still more wildlife viewing, snorkeling or hiking. After a full week of exploration, the *M.S. Polaris* will return to the Island of Baltra, and participants will fly back to the mainland for an afternoon of relaxation and sightseeing in Guayaquil. The trip home begins the following morning on Sunday, June 29th, with a return flight to Miami.

For a complete itinerary, accommodation options, and specifications for the *M.S. Polaris*, please call travel consultant Susan Belt at 480-998-0327, or e-mail: shbelt@earthlink.net.

Opuntia

Red footed boobie

The Sonoran Quarterly WINTER
December 2002 | Volume 56, No. 4

After 9/11
Students from Oman return to the Garden

Our friends from Oman have returned to Arizona and to the Desert Landscaper School. This is significant in terms of the history of September 2001.

(Left to right) Jameel Albalushi, Abdulah Al Shariqi, and Diane Barker, coordinator of the Desert Landscaper School

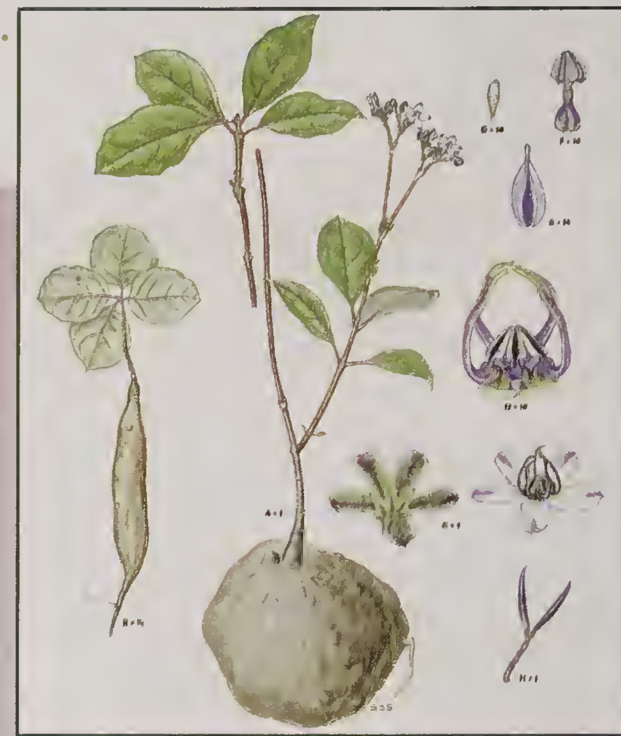
The School (DLS) has included international students from Israel, Kuwait and Oman, and during the summer of 2001 we started communicating with two prospective students from the country of Oman recommended to us by a DLS graduate, also from Oman.

Oman is a small country in the Middle East between Yemen and Saudi Arabia. The climate and terrain in Oman is similar to the Sonoran Desert: hot and dry, with monsoon summers and drought conditions. Oman suffers from deforestation mostly due to grazing. Two plants native to the southern part of Oman, *Raphionacme arabica* and *Dhofaria maleichi*, are threatened.

Our prospective students were Abdulah Al Shariqi, director of the botanical garden at the Sultan Qaboos University in Oman, and Jameel Albalushi, superintendent of landscape maintenance there. They enrolled in the Desert Landscaper School for the school year 2001-2002, arriving in the United States on September 7, 2001, and settling into an apartment for what we all thought was going to be an educational experience to which they were looking forward. Immediately they began to meet the people in the area where they were living and found everyone friendly and welcoming.

The first day of class arrived: September 11, 2001—and everyone awakened to the terrible events of that day. Abdulah and Jameel arrived at school in a state of shock, feeling the same horror that we all felt. They could not believe that terrorists could attack this country. After class that day their experiences in the United States changed. They received death threats at the same grocery store that days before had been hospitable.

By orders from the Sultan of Oman they returned to Oman within the week, fearing for their lives. Their wives and children were frightened and wanted the men safely home. Just as Jameel and Abdulah could not believe that people of their faith would commit such acts, we could not believe that people of Arizona would threaten innocent people just because of the language they spoke or the way they looked. We took them to the airport to be sure of their safety and stayed until they boarded their plane to Oman. They were gone but our friendship and communications continued.



Botanical illustration of *Raphionacme arabica*, a native plant in Oman threatened by loss of habitat, from *Plants of Dhofar: The Southern Region of Oman: Traditional, Economic and Medicinal Uses*, by Anthony G. Miller & Miranda Morris

Meeting the men from Oman with their different culture, religion, and language was a wonderful experience for the horticulture department. Our common interest with them (plants) was the great bridge across customs and words. People who share a love of plants interact as if there are no differences between them and love discussing everything about plants, botany and related areas.

We were pleased when Abdullah e-mailed us that they wanted to return to the Desert Botanical Garden and DLS in September 2002. As part of the international program the students train with specific horticulturists to learn the responsibilities of each position. They have now completed Session I and are finding their experience safe, educational and enjoyable.

–Diane Barker coordinates the Desert Landscaper School.

Desert Botanical Garden wins Crescordia Awards

The Garden is the recipient of two Valley Forward Environmental Excellence Awards. The awards recognize outstanding contributions to the physical environment of Valley communities.

A first place award, under the category Environmental Stewardship – SRP Centennial Award, highlights the Garden's efforts for sixty-five years in encouraging an understanding, appreciation, and promotion of the uniqueness of the world's deserts. Wendy Hodgson, director of the Garden's herbarium and curator of collections, and Pat Smith, administrator of volunteers at the Desert Botanical Garden, submitted the Garden's nomination.

Landscape architect Christine Ten Eyck submitted the other nomination which received a first place award, under the category Site Development and Landscape – Commercial Plazas. To quote Christy, "This significant renovation connects people with the landscape by sculpting the earth, hardscape and plant life into a sequence of memorable spaces that accommodate a diversity of visitors and group sizes."

Cultivating Growing Minds:
Lucky 13 interns at the Garden

The Garden's intern program is healthy and growing. We offer students the opportunity to work with experts in a wide array of fields including fundraising, retail, education, horticulture, research and ecology, business, marketing, library science, event planning, public programming, parks and recreation, and museum management.

Located near Arizona State University, one the largest universities in the country, as well as six community colleges and a number of private higher education schools such as the University of Phoenix, the Garden can partner with these institutions to give students experience in their field and networking with experts. The interns benefit the Garden by contributing hours of service, strengthening our ties to local schools, and bringing youth into our volunteer programs.

This fall semester the Garden is hosting thirteen interns. Six students interested in the sciences are researching seed storage and germination or working in the herbarium. One student in the development department is learning about grant writing. Another intern is in volunteer management, one in horticulture, and three in education. And one intern came from Guadalajara, Mexico, to learn more about the desert.

One intern is Tony Ingham. Tony worked at Intel for years before deciding to go back to school and become a high school science teacher. He needed to find out if education is really the right field for him. Tony is developing a "traveling trunk" outreach kit of show-and-tell items and other educational materials to go to schools. In order to do this he first called other museums to learn about their kits. Then he interviewed teachers in order to determine what subjects they would like for the kits. Tony will then create resources, background, and activities for the kit that tie to the state teaching standards. He will assemble a test kit, take it to classrooms and evaluate it, and then "tweak" the kit so that it is ready by the following year. Finally, he will write a report about the project and attempt to publish an article in a museum journal.

Interns enrich the Garden's programming. They bring a wonderful energy and excitement to the Garden. In turn, the staff here contribute to our fields by mentoring some of our future peers. The number of interns increases every year. The time to set up an internship for spring is December, April for a summer internship, and August for a fall internship. Students interested in an internship should contact Ruthie Copeman at 480-481-8118 to set up an interview.

Tony Ingham talks to school children.

DLS Wins Xeriscape Award

The Desert Landscaper School (DLS) has received the Xeriscape Award of Special Recognition, presented annually by Arizona Municipal Water Users Association (AMWUA) to an individual, place, and institution for significant contribution to promoting xeriscape concept and principles.

The School was cited for its "unparalleled comprehensive training in landscaping practices," as well as extensive hands-on training, access to the Garden's vast plant collection, and Spanish teaching and training materials provided by staff.

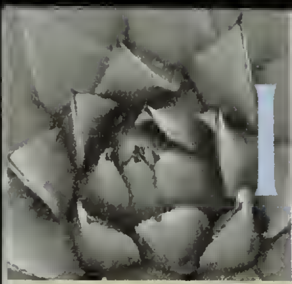
Executive Director Ken Schutz and DLS Coordinator Diane Barker picked up the award in September during the Southwestern Horticultural Conference and Trade Show at the Phoenix Civic Plaza.

AMWUA is a voluntary, non-profit organization established by cities in the urban area of Maricopa County for the development of an urban water policy.

Wildflower Symposium

"All About Wildflowers, How to Know, Grow, and Conserve Wildflowers in Arizona" will be a day-long symposium at the Garden on Saturday, March 8.

There will be presentations by experts in many areas of wildflowers, sales of wildflower plants and seed, herbarium and Desert Wildflower Trail tours, and more. The $25 fee (10% discount for members) includes continental breakfast and catered lunch. Symposium sponsored by the DBG, Arizona Federation of Garden Clubs (AFGC), and Columbine Garden Club (GCA). Call 480-941-1225 for more information.



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*The Desert Botanical Garden is grateful for the support of all 9,907 members. Recognized here are members of the Founder's Circle, President's Club, Director's Circle, Curator's Circle, Saguaro Society, and The Sonoran Circle. Also listed are donations and memberships received from **July 1 to September 30, 2002**, for the Ocotillo Club, Boojum Club, Agave Century Club and Desert Council.*

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Honorary & memorial contributions are used to provide for the ongoing horticultural, education & research programs of the Desert Botanical Garden. From July 1, 2002, to September 30, 2002, contributions have been received in honor of:

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Boojum tree

Calendar of Special Events

Gary Lee Price sculpture, throughout the Garden, through January 5

Las Noches de las Luminarias, December 5 - 7

Holiday Teddy Bear Tea, December 14

Holiday Concerts

Estéban for two shows,
11:30 a.m. - 1:30 p.m. & 4:30 - 6:30 p.m.,
December 15

Matt Bachrach for two shows,
11:30 a.m.-1:00 p.m. & 4:30 - 6:00 p.m.,
December 21

Music in the Garden, Spring 2003

February 2, Trinidad Calypso
February 9, Carmela y Mas
February 16, Nazim Rashid with New Renaissance and special guests
February 23, Big Pete Pearson Band
March 2, Swingtips
March 9, Stephen Bennett
March 23, Pan America Orchestra

Concerts noon - 2 p.m.;
limited seating; optional brunch;
call 480-941-1225 for ticket information

Photo by Jennifer Johnston

The Sonoran Quarterly
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leave us your forwarding address!

The mission of the Desert Botanical Garden:

The Garden's commitment to the community is to advance excellence in education, research, exhibition, and conservation of desert plants of the world with emphasis on the Southwestern United States. We will ensure that the Garden is always a compelling attraction that brings to life the many wonders of the desert.