The Plant Press

THE ARIZONA NATIVE PLANT SOCIETY

Volume 14, No. 2
Fall, 1990

C. Hart Merriam: A Biologist in Arizona

by Barbara G. Phillips

The concept embodied in "Merriam's Life Zones" is frequently used in Arizona and the Southwest by teachers, biologists and laypeople. This year marks the 100th anniversary of the publication: *Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona* (Merriam 1890), based on the 1889 expedition to northern Arizona funded by the U.S.D.A. Biological Survey. It is very timely, therefore, to present in *The Plant Press* a brief biography of C. Hart Merriam, Chief of the Biological Survey, Head of the Expedition, and developer of the concept.

Merriam was a very fascinating person who in addition to studying birds and mammals all his life was truly an all-round naturalist from an early age. He was born in New York City December 5, 1855 and spent summers on his father's farm at Locust Grove in northern New York, overlooking the western front of the Adirondack Mountains.

"I had as a boy become familiar with the chipmunks and squirrels about the house, the woodchucks and meadow mice of the fields, the skunks of the woodlands, the mink and muskrats of the streams. Nearly every spring my father went into the nearby Adirondacks on fishing trips and often took me with him. During these trips I made the acquaintance of a number of birds different from those at the home farm..., several butterflies, a few trees, and many shrubs and flowering plants different from those at our home. The observance of these obvious differences with the recognition of the fact that they were due in the main to the cooler climate of the Adirondacks was one of the thrilling events of my young life...my father, reaching up to the Humboldt shelf of his library, gave me the volume entitled *Views of Nature*—a great work, containing a most revealing discussion of the distribution of animals and plants. I was deeply impressed by Humboldt's account of animal and plant life in the lofty Andes, particularly on the great Chimborazo [a 20,561 ft. mountain in west central Ecuador], where the various species are grouped one above another in successive belts or zones according to differences of temperature and humidity...In other words, the subject of the geographic distribution of animals and plants—the very substance and essence of a biological survey—had taken form in my mind at an early date." (Merriam, 1935).

At age 16 Merriam participated as naturalist in the 1872 Hayden Survey of the Territories. The Survey went to Cheyenne, Wyoming and a little later to Ogden, Utah. From Utah it traveled north by horseback to old Fort Hall on the Snake River in Idaho and then to the geyser region of relatively unknown Yellowstone area.

"There were no roads. The route led through arid deserts, rolling plains, deep canyons, and dense mountain forests, each the home of a different association of animals and plants. Being young and susceptible to new impressions, I was keenly observant of these changes and thrilled by the succession of unfamiliar scenes. This naturally broadened my view of the animal and plant life of our country and opened my eyes still wider to the influence of altitude and other factors in determining the distribution of animals and plants." (Merriam 1935)

Merriam prepared "A Report on the Mammals and Birds of the Expedition," which appeared in 1873 as part of Hayden's *Sixth Annual Report*. This report listed thirty-three species of mammals including two bears, fourteen rodents, three rabbits, and hares, moose, deer and three bats.

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Notes from the President

The Annual Meeting in Flagstaff will be held on September 22 and 23. Non-flowering plants will be the main emphasis to talks, with field trips oriented to finding ferns, lichens, and mushrooms scheduled for Sunday. A new Adopt-a-Species Program will be introduced and Conservation Committee members will discuss issues on native plant conservation.

The annual Labor Day weekend Chiricahua Workshop was again a raving success. Over 50 species of mushrooms were discovered in wide ranging habitats with the guidance of Dr. Harry Thiers, a guest field trip leader from San Francisco State University. (Dr. Thiers believes the Chiricahuas may prove to be a significant location for mushrooms because both eastern and western species were found here.) Over 140 species of vascular plants were listed by Jack Kaiser as he led a following of enthusiasts along the base of Rucker Canyon. The staff at the Research Station said the Arizona Native Plant Society is their largest, most easy going, helpful, and quiet group. No wonder we're always invited back!

Several events are worthy of your calendar. In early October, the Agriculture and Horticulture Commission will hold a hearing on the regulations of the Native Plant Law. The Nursery Association is concerned that all *propagated* native plants protected under the law will require tags and seals, which could dampen the marketing of nursery grown native plants for landscaping in the state. The scientific community is concerned because Ag. & Hort. appears to be avoiding our efforts to form a Scientific Advisory Committee. Your attendance could really make a difference. See conservation page (pg. 14) for more information.

Also, don't forget to vote for proposition 200. ANPS members helped to put this on the ballot by collecting an estimated 3,000+ signatures for the petition. The State desperately needs the funds that will be provided for parks, recreation, and most importantly, conservation.

This Spring (March 14-16) the Desert Botanical Garden will co-sponsor a wildflower conference with the National Wildflower Research Center and will host the event. The ANPS is invited to participate in the conference titled "Creating Regional Landscapes with Wildflowers and Native Plants." Talks will include desert ecology, native landscape plants, landscape design and maintenance, and ethics of field collecting.

Carol Shumaker, who has served as ANPS Recording Secretary for two years now, is resigning. On behalf of the Society, I wish to acknowledge her service, her faithful participation in many board meetings, and her responsible and punctual presentation of the minutes. Thank you Carol! Sandy James, a landscape architect working in the Phoenix area has agreed to step in and become our next Recording Secretary. Thank you Sandy and welcome to the ANPS Board of Directors!

Three dear friends of the society have passed away this spring and summer. Rodney Engard served on the Board of Directors for several years. His keen insight, wry wit and loving dedication will truly be missed. Louis Hamilton was a charter member and loyal participant in the Tucson Chapter. We will miss his warm presence, sincerity, and love for native plants. Dr. Carroll Adams of Casa Grande and Mason City, Iowa, was an active participant in the South Central Chapter, where he will be especially missed. This newsletter is dedicated to Rodney, Louis, and Carroll.

Karen Reichhardt

Editor's Desk

It is my hope that this issue of *The Plant Press* will bring at least one article of particular interest to each member of its diverse readership. Thanks to contributor Karen Reichhardt it even includes something for the next generation of native plant enthusiasts — three reviews of children's picture books in the "Pressed Pages" column.

The feature article of this Fall issue, by Barbara Phillips, was drawn from her well-researched study of Biologist C. Hart Merriam's work with native plants in Arizona. It should intrigue plant enthusiasts, ecologists, and historians alike. Phoenicians: take note of Merriam's description of your city 100 years ago today!

Taxonomists and horticulturists should be sure to look for Matt Johnson's "The Native Landscaper" column which in this issue brings comparative descriptions from five species in the remarkable *Jatropha* genus. Backyard native gardeners will enjoy reading about a seasonal round of plant/insect relationships in entomologist Michael Plagens's "The Sacred Apple" article. Outdoor recreationists are encouraged to become amateur naturalists and to look both more closely and more broadly at the natural world in Patrick Boles's article "Observing Nature." And Sue Rutman's submission on Arizona Willow in her "Our Unique Arizona Flora" column may inspire some readers to study Julia Fonseca's "Adopt a Plant" conservation proposal (presented on the "Conservation Page") and join in this new ANPS effort to contribute to the conservation of rare and endangered native plants.

Looking ahead to the winter issue and beyond, I'm still seeking feature editors for "Pressed Pages" and the "Conservation Page". Do contact me if you are interested in either position. One of the rewards of my job is receiving unsolicited articles for consideration. The unexpected mailbox arrival of Michael Plagen's "The Sacred Apple," with its interesting story and style, truly brightened my day not too long ago. I wonder what other surprises might be on their way?

Karen Enyedy Bruenig

Merriam—*Continued from page 1*

Following the Hayden expedition, Merriam trained as a special student at the Sheffield Scientific School at Yale. In 1877 his first major work was published, "A Review of the Birds of Connecticut, with Remarks on their Habits," establishing him as a young naturalist of merit and much future promise. About the time Merriam finished Yale his father had a museum built for him about one hundred yards from the main house at Homewood (near Locust Grove), in which Merriam maintained an office as well as space for preparing, preserving, and storing his rapidly growing natural history collections. Merriam graduated from the College of Physicians and Surgeons at Columbia in New York in 1879. He took 2nd Harsen Prize (worth $75. and a bronze medal) for "best report of Medical and Surgical Clinic held at New York Hospital." He spent the money on sixty books, some of them in botany.

From 1879 until 1885 Dr. Merriam maintained a medical practice in Locust Grove, N.Y. Nevertheless, he managed to keep up his natural history studies and continue producing publications. His *Mammals of the Adirondacks* was published in two installments in 1882 and 1884. It grew out of many years of collecting: "The circumstance that my home during the years of medical practice was in a sparsely populated region just west of the Adirondacks enabled me at the same time to continue natural-history investigations." (Merriam, 1935)

While at Columbia Merriam tried to get financial backing for a projected biological survey of New York State. A few years later in 1885, his father, with the assistance of the Senator Warner Miller from New York; a cousin; and Professor Baird, Secretary of the Smithsonian Institution, secured an appropriation to set up a position of Ornithologist of the Department of Agriculture. "...I felt that this might give me the long-cherished opportunity to establish a Biological Survey—this time to include the whole United States instead of the single State of New York! Returning to Washington I entered upon the new duties, formulated plans, and proceeded to carry out the dream of my life!" (Merriam, 1935)

Merriam became Ornithologist, chief of a section of the Division of Entomology in the U.S. Department of Agriculture. Charged in his post with studying the economic importance of birds (and after 1886, mammals), Merriam turned his attention to research in biogeography, emphasizing the importance of temperature. The expedition of 1889 (funded by the Biological Survey for $600) was important not only because it presented the concept of life zones but also because it garnered the first comprehensive description of the plant and animal life of the area encompassing the San Francisco Peaks, the Painted Desert, and the Grand Canyon.

After the expedition in 1889, Merriam made two other major trips to Arizona in 1894 and 1896. Merriam started keeping a daily journal about 1873, and filled many notebooks over the next several decades. His keen eye and insights provide us with many observations on the plant as well as animal life of that era. The following is an excerpt from his journal as he journeyed from Flagstaff to Phoenix via Prescott.

"**Tues Oct. 23, 1894.** Clear and warm. Left Prescott at 8 a.m. by stage for Phoenix; distance 110 miles. The front axle broke about a mile from Agua Fria which delayed us considerably as we had to get a heavy wagon at Agua Fria and go back after the load. Agua Fria is locally called "Uncle Dick's." It is a single ranch with a windmill, no water running in the valley. The post office is the ranch...

"On leaving Prescott the road goes down the valley to Whipple and then turns east and winds out over the hills to the Agua Fria Valley. The highest elevation we passed over is 5500 ft on the last hill before going down into the Aqua Fria Valley...

"There are boxelders and walnuts in the valley near Prescott. The hills are covered with scrub oak, mixed with more or less *Rhus trilobata* [skunk bush], *Fallugia paradoxa* [Apache plume], *Purshia tridentata* [antelope bush; or possibly *Cowania* sp., (cliff rose)] & *Cercocarpus parvifolius* [birchleaf mahogany], and some *Lycium* sp. [wolfberry]. Most often junipers and piñon have been cut down but here and there a scrappy cut remains. They may never have been abundant along the line followed by the road. The juniper is *J. occidentalis* as in the Black Forest [Ponderosa Pine Forest] and on the S.F. Mtn. Plateau.

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Museum of Northern Arizona Collections

C. Hart Merriam (photographer unknown)

"On descending to the valley, saw a flock of Gambels Quail at 5000 ft... The valley is broad and somewhat grassy and lacks most forms of desert vegetation. I place it in the lower edge of the upper Sonoran with a few lower Sonoran forms just begining to come in (as the desert willow and catspaw)...

"Left Agua Fria at 12:30 noon...took supper at Goddard's ranch and stage station on Agua Fria at 10:30 p.m. Fed the horses and did not get started again till midnight.

"The hills the stage road winds among on the west side of the Agua Fria Valley are a direct continuation of the eastern foothills of the Sierra Prieta [and] are devoid of timber except on the higher summits [of] most of the stage road. They are clothed in scrub oak with some manzanita, barberry and catspaw in lower altitudes...

"At about 4000 ft. and approximately 5 miles south of Mayer some large acacias and perhaps mesquite appear. Colonies of kangaroo rats were common under the mesquite or catspaw, and nests of cactus wren were seen. The big tree *Ephedra* was first observed at about 3800 ft. and was the point where the Prescott and Verde Roads fork and large pad cactus with thumbs 3-4 ft. high (prob. *O. Engelmanni*) were noted near the same place.

Before entering Black Cañon (alt presumably a little less than 2000 ft.) we saw giant cactuses and *Fouquieria* in abundance on the side slopes and they continued all along though it was too dark to see distinctly.

"The ride through Black Cañon was exciting. The grade is steep and about a mile or a mile and a half long and much of the way is narrow with the bottom of the cañon far below. We plunged down it with our 4-horse team and lumber wagon and met the up-bound stage at about the only practical turnout on the grade. It was quite dark and the darkness was increased by a slight cloudiness which grew thicker as we went south.

"Our driver showed us the spot where he suddenly came upon a large spotted cat—probably a jaguar—about 5 years ago. This makes the 3rd authentic record we have of this animal for Arizona...Our driver volunteered this information about his as we drove by the spot, showing me just where the animal stood and where it ran away and telling me how the horses stopped and looked at it. I had not spoken to him at all on the subject of cats and regard his statements as entirely trustworthy.

"**Wed Oct. 24, 1894.** Mostly cloudy early mng and more or less cloudy all day; warm. Pulled out from Goddard's stage station on Agua Fria at midnight and reached New River at 3 a.m. and Phoenix at 9 a.m. driving into town with our lumber wagon... We smelled the *Larrea* before reaching New River, and almost continuously afterward, and saw giant cactuses and mesquite on nearly all suitable slopes. When light enough to see distinctly we were among mesquite and *Larrea* with much catspaw and palo verde on a broad and nearly level plane. Sharp desert ranges are seen in all directions rising abruptly from the desert, their bases covered sparingly with giant cactuses and other species. The Salt River desert is very broad and flat.

"Alt. of Phoenix by my barometer 1000 ft. Phoenix is spread out over a large extent of country. There are two big irrigation canals on the north side of town, one 4 miles away, the other 10 miles. Inside of the outer canal are extensive fields of alfalfa, vineyards, fruit orchards, and much stock. Numerous tropical forms of vegetation have been introduced and thrive. Umbrella trees [Chinaberry trees] and palmettos [palms] abound and are evidently favorites.

"Mesquite and catspaw come right into town along the roadsides, all of which are bordered on both sides with cottonwoods. The profusion of vegetation and shelter in the midst of a great desert makes Phoenix a wonderful haven for birds...In the multitudes of birds seen but not identified [there] must have been many of great interest. But I was too sick and tired to go and look at them closer and went to bed soon after reaching the hotel.

"I rode all the way from Prescott on the front seat with the driver and after the breakdown, the seat was a high board across the front end of the lumber wagon without spring. Riding 100 miles over range roads on this seat injured me considerably.

"Went to Maricopa (28 miles) in evg and took the eastbound train over the Southern Pacific at midnight (to El Paso, Ft. Worth, Little Rock, Memphis, Chattanooga and Washington)."

Dr. Merriam's bibliography contains more than 400 titles, several of which included extensive descriptions of the plant communities in which the studies took place. Examples are: *Life Zones of San Francisco Mountain, Arizona,*1890; *Results of a Biological Reconnaissance of South Central Idaho,* 1891; *Life Zones of North America,* 1891 and *Results of a Biological Survey of Mount Shasta, Northern California,* 1899.

After leaving government service in 1910 Merriam spent much time in collecting vocabularies of Indian tribes that were on the verge of extinction. Dr. C. Hart Merriam died in Berkeley, California March 19, 1942 at the age of 86. Merriam constantly protested that life was too short. Indeed, he was a person of prodigious energy and talent who progressed rapidly from one field to another in his knowledge and interests, and certainly accomplished far more than most in one lifetime.

Author's note: A delightful presentation of the two-month scientific expedition to the San Francisco Peaks in the summer of 1889 along with a discussion of the life zone concept and a more complete biography on Merriam is contained in the publication, "Expedition to the San Francisco Peaks" (*Plateau* 60:2, 1989). Literature cited is detailed in this magazine except for Merriam (1935): *The Biological Survey—Origin and Early Days—A Retrospect,* a talk given by Merriam at the 50th anniversary dinner of the founding Biological Survey.

About the author: Barbara G. Phillips, Ph.D; an ANPS former board member, is a zone botanist for the U. S. Forest Service on the Coconino, Kaibab, and Prescott Forests of Northern Arizona. She retains a long-held research affiliation with the Museum of Northern Arizona in Flagstaff.

Editor's note: Anomalies of spelling and abbreviation in Merriam's journal have been preserved by the author.

The Sacred Apple

by Michael Plagens

For many biologists and nature lovers Arizona is a paradise. The unrivaled diversity of plants and animals allows for fascinating discoveries on every outing to the deserts and mountains. One of the more fascinating of Arizona's plants is *Datura meteloides*, also called "The Sacred Apple" or "Angel's Trumpet." Wanting to enjoy this plant closer at hand I transplanted a potato-like tuber from this plant to the small garden at our Phoenix condo. (The underground tubers contain an alkaloid that can produce hallucinations and death, thus the source of the common name.)

At first the tuber didn't sprout any shoots and I feared I had injured it too severely during transplant, but a month later dark green leaves appeared and grew rapidly to produce a plant two feet tall. That first year it didn't bloom, but instead recovered its strength and developed a large root store. The winter's frost killed the plant back to the roots but with spring it again grew rapidly, even wildly. Soon I was cutting it back or else it would have taken over my whole patio.

But still it didn't bloom. By April, buds had begun to form and then would wither. This was disappointing because datura's flowers are truly spectacular. The lily-white blossoms are fully five inches across and have a long graceful funnel; in fact they bear a striking resemblance to the Easter Lily. Finally the buds grew long and stout but remained green until at last they began to fade to white. Any day they would open. It was late May and the evening had cooled sufficiently for us to open the windows and doors. Just after the sun set, as we were finishing dinner, a strong perfume came in on a breeze. At once we know the datura had bloomed. We rushed out to see a glorious white blossom greeting the dusk air. All night the flower stood beckoning a pollinator with strong perfume and a reward of nectar at the bottom of the funnel. Not bees for this night-blooming flower—instead this plant requires the visit of a large sphinx moth. Only the sphinx moth with its long tongue (up to six inches) can reach the nectar. Bees and ants which visit the next day find themselves trapped at the bottom of the long, waxy and slippery tube. By 10:00 A.M. the flower wilts under the hot sun and turns brown.

If no sphinx moth visits and cross-pollinates the flower, the fruit and seeds will not develop. Cross pollination means the sphinx moth must carry pollen from another datura plant. For two weeks we watched at dusk as one to several flowers magically popped open like clockwork as the sun went down. None were pollinated until one night in late June there were twenty-five flower buds all ready to open at once. To me it was a grand show of beauty but the plant was making a major effort to attract the needed pollinator. The fragrance was overwhelming...from several houses down the street I could detect the characteristic perfume. Would this be the night a sphinx moth would find this isolated plant? The next morning I inspected the flowers, still magnificent in the cool dawn. Ah ha! There! On the white throat of a blossom was a dusting of minute dark hairs that had rubbed off the big moth as it entered the flower for a welcome reward of nectar. How far the moth had come I couldn't know, but now the datura fruit could develop if the moth had brought pollen from another datura plant.

Soon the fruits began to develop...odd spiny things that look rather like castor bean fruits. But at the same time holes began to appear in the leaves. Datura needs the sphinx moth for pollination, but then the moth lays eggs that turn into caterpillars that eat datura's leaves. Sphinx moths can lay many eggs and there were probably visits by more than one moth. Soon there were hundreds of rapidly growing caterpillars. Within two weeks of the initial visit by the sphinx moth, the entire plant, which had covered most of my patio area, was stripped clean of leaves. The huge green worms then gnawed the stems and unopened flowers. I trimmed the naked stems all back to the base, figuring the other plants in the garden needed a chance to grow anyway. The caterpillars crawled away to pupate in underground cells.

It seems ironic that the plant's needed pollinator also causes its destruction. But spring time brings new life as the underground tubers send forth abundant new growth and more beautiful flowers, while the hidden caterpillars have also completed development into large gray moths that hatch and fly off in search of mates and more Datura plants.

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Pressed Pages: *A Review of Three Picture Books for Children*

by Karen Reichhardt

The Desert Is Theirs, by Byrd Baylor is a near-classic children's book for grades K-3 that recently has been reprinted (Aladdin Books, 1987). This is a Caldecott Honor Book, with illustrations by Peter Parnall consisting of ink drawings and tempera or watercolor wash. The drawings are a combination of realistic desert plants, animals, and people accurately portrayed using ink lines and dots, juxtaposed by a background of ethereal colors of illuminating light and space. The background gives a liquid impression to an otherwise dry desert landscape, although the color choice of gold and turquoise is more reminiscent of heat and sun.

Baylor's text is intended to teach the reader about the mystical qualities of the desert. The animals, plants, and people who live there struggle to survive and are dependent upon one another, constantly influenced by the harshness of the climate. The overriding tone is one of reverence for life, and joy for the precious limited resources.

The pictures appear to illuminate the feeling described by Baylor in her brilliant text. The colors and lines which are the backdrop of each picture illustrate the dominating light and heat of the desert which the text does not specifically mention but subtly implies.

Desert Giant: The World of the Saguaro Cactus by Barbara Bash (Sierra Club Books; Little Brown, 1989) is a new release for grades 3-6 in the Tree Tales Series by the Sierra Club. *Desert Giant* is an instructive book about the life history, ecology, and ethnobotanical uses of the saguaro cactus. Each page is a full tempera painting of the saguaro, beginning with a scene of a hillside with saguaros and later focusing on details of the saguaro's life. The illustrations are bold and realistic, brilliantly colored, and carefully researched. The pages showing the ethnobotanical uses of the saguaro are especially refreshing—the style closely resembling that of native Tohono 'O'odham Indian illustrators, and truly conveying the small village and camp life surrounding the saguaro harvest.

Some of the illustrations could be misleading to children, because objects of focus are shown larger than life, or in larger proportion to the background drawings. Small children cannot visualize these size differences, especially if they have never seen the objects in real life.

The text of *Desert Giant* is instructive. Each page is a phase in the life cycle of the saguaro, while the text describes sounds, smells, and sights of events shown. Although the text is well-written, it is not essential to read it to understand the story the pictures tell.

One Green Mesquite Tree, by Gisela Jernigan (Harbinger House, Inc., 1988) is a K-2 inventive, informational book which utilizes the traditional counting scheme to inform the reader of the interactions of Sonoran Desert plants and animals. The illustrations are realistic, drawn in pen and ink with tempera color filling in the objects. On each page, the reader must count the number of plants, each of the same species, and then the number of animals. Again, careful research went into this book.

The drawings of the plants and animals are extremely accurate, as are the plant/animal interrelationships. The text does not describe the relationships shown on each page, and they may not be important to a young reader, but for an adult who is sensitive to desert ecology, these interactions are a delight. Cicadas are right at home inhabiting the mesquite tree. Likewise, hummingbirds are common visitors to ocotillo flowers and turtles really do lust for prickly pear fruit to eat.

Karen Reichhardt holds an M.A. in Botany and is Collections Manager for the A.S.U. Herbarium. She is the current ANPS President.

Sacred Apple—*Continued from page 5*

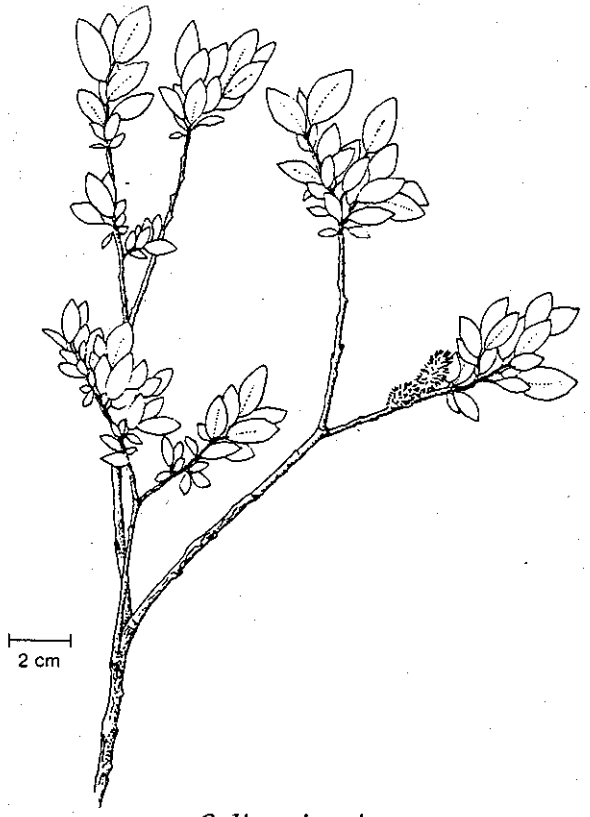
This spring, as the datura entered its third year of growth in our garden, aphids also found the plant suitable to feed on. They sucked sap from tender shoots and the undersides of leaves. Just as the plant began to show signs of the aphids' ever increasing numbers, a pair of verdins discovered the bonanza and began making daily visits to glean a meal of aphids. These delightful little birds would also take most of the caterpillars before they grew large enough to do significant damage.

Native Arizona plants are thus anything but dull scraggly shrubs. They are fully alive and present fabulous dramas of ecology from the natural desert that surrounds our city. By planting native plants in our yards and gardens we can bring at least a part of Arizona's natural heritage into our daily lives.

Michael J. Plagens, Ph.D., is an entomologist and an ANPS member.

Our Unique Arizona Flora: *Arizona Willow*

by Sue Rutman



Salix arizonica

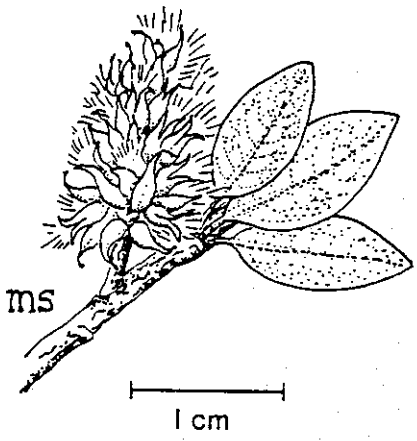
Arizona Willow (*Salix arizonica*) occurs in the scenic high country of the White Mountains of northeastern Arizona. This willow is found most commonly in or adjacent to perennial water but is also found on drier sites within the riparian corridor. Other species of willow such as *S. geyeriana, S. monticola,* and *S. bebbiana* are sometimes codominant with *S. arizonica*. In undegraded habitats, these willows together form thickets.

The fine-toothed shiny leaves of the Arizona willow are borne on stems that are bright red when young, aging to olive-grey. The plant has several forms, ranging from prostrate mats, spindly shrubs, rounded shrubs, and large thickets or hedges. It takes a trained eye to find the prostrate plants that may only reach a height of one inch growing amongst grasses, sedges and herbaceous perennials.

Although no historic records of the former distribution of Arizona Willow exist, the species is presumed to have declined due to a combination of factors. Degraded habitat conditions and the apparent reduced vigor of individuals indicate that the populations may be declining. Threats to the species include browsing by livestock, elk and other herbivores, habitat degradation due to livestock, rust (fungus) infestation, heavy recreational use of habitat, and habitat loss due to dam construction.

Another unique species shares the same habitat as *Salix arizonica. Castilleja mogollonica* (White Mountains paintbrush) also occurs in the wetted soils along the high elevation riparian corridors of the White Mountains. This yellow-flowered *Castilleja* was overlooked by most rare plant enthusiasts because of its rather odd entry in *The Flora of Arizona*. We hope to build our understanding of *C. mogollonica* during the next few years.

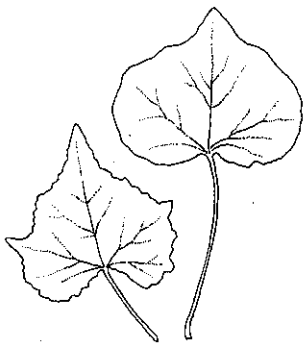
Editor's note: At present, *Salix arizonica* is federally listed as a Category 1 species and *Castilleja mogollonica* as a Category 2 species.



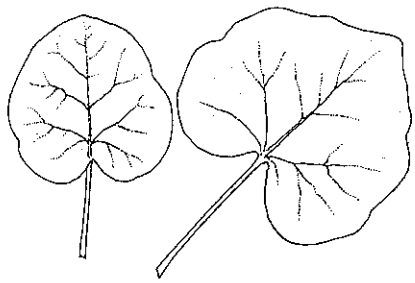
Fall Plant Sales

Arizona-Sonora Desert Museum	November 3—4 9am to 4pm
Boyce Thompson Southwestern Arboretum	November 10—11 8am to 5pm
Desert Botanical Garden	
Members Preview	October 19 3pm to 6pm
Public Sale	October 20—21 9am to 5pm
Tucson Botanical Gardens	
Members Preview	October 6 8am to 10pm
Public Sale	October 6 10am to 4pm October 7 11am to 4pm

Limberbush—*Jatropha cardiophylla* (Euphorbiaceae)
Description: Shrubby plants, generally 0.3-2 m height, with several to 100 or more semi-succulent, erect or spreading, flexible stems arising from the roots. The stems are sparingly branched but bear numerous short spur branches. The bark is smooth and dark reddish-brown in color. Limberbush, also known as Sangre de Drago, grows and produces leaves only during the summer, from June to September. The leaves turn bright yellow and are quickly shed in late September or October. The leaf blades are 2-7 cm long and are heart-shaped with irregularly toothed margins. The plants are dioecious. Inconspicuous white flowers appear during the summer months. The fruit are green and contain a single rounded seed. They ripen from August to October.
Habitat and Distribution: Rocky or sandy soils of ridges, slopes, bajadas, arroyos and (southward) plains in Sonoran Desertscrub, thornscrub, and lower semidesert grassland. 65-1,270 m (200-4,000 ft) elevation. Arizona in central and eastern Pima County, southern Pinal County and southeast Maricopa County, extending southward through much of lowland Sonora, Mexico. Limberbush is widespread and locally common but is inconspicuous when not in leaf.
Propagation, Cultural Requirements, and Maintenance: Limberbush is easily grown from scarified seed. Clipping a small section of the seed coat is sufficient to accomplish this. Approximately 80% germination was obtained from scarified seed direct-sown in one-gallon containers with a daily air temperature range of 21-40° C. Germination takes five to eight days. Caution should be observed to prevent small ants from burrowing into the soil and destroying the seed before they germinate. Plants were 30-40 cm tall at four months after germination. Limberbush may be grown from stem cuttings taken in the summer and treated with IBA. The cuttings are slow to establish and develop. Division is an effective method of propagation and the plants establish more rapidly than do those propagated from cuttings. Bare-rooted, field-salvaged limberbush transplant without much difficulty but should be quickly replanted to prevent them from drying out. Limberbush sustains stem damage at -6.5 to -5.5° C but recovers rapidly the following summer. The plants are drought resistant but prefer regular irrigation during the summer for optimal growth. Limberbush usually will not leaf out before June in southern Arizona even if regularly watered. They will quickly defoliate if they do not receive adequate moisture in the late summer, and in any case the plants will go dormant by mid-October even when receiving extra water. Limberbush grows naturally in areas that receive 200-400 mm of annual rainfall. The plants require good drainage and seem to prefer sandy soils. Limberbush will grow equally well in full sun or partial shade. Red spider mites are an occasional problem on limberbush in the greenhouse. No other pest or disease problems have been observed and the plants are not bothered by rabbits and other rodents. Limberbush does not produce litter and does not require pruning. Cut stems exude a watery sap which can stain clothing. Limberbush is not specifically reported to be poisonous; however, other species of *Jatropha* are known to be toxic if eaten.
Landscape Application: Limberbush is a unique desert plant which is suitable for landscape use in southern Arizona. The plants are leafless much of the year, displaying the attractive reddish-brown stems. When in leaf, limberbush is distinctive in having larger leaves than many other desert plants. The yellow autumn foliage provides a brief splash of color as the plants go dormant. Limberbush is appropriate for desert landscapes where it can be combined with other desert shrubs and succulents as an accent plant. It may be used as a patio plant and is compatible in cactus and succulent gardens. Limberbush can enhance existing native desert vegetation and can be planted on stabilized banks or in transition areas. Limberbush makes an eye-catching container plant in or out of leaf.
While some people object to plants which "look like a bunch of sticks" for most of the year, limberbush can be an appealing landscape subject for those people who appreciate plants with unusual character. It is a low maintenance plant which can enhance a landscape when used properly. While limberbush is not likely to become a widely used landscape plant, perhaps nursery growers will begin to propagate it and market it as a specialty item.
Other Species: Several other species of *Jatropha* which have landscape potential for southern Arizona are described below.



Jatropha cardiophylla



Jatropha cinerea

Ashy Limberbush—*Jatropha cinerea*: Usually shrubs, 1-3 (6) m tall with several semi-succulent stems arising from a short trunk (can reach 6 m height where the plant is protected from freezing). Smooth grayish bark. The leaves are drought deciduous, the blades are kidney- or heart-shaped with entire or shallowly lobed margins. The flowers are bell-shaped and pink. Ashy Limberbush blooms in the summer. The two- to three-seeded capsules ripen in the fall. Ashy limberbush occurs in Arizona in Organ Pipe Cactus National Monument near the Mexican border but is common and widespread in

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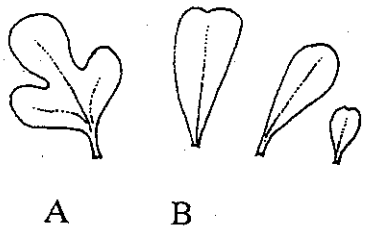
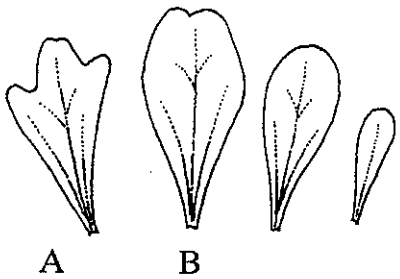
much of Baja California and coastal Sonora. The plants are readily propagated from seed in the same manner as for *Jatropha cardiophylla*. Dormant stem cuttings taken in November failed to root. Ashy limberbush suffers severe stem damage below -4° C. In cultivation in Arizona it should be planted in a protected site. The plant has similar cultural requirements to *Jatropha cardiophylla* but will remain in leaf for most of the year with sufficient moisture and warmth. Ashy limberbush may be used as a specimen or container plant.



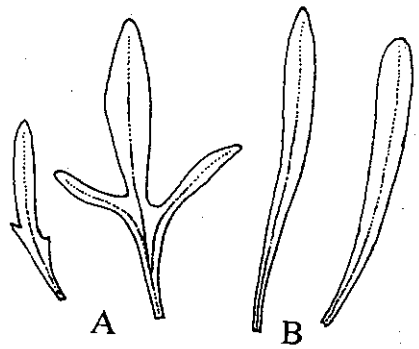
Jatropha cuneata

Shrubby Limberbush — *Jatropha cuneata*: Much-branched spreading shrubs, 0.5-2 m tall with semi-succulent stems. Smooth yellowish gray or brown bark. Leaves are produced in response to moisture throughout the year. Leaves of mature stems are small and obovate or spatulate with entire margins. Small white flowers are followed by single-seeded fruit which ripen in the fall. Shrubby Limberbush is found in Arizona from southeastern Yuma county to Organ Pipe Cactus National Monument and is widespread in Baja California and western Sonora. Shrubby Limberbush is propagated from seed in the same manner as the previous two species. Plants in 10 cm containers were 12-15 cm tall at four months after germination. No information is available on vegetative propagation. The plants sustain severe stem damage below -4° C. Cultural requirements for Shrubby Limberbush are similar to the previous species. It is suitable as a specimen plant for nearly frost-free landscapes and makes an attractive container plant when larger. It naturally develops a bonsai appearance in habitat and this can be encouraged in cultivation.



Jatropha dioica var. *dioica*

Leatherstem—*Jatropha dioica*: While not native to Arizona, this plant is included because of its interesting growth habit. The plants consist of dozens of semi-succulent stems arising from a spreading underground root system. Old plants can develop patches over 3 m across with stems usually less than 1 m tall. The bark is smooth and dark red-brown. The leaves of mature stems are obovate to spatulate in *J. dioica var. dioica*, and linear in *J. dioica var. graminea*. The leaves are clustered on numerous short spur branches. The plants leaf out in April in the Tucson area and will remain in leaf until frost with irrigation. The flowers are small and white. The fruit are single-seeded and ripen in the fall. Leatherstem ranges from south and southwest Texas to central Mexico. Seed propagation is the same as for the previous species. Plants may be rooted from stem cuttings which are initially slow to develop and are easily propagated by division. Leatherstem sustains stem damage at -6.5 to -5.5° C but recovers quickly. They are easily cultivated and prefer regular watering in warm weather. Leatherstem may be used as a unique accent plant in desert landscapes. It is compatible with cacti and succulents.



Jatropha dioica var. *graminea*

Jatropha—*Jatropha macrorhiza*: Herbaceous stems to 0.5 m tall are produced from a large underground root during the summer months. The stem dies back completely in the fall. The large palmately lobed, blue-green leaf blades have toothed margins. Showy pink flowers are produced in the summer. The fruit are three-valved capsules which ripen and quickly release the rounded seed. *Jatropha macrorhiza* ranges from Cochise, Santa Cruz, and southeast Pima Counties into southwest New Mexico and southward into Chihuahua and northeast Sonora, Mexico. This species is propagated from

Continued on page 10

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1 cm

Leaves from new stems (A) and from mature stems (B)

Drawings on pages 8 and 9 by M. B. Johnson

Native Landscaper—*Continued from page 9*

seed which may be scarified. First-year seedlings produce two oblong cotyledons as their only leaves. The adult leaves are produced the second year. The plants should have well-drained soil and regular watering when growing. Plants growing in the ground do not require irrigation when dormant. *Jatropha macrorhiza* may be grown as a summer root perennial with wildflowers and would be suitable for planting on stabilized slopes where it could be combined with similar native palmate-leaved plants such as *Amoreuxia, Cnidoscolus,* and *Manihot.* Schmutz and Hamilton (1979) report that *Jatropha macrorhiza* is toxic if eaten.

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Matt Johnson is an ANPS Board member and is a Botanical Specialist at the Desert Legume Program in Tucson.

A Double Take for Gary Nabhan

Just before Labor Day weekend, news of winning a second major professional award reached already "reeling" ANPS member Dr. Gary P. Nabhan who learned that the Pew Charitable Trusts had conferred upon him a $150,000 scholarship to be awarded over the next three years. The award is from the Pew Scholars Program, a new program just beginning its first year of what is to become a nine year duration of three rounds of three-year awards. The program was established to further non-traditional research on subjects relating to the environment. Gary was one of ten recipients of this first-ever scholarship award.

Last July reporters had tracked Gary down in the field and interviewed him over the phone from Ajo concerning his feelings over winning a prestigious MacArthur Fellowship from the MacArthur Foundation for $245,000 over a five year period. It was in the Ajo phone interview that Gary reported he was "still kind of reeling" from the news. But research with plants has the blessing of keeping one down-to-earth, and if Gary counted this blessing last July ("I'm going to go out right now and plant a few plants to keep my mind off all this...") he no doubt is counting it even more frequently after this latest announcement. The effect of receiving two such major honors in the same year must be extremely celebratory yet sobering at the same time. But for native plants in Arizona the two awards are simply extremely good news. Gary is the only person to have received both a MacArthur Fellowship and a Pew Scholarship this year; and he will forever hold the distinction of being the first person to receive both awards.

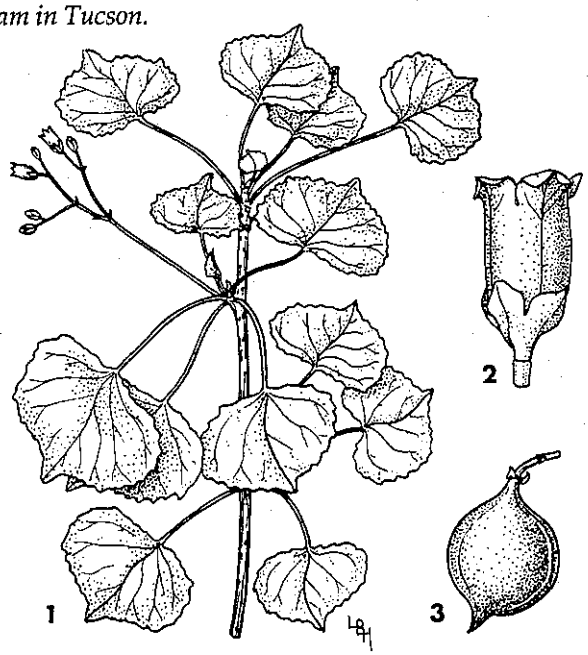

Fig. 3.86. Limber bush, *Jatropha cardiophylla. 1,* leafy branch with staminate flowers; 2, staminate flower with a sympetalous corolla; 3, fruit.

Reprinted from *Trees & Shrubs of the Southwestern Deserts,* 3rd ed. by L. Benson and R. A. Darrow; U. of A. Press, 1981: Copyright protected

Observing Nature

by Patrick Boles

During a presentation on ecology that I gave before the Prescott Chapter of the Native Plant Society a few years ago, I stressed the importance of not overlooking the other "components" which make up an ecosystem when on a botanizing trip. During my talk, to make a point, I projected a slide showing the lower portion of a standing dead Ponderosa Pine trunk. I mentioned that a person should also look at other things around the particular plant they are interested in at the time, and as I changed to the next slide added, "look up...something might be watching you!" The next slide showed a brown bear at the top of a dead Ponderosa Pine. If you do not look, you may miss an important part of the total experience—such as bumblebees landing on thin-stemmed wildflowers and riding them to the ground as they search for nectar. My family and I observed this on a hike in the Prescott National Forest.

On a recent mountain bike ride I stopped to rest and ended up spending several minutes watching a foraging darkling beetle. I watched as it checked out and passed over such plant species as fairy duster (*Calliandra eriophylla*), spurge (*Euphorbia* sp.), and Indian Wheat (*Plantago purshiia*) before finally deciding on a narrow-leafed forb. Although I wasn't quite sure of the identification of this nondescript forb, the insect apparently was satisfied as to the identification it had made. The beetle proceeded to devour half of one of the leaves by starting along an edge and only eating to the central rib. It was interesting observing the feeding habits of this common insect, which is usually encountered on any outing in Arizona.

On another bike ride I noticed that ants were collecting skunkbush sumac seeds. I stopped and observed the large ant hill for a few minutes. A few orange-colored skunkbush sumac fruits were being carried toward the entrances. One of these fruits was abandoned a few inches from the entrance. About this same time another ant came out of the entrance carrying something orange, which looked like the peeled skin of a skunkbush fruit, and discarded it and returned to the hole. I took a stick and knocked the "abandoned" fruit into the entrance—a swarm of ants carried it out of sight within seconds. Elsewhere on the mound an ant was on top of a skunkbush fruit and appeared to be eating it.

My office in Prescott is next to a small creek (usually dry) with a fairly nice stand of cottonwoods along it. Early one morning in late July I found a cicada larva, still covered with bits of dirt, crawling around just inside the open doorway at the back of the office. It had evidently just emerged from the ground and instead of climbing up a tree it had made a wrong turn into my office. I picked it up and took it outside and placed it on the trunk of an elm tree at the back of the office building. Cicadas in the large Fremont Cottonwoods along the creek were loud. Within an hour the larva had climbed about two and one-half feet from where I had placed it to a point about seven feet from the ground, and had started molting. The wings were curled and emerald green. It emerged backwards, leaning out from the old shell. After another thirty minutes it was all the way out and was turned around and holding onto the old shell with fully developed wings spread out and drying (the wings were now bright green).

And then there was the time last summer that my son Matt and I stopped to watch the conclusion of a successful hunt. A tarantula hawk (a large black wasp with orange wings) was dragging its stunned victim across a paved road. We watched as the trek across the road was finally completed and the wasp searched for a nest site (hole) in which to deposit the spider. Later the wasp will lay its egg on the helpless spider and close the entrance to the hole. When the egg hatches, the larva will feed on the still-living tarantula.

The book *Sonoran Desert Spring* by John Alcock is full of observations on both plants and animals in a Sonoran Desert community near Phoenix during the early part of the year. During numerous visits to Usery Ridge, Dr. Alcock observed everything from flowering periods of palo verde to the mating habits of the great purple hairstreak. Included are fascinating observations on rattlesnakes, saguaros, digger bees, ants, birds, etc. The book is published by the University of Chicago Press and provides an excellent example of observing the many components of an ecosystem. Dr. Alcock has recently published *Sonoran Desert Summer* which follows the residents of Usery Ridge during their summer activities. This second book includes illustrations by Marilyn Hoff Stewart and is published by the University of Arizona Press. It presents observations on the ecology of a fallen saguaro, the relationship between empress butterflies and desert hackberry, prey/predator relationships, effects of fire, and mating habits of peccaries or javelina.

Patrick Boles is ANPS Prescott Chapter President. He holds a Masters in Plant Ecology and is a Plant Ecologist for the State Land Department.

In Memorium

Last April ANPS lost one deeply committed member of our Tucson chapter: Rodney G. Engard. In June we lost another: Louis Pennock Hamilton. Both were charter members in the society. In August, Dr. Carroll Adams of the South Central Chapter passed away while in Iowa, his summer home. We feel the loss of these three members, and they are missed; yet we also go on feeling the gifts of their contributions and their friendship.

Carroll Adams and his wife Velma moved to Casa Grande nearly a decade ago and were active in the South Central Chapter's efforts to develop and install identification signs for the fine collection of native and other desert plants on the Central Arizona College campus. Despite a long illness eighty-year-old Carroll remained active in ANPS, helping — among other things — man the ANPS Earth Day booth on a hot day in Florence last April 22. He was a member of the local Archeological Society and the Casa Grande Valley Historical Society. An orthopedic surgeon, he has an extensive record of service to his profession and to his community in Iowa. Carroll is survived by his wife Velma, of Casa Grande and Mason City, Iowa; by two daughters, Carol Adams Watson of Mason City and Dr. Mary Jane Kelley, a marine biologist, of Arcadia, Ca.; by two sons, Dr. Richard Adams of Duluth, Minn. and Robert Adams of Cheyenne, Wyoming; and by nine grandchildren and one great-grandson. Carroll's wife Velma is ANPS South Central Chapter President. Donations in memory of Dr. Adams may be sent to either the Dr. J. E. Christopherson Memorial Scholarship Fund or to the Hospice of North Iowa in care of Velma Adams at 450 Sun West Dr., #30, Casa Grande, AZ 85222.

"Louis P. Hamilton," writes ANPS Treasurer Horace Miller, "was one of our founding members. He died in Tucson on June 29, 1990 at age 80. Four years ago, we also experienced the great loss to our Society of Louis' wife, the famous plant illustrator, Lucretia Breazeale Hamilton. This double loss is felt most deeply by all who knew and revered the Hamiltons.

"Louis was engaged in agricultural investigations and developments throughout his life. He attended the University of Arizona from 1929 to 1933 and later returned to obtain a master's degree in 1942. Virtually his entire working life was with the U. S. Department of Agriculture in the Southwest — principally in Yuma; Shiprock, New Mexico; and (for most of his life) the Plant Materials Center in Tucson. His principal field of interest was grass introduction and production studies.

Louis and Lucretia first met at the University of Arizona in the early thirties and were married in 1935." They are survived by a daughter, Mary Frances Zimmer; a son Edward; two grandchildren, Emily Zimmer and Todd Hamilton; and a brother, Joseph Hamilton of Maine.

For those who wish to make donations in Louis's memory, his family suggests that such be sent to the Lucretia Breazeale Hamilton Scholarship, c/o the University of Arizona Scholarship Development Office, 1111 N. Cherry, Tucson, AZ 85721.

Rodney Engard came to Arizona in 1961 as a student, receiving a Master's in Wildlife Biology from Arizona State University. Upon graduating Rodney became a student horticulturist at the Desert Botanical Garden. From 1977-78 Rodney served as Director of the Desert Botanical Garden, leaving in 1979 to begin doctoral studies with Dr. Howard Gentry. In 1982 Rodney accepted the Director's post at the Tucson Botanical Gardens and served there until his recent illness.

In memory of Rodney Engard ANPS member Barbara Tellman writes the following. "Rodney cared a lot about plants, especially those growing in the wild places. In June of 1989, although he was not feeling at all well, he wrote to Congress urging that the Cabeza Prieta Wildlife Refuge and the adjacent Tinajas Altas Mountains be declared a wilderness area. Here's part of what he wrote:

The Canadian Wildflower Society (CWF) has made an appealing limited offer to members of native plant societies. From now through December 30, 1990, ANPS and other plant society members may join the CWS for only $15.U.S./Yr. After the first of the coming year the membership price will increase to $30.U.S. Membership includes a subscription to ***Wildflower***, a quarterly magazine of typically 45 pages in length and a dozen or more features related to the flora of the North American Continent. Subjects covered include horticulture, ethnobotany, plant conservation, and natural history. In the Summer, 1990 issue of *Wildflower*, articles from *The Plant Press* (by Kevin Dahl and Martha Burgess) were selected as reprints by *Wildflower's* Editor James L. Hodgins.

Wildflower magazine's mandate is "the study, cultivation and conservation of North America's wild flora." To apply for CWS membership and to receive *Wildflower*, individuals should send their name, address and payment to: The Canadian Wildflower Society, 75 Ternhill Crescent, North York, Ontario, Canada M3C 2E4.

Yucca decipiens (Y. australis) | monograph in Mexico

"'For twelve years I searched the region for the *Triteliopsis palmeri* reported to occur there. Suddenly in April 1983 what had been apparently barren dunes erupted in a sea of three foot high Blue Dune Lilies. I was stunned by the beauty of the scene as I wandered through millions of waist high three-inch wide clusters of blue-purple flowers. This phenomenon has not recurred since. The number of new and/or rare plants discovered to occur in Arizona...every year that substantial rains occur, is significant. Rains of this nature occur so rarely that several generations of botanists will be necessary to catalog these incredibly adapted plants.

"'I have seen the massive and mindless destruction by ground-based military operations in the midst of one of the largest populations of the Many-headed Barrels in the state. I have seen the careless operations of ATVs and ORVs by people who have signed agreements to stay on designated roads, and then witnessed these people plowing over vegetation that will take generations to be replaced...

"'I am not a "lock-it-up" preservationist or elitist. I believe in publi~ and scientific access, but I believe also that before acce should go education and responsibility. I .owhere in Arizona have I felt the mystical, primal feeling of Wilderness more acutely than in the Cabeza Prieta and Tinajas Altas.

"'I urge you and your fellow legislators to include the Cabeza Prieta and specifically the Tinajas Altas Mountains and environs in a wilderness area officially designated. We can't change our minds once its gone.'

"Before Rodney left us, the area *did* get added protection, although not all he had asked for. The Bureau of Land Management, working with the Air Force, agreed that the region of the Tinajas Altas would be managed as an Area of Critical Environmental Concern (ACEC). The U. S. House of Representatives passed a bill designating the Cabeza Prieta Refuge as wilderness, and this bill is now in Senate subcommittee."

Rodney is survived by his mother, Lola Engard, of Scottsdale; a sister, Connie Whittenburg, of Tucson; a brother, Craig, of Phoenix; one niece and one nephew; and his longtime companion, Frank Cisneros.

Before his death he asked that contributions made in his memory go to Native Seeds/SEARCH, 2509 N. Campbell Ave., #325, Tucson, AZ 85719 or to the Cactus Garden or Library at Tucson Botanical Gardens, 2150 N. Alverdon, Tucson, AZ 85712.

May the good works and the generous spirit of Rodney, Louis, and Carroll continue to inspire members of the Arizona Native Plant Society far into the future.

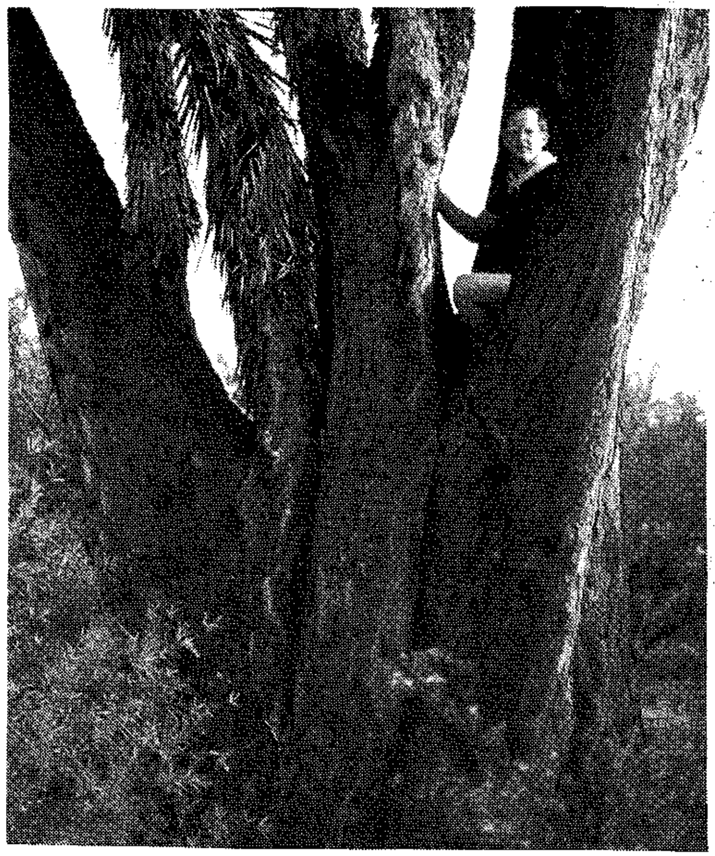

Photo of Rodney Engard in a Giant Yucca found in San Luis, Potosi, Mexico in 1986 by Ron Gass

MEMBERSHIP APPLICATION FORM

Membership Categories:

__ Lifetime	$1,000.
__ Patron	$100.
__ Sponsor	$50.
__ Commercial	$50.
__ Institutional*	$25.
__ General**	$15.
__ Senior Citizens	$10.
__ Student	$10.

Chapter Affiliation:

__ Flagstaff	__ South Central
__ Phoenix	__ Tucson
__ Prescott	__ Yuma

Name: ______________________________

Address: ______________________________

City, State, Zip: ______________________

Home Phone: ______________________

Work Phone: ______________________

Clip and mail this form with proper remittance to:
The Arizona Native Plant Society
P. O. Box 41206
Tucson, AZ 85717

* Includes clubs & societies
** Includes individuals and families

Conservation Page

ADOPT-A-SPECIES PROGRAM

Eighteen rare Arizona plant species need your help! The Goodding Onion, the Pima Pineapple Cactus, and the Arizona Willow are just three of the approximately 3,000 species, subspecies, or varieties of plants native to the United States that are at risk of extinction in the wild. The Center for Plant Conservation estimates that 680 of these may become extinct within the next ten years. The majority of these plants are not protected under the Endangered Species Act (ESA) since their formal listings have been delayed by the U. S. Fish and Wildlife Service (FWS).

The 1990 plant notice of review is a list of species that FWS is reviewing for their listing potential. It identifies eighteeen taxa in Arizona for which the FWS has sufficient information showing them to be significantly at risk to support listing them as threatened or endangered: *Allium gooddingii* (Goodding Onion), *Astragalus xiphoides* (Gladiator Milk Vetch), *Chrysothamnus molestus* (Tusayan Rabbitbrush), *Cimicifuga arizonica* (Arizona Bugbane), *Clematis hirsutissima* var. *arizonica* (Arizona Heather Flower), *Coryphantha recurvata* (Santa Cruz Beehive Cactus), *Coryphantha scheeri* var. *robustispina* (Pima Pineapple Cactus), *Dalea tentaculoides* (Gentry Indigo Bush), *Echinomastus erectrocentrus* var. *acunensis* (Acuña Cactus), *Erigeron kuschei* (Chiricahua Fleabane), *Flaveria macdougalii, Pediocactus paradinei* (Kaibab Pincushion Cactus), *Pediocactus peeblesianus* var. *fickeiseniae* (Fickeisen Pincusion Cactus), *Penstemon discolor* (Catalina Beardtongue), *Phaseolus supinus, Rumex orthoneurus* (Blumer's Dock), *Salix arizonica* (Arizona Willow), and *Senecio huachucanus* (Huachuca Fleabane).

Without ANPS member support, these plants could remain among the hundreds of vulnerable plant taxa which lack legal protection. Members are needed to "adopt" each of these plants. Adopters will learn how to obtain protection for theses species under the ESA. For those species which occur on public lands, adopters will find out how to get agencies to comply with existing conservation laws and regulations for interim protection. If you are interested in joining this effort, contact me for information at 792-2690 (315 E. Elm, Tucson, 85705) or come to the organizational meeting October 3, 7 p.m., at Tucson Botanical Gardens.

by Julia Fonseca

NATIVE PLANT LAW HEARING

The Arizona Commission of Agriculture and Horticulture will hold a public hearing to take comment concerning regulation and enforcement of the revised Native Plant Law. Mark your calendars for this important meeting to be held October 11 at 10:00 A.M. in Rm. 421 at 1688 W. Adams in downtown Phoenix. Those in attendance will have a chance to make a short statement if they sign up to speak at the door. (To learn more, see "Notes from the President" on pg. 2 and call Steve McLaughlin at the U. of A. Office of Arid Lands Studies or Deborah Flowers at the Arizona Nurseryman's Association.)

HERITAGE FUND-PROPOSITION 200

Thanks to help from ANPS and 89 other organizations statewide, the Arizona Heritage Fund Initiative petition drive was a success—bringing in 130,000 signatures. It will be placed on the November ballot as Proposition 200. If approved by voters, the Proposition will establish a $20 million Arizona Heritage Fund from monies in the undesignated portion of the Arizona Lottery. The fund would be administered by the Arizona Game & Fish Commission and the Arizona State Parks Board for use in state park restoration and acquisition, wildlife protection, acquisition and maintenance of natural areas and habitats for state threatened species and biotic communities, environmental education, cultural and historic preservation, and trails. Help get the vote out for Proposition 200 by writing a letter of support to your local paper, and posting "Vote Yes on Proposition 200" signs on bulletin boards, on your vehicle, etc. Cash contributions are still needed—send to the Arizona Heritage Fund, 1242 E. Washington Street, Phoenix, 85034.

LEGISLATIVE BILLS

Arizona Wilderness Bill

Although the U. S. House passed HB2570 (BLM Desert Wilderness Bill) and HB2571 (USFWS Game Refuges Wilderness Bill) last February; the U. S. Senate version (S1080) is still tied up over water rights language. Letters and phone calls to Senators DeConcini and McCain encouraging them in their efforts to push the bill through will help. They should be thanked for holding firm to the present water rights language and urged not to yield to any weakening of water rights as this would further endanger Arizona's riparian values and native plants.

Grand Canyon Dam Water Release Bill

S2807, a bill to control flows from Grand Canyon Dam and thus reduce the erosion of the Colorado River stream bed margins, is now before the Senate. Write and call with your support for this bill and underscore its benefit to native plants along the Colorado River downstream from Glen Canyon Dam.

LAND MANAGEMENT AGENCY ISSUES

BLM Kingman Resource Area Management Plan

The BLM Kingman RMP is due out in October or November and will have a 90 day public comment period. Remember, citizens are responsible for planning the proper use of lands managed by the BLM. Become involved by requesting a copy of the plan from Elaine Marquis, Area Manager, BLM Kingman Resource Area, 2475 Beverly Ave., Kingman, AZ 86401.

Rare Plants in Apache-Sitgreaves National Forest

Candidate species *Salix arizonica* and *Allium gooddingii* (Arizona Willow and Goodding Onion) are both found in parts of the Apache-Sitgreaves National Forest that are currently under analysis as grazing allotment and timber sale areas. If you wish to participate in the management process for these Apache-Sitgreaves grazing allotments (Hayground, Reservation, and Burro Creek allotments) or timber sale (Conklin Timber Sale) write to Charles W. Denton, District Ranger, Springerville Ranger District, P.O. Box 640, Springerville, AZ 85938 and ask to be mailed all relevant public meeting announcements, scoping documents, environmental assessments (EAs), environmental impact statements (EISs), or decision notices.

Coronado National Forest Rock Corral Canyon

Native Seeds/SEARCH is calling for letters in support of a special plan to manage the Rock Corral Canyon area of the Coronado National Forest for the enhancement of a population of wild chilies (chiltepines) growing there. Also found growing in this canyon are wild teparies, wild cotton, devil's claw, and many rare legumes. Support this initiative with a letter to James Abbott, Forest Supervisor, Coronado National Forest, 300 W. Congress, Tucson, AZ 85701. (Send a copy of your letter to NS/S, 2509 N. Campbell Ave. #325, Tucson, AZ 85719.)

Chapter and Committee News

PHOENIX CHAPTER:

Meetings are held on the second Monday of each month at 7:30, usually at the Desert Botanical Garden's Webster Auditorium, located in Papago Park at 1201 N. Galvin Parkway. However, there will be a change in the October meeting time and location (see below). • Big Bend Memorial Day Extravaganza Report: This trip was a great success. Members received Chapter President Kent Newland's fine introduction to the flora of the Chihuahuan Desert and were on hand to see the vivid pink, magenta-centered blossom of *Echinocactus horizonthalonius* (Eagle Claws Cactus) during the short two or three day blooming period characteristic of this species. An unexpected treat was a row boat escort across the Rio Grande to the Mexican village of Santa Elena for a hearty noon meal, prepared order-by-order in a home-turned-part-restaurant. At the chapter's first fall meeting on September 10, those who took photos on the Big Bend trip showed slides following the season's kick-off potluck. • October Events: Guest John Alcock, Professor of Zoology and author of *Sonoran Desert Spring* and *Sonoran Desert Summer* will speak on insect and animal relationships to plants; the chapter's **Annual Wildflower Seed Release** will also take place this evening. Note meeting date changed to Oct. 15 and location to 4341 E. Broadway, Phoenix. • November Events: Dan James will speak on Western Sere, Grasses of Arizona at the November Chapter Meeting. • December Events: Chapter Meeting to include a potluck and holiday party featuring the chapter's **Annual Plant Exchange** and a talk on the subject of herbs. • For information about Phoenix Chapter events contact Chapter President Kent Newland at 8376 Cave Creek Stage, Cave Creek, AZ 85331; (602) 261-8369(W) or 585-3630(H).

PRESCOTT CHAPTER:

For information contact Chapter President Patrick Boles at 372 Dogwood Lane, Prescott, AZ 86301; (602) 778-1128.

SOUTH CENTRAL CHAPTER:

Meetings are held on the first Saturday of each month at 9:30 A. M. in the Community Room of Central Arizona College in Casa Grande. • Past Events: The chapters final spring meeting last May 5 brought a temporary shift in focus from wild flora to commercial agriculture with a talk by Rick Gibson, Agricultural Agent with the University of Arizona's Cooperative Extension Service. There has been a long history of commercial agriculture in the Casa Grande Valley area, going back to the days when Pima Indians first started producing hay and grain crops for pioneer immigrants and the U. S. Army. Rick Gibson discussed the intricacies of good water management and the problem of chemical contamination of underground water supplies. The problem is not just a modern one, he believes, but an age-old problem that has its base in the evolutionary process of nature itself. • Special Project: The chapter will continue to work on the Central Arizona College plant identification sign project and will hold its first meeting of the fall season on Saturday, Oct. 6th. • For information about South Central Chapter events contact Chapter President Velma Adams at 450 Sun West Dr., No. 30, Casa Grande, AZ 85222; (602) 426-9172.

TUCSON CHAPTER:

Meetings are held on the second Wednesday of the month at 7:30 P. M. at the Tucson Botanical Gardens, 2150 N. Alvernon Way, Tucson, AZ. • Special Project: Work on the ANPS wildflower garden at the Tucson Botanical Gardens continues. Be there September 29 or 30 from 7:30 A. M. to 9:30 A. M. to learn more about fall planting. Call Linda Brewer at 622-3861(W) or 743-9272(H) to sign up. • September Events: **Arivaca Cienega** hike with Jack Kaiser. This area is a recent addition to the Buenos Aires Wildlife Refuge, and one of the few cienegas remaining in southern Arizona. It has a number of wetland species uncommon to the area. • October Events: Join Horace Miller and Dan James on October 6 for a leisurely walk among **Catalina State Park grasslands and stream areas.** Recent summer rains should make it possible to find many of the species on Horace Miller's checklist of grasses for the park. On October 14 Tom Collazo, Preserve Manager of the **Nature Conservancy's Aravaipa Canyon Preserve** will lead an ecology hike of this preserve located just outside the west end of the BLM'S Aravaipa Wilderness Area. Join hydrologist Julia Fonseca and Arizona Nature Conservancy Director of Stewardship Mark Heitlinger on October 27 for a morning at **Bingham Cienega Natural Preserve,** a wetland along the San Pedro River that, in part, closely resembles the wooded swamps of the eastern U. S. • November Events: **Ramsey Canyon and Miller Peak Wilderness Area Fall Color Hike** with Ramsey's Preserve naturalist Jack Whetstone and ANPS's David Mount. For more information on field trips contact Andy Laurenzi at 623-5733(H) or 622-3861(W). • For more information on Tucson Chapter activities contact Tucson Chapter President, Barbara Tellman at 127 E. Mabel, Tucson, AZ 85705 (602) 792-4515.

YUMA CHAPTER:

Regular meetings are held the third Monday of each month at 7:30 P. M. at the University of Arizona Agricultural Station in Yuma Valley on 8th St. • Special Projects: **Betty's Kitchen Protective Association,** a half mile signed nature walk along the backwaters of Mitty Lake; and a **Native Plant Demonstration Garden** near the Yuma Train Depot. • For more information on Yuma Chapter activities contact any of the following people: Pat Callahan, Rt. 1, Box 28M, Somerton, AZ 85350 (602) 627-2773; Mr. and Mrs. Robert Moody, 1700 W. 32nd St., Yuma AZ 85364 (602) 726-0522; Ross and Helen Rodney, 2025 Cottontail Ave., Yuma AZ 85364 (602) 343-1492; Pauline Smith, 2045 S. 14th Ave., #45, Yuma, AZ 85364 (602) 783-4026; or May Foerstner at 1333 S. 11th Ave., Yuma, AZ 85364; (602) 782-2497.

CAVE CREEK EARTH RALLY II

ANPS member Geoffrey Platts announces "A Grand Annual Gathering for the Environment-minded of All Ages" to be held the weekend of October 6 and 7 at Tamarisk Grove, Cave Creek, 30 miles north of Scottsdale. Booths, a speakers' forum, music, and poetry "in a Sonoran desert ambience" make up the program. Call Michelle Berson at 585-4408(H) or 488-4030(studio) for more information.

CONSERVATION COMMITTEE:

Next meeting will be October 4, 6:30 P.M. at the Flying J truck stop in Eloy. All members welcome — contact Chairman Gary Maskarinec at P.O. Box 212, Tucson, AZ 87502-0212; (602) 882-0969 for more information.

URBAN LANDSCAPE COMMITTEE:

Preparation of the **Desert Groundcovers and Vines** brochure is underway. Those interested in Urban Landscape Committee activities may contact Chairman Andrea Pook at 2563 N. Fremont, Tucson, AZ 85719; (602) 624-7401(W) or 623-8519(H).

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NEXT DEADLINE IS: November 1, 1990

Please direct all other inquiries regarding the Arizona Native Plant Society to the Secretary at our official address: PO Box 41206 Sun Station, Tucson, AZ 85717

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