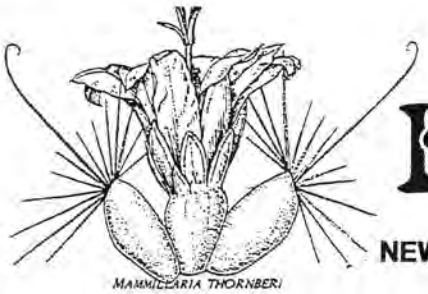
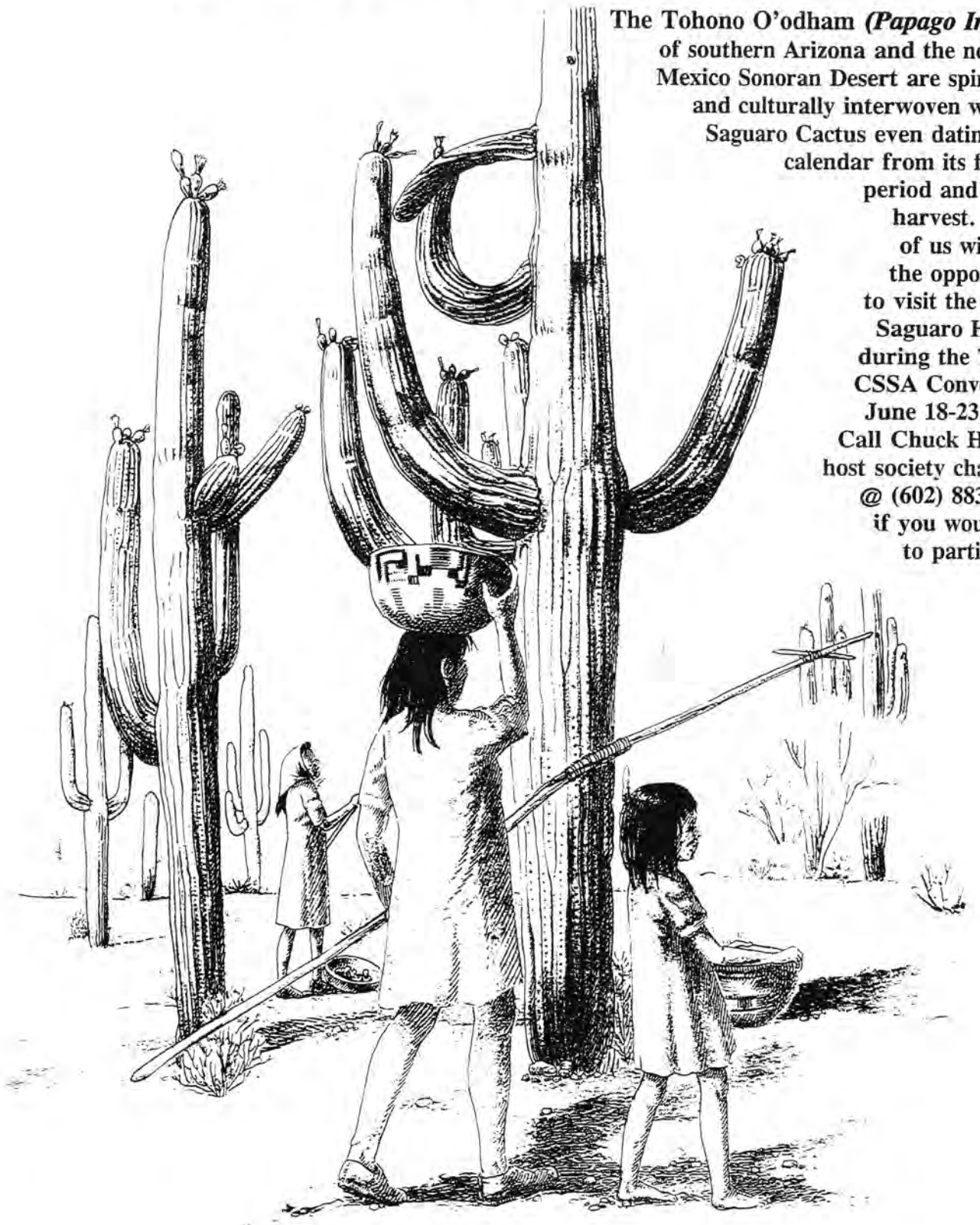


Espinas y Flores

NEWSLETTER OF THE SAN DIEGO CACTUS & SUCCULENT SOCIETY, INC.
Affiliate of the Cactus and Succulent Society of America, Inc.

VOLUME XXX NUMBER FOUR SATURDAY, APRIL 8, 1995 @ 1:00 PM

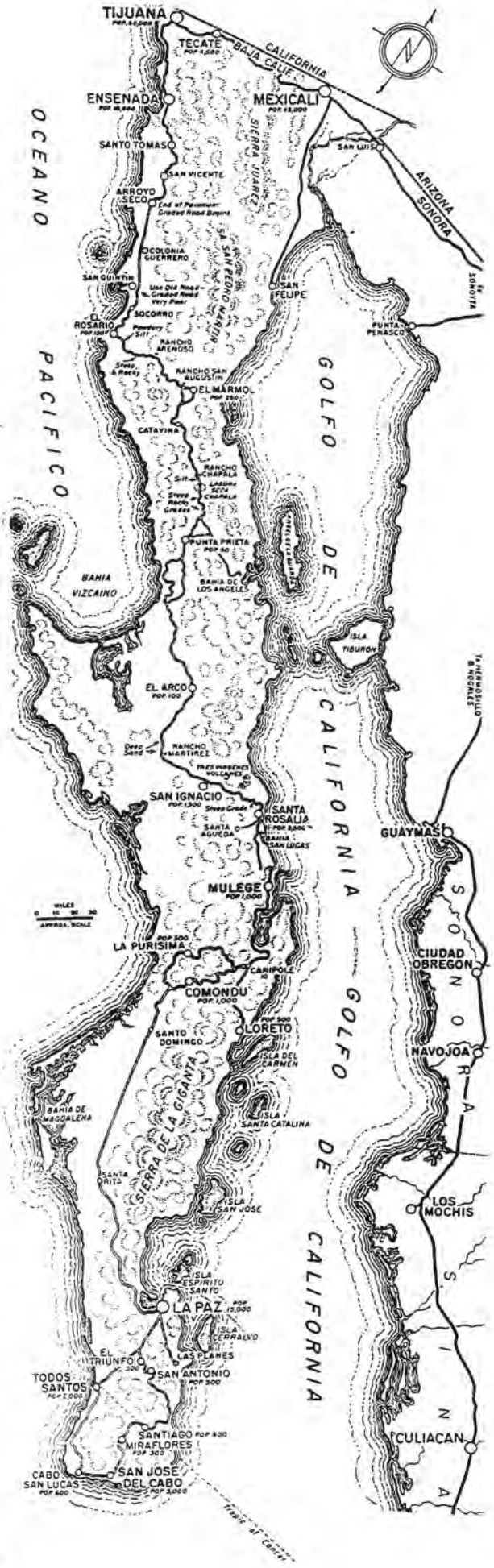
The Tohono O'odham ***(Papago Indians)*** of southern Arizona and the northern Mexico Sonoran Desert are spiritually and culturally interwoven with the Saguaro Cactus even dating their calendar from its fruiting period and sacred harvest. Many of us will have the opportunity to visit the Indian Saguaro Harvest during the Tucson CSSA Convention, June 18-23, 1995. Call Chuck Hansen, host society chairman @ (602) 883-9404, if you would like to participate.



APRIL PROGRAM: TWENTY-FIVE YEARS IN BAJA CALIFORNIA

Woody Minnich, who hardly needs an introduction in the Cactus and Succulent world, will present a double projector screen program illustrating his love affair with Baja California and its Flora (and Fauna). Woody has been working on a book THE CACTUS OF BAJA CALIFORNIA for many years. Now you and your guests will get to enjoy a preview of his remarkable slides of cacti, succulents, endemic plants and scenery of this amazing and incredible peninsula with its diverse botanical anomalies and breathtaking panoramas. Don't miss this educational and entertaining Natural History program by an educated and naturally enjoyable person.

"Woody", Wendell S. Minnich, owns CACTUS DATA PLANTS, a specialty Cactus and Succulent Nursery (since 1982) with 6000 square feet of glasshouse space specializing in the propagation of the rare and unique globular Mexican and South American Cacti, Caudiciforms, and unusual Succulents. His greenhouse collection of the Genus Mammillaria is considered one of the largest documented collections in the world. With sixty exploratory trips to all regions of Mexico, Woody has discovered eight species and rediscovered many others lost to horticulture.



Stefy Mangold says **"Please don't forget to bring in goodies for the refreshment table!"** Last month we failed to remind you in this newsletter - and contributions were really bleak. Sorry, Stefy! **We will all bring something good to eat and share this time!**

Brag Table Winners for March meeting will be published in the May /June Show & Sale issue of Espinas y Flores. The editors were not present during Brag Table judging and unfortunately records of the Brag Table winners were not made available to us before press time.

Noted on the **April Tours Update** for the San Diego Horticultural Society: The spring garden tour will be on April 23. We will visit **Irina and Erik Gronborg's** garden in Solana Beach, and Linda and Bill Teague's garden in Del Mar in the morning. In the afternoon, we will see Agatha Youngblood's garden and Bruce Hubbard's garden, both in Rancho Sante Fe. Tickets are $10 and must be purchased in advance. . . Please call Laurie Bussis @ 944-1448 for information.

OUR COVER: A beautiful illustration of Saguaro fruit harvesting by a Tohono O'odham Indian reproduced from **SURVIVAL UNDER THE SUN** by Wayne Walker; illustration by Jean Zallinger, c.1971, Doubleday & Co., NY, first edition from the collection of Michael & Joyce Buckner.

CALENDAR OF EVENTS*:

The Biggest and Best Show of All: THE BLOOMING DESERTS.
For info call the wide-ranging Theodore Paine WILDFLOWER HOTLINE: (818)768-3533*; ANZA-BORREGO Desert State Park: (619)767-5311 and (619)767-4684* for Anza-Borrego Wildflower Hotline; MOJAVE PLANT SOCIETY WILDFLOWER HOT LINE: (702)648-2177*; JOSHUA TREE NATIONAL PARK: (619)367-7511; The LIVING DESERT in Palm Springs (619)346-5694, with their excellent far-ranging WILDFLOWER HOTLINE: (619)340-0435*. Please, always prepare for road conditions and climate, take plenty of water and let people know your travel plans.

April 1: San Diego Museum of Natural History, Balboa Park: Meet a live desert tortoise and find out about their conservation with Dave McCulloch from the San Diego Turtle and Tortoise Society.

April 2, Sunday morning, DAYLIGHT SAVINGS BEGINS.

April 23: Celebrate EarthFair in Balboa Park for Earth Day's 25th birthday. If you have never been to an EarthFair in Balboa Park, you're missing an extraordinary and educational event. SDC&SS should really be participating — maybe next year.

April 29 & 30, SUNSET SUCCULENT SOCIETY SHOW & SALE, 10am- 5pm, Garden Room - Veterans Memorial Bldg, 4117 Overland (at Culver), Culver City; for information: call (310)822-1783.

May 13 & 14, SAN DIEGO EPI SOCIETY SALE, with SHOW 11am - 4pm on Sunday (Mother's Day), May 14th @ Casa Del Prado, Balboa Park, San Diego. Show Chairperson: Don Francis, (619)276-0109.

June 2, 3 & 4: SAN DIEGO CACTUS & SUCCULENT SOCIETY SHOW & SALE. Open show, set-up Friday /early Saturday morning. Show: Saturday 1 - 5pm, Sunday 10am - 5pm; Sales 10am - 5pm both days. If you are a SDC&SS member, you should be thinking about which of your plants you are going to show, as well as what services you will be helping with! Contact Joey Betzler (619)569-8510 or any board member for more information.

*A Special Thank You to Carol & Joe Wujcik!

NEW MEMBERS - WELCOME - NEW MEMBERS - WELCOME - NEW MEMBERS

TED & MARILYN ALFORD
JOHN E. BLECK
DAVID BERNSTEIN
GEORGE BOYD
MICHAEL DINGESS
STEPHEN DORSEY
JULIAN & LESLIE DUVAL
JOHN FEE
JAMES GAUDET
BARBARA HECKLER
LEAH HEWITT
WILLIAM & LINDA HOLDEN
CAMILLE & RICHARD HORAK
RICHARD & LUPE HULETT
BART KEERAN
RICHARD KESSLER
ROBERT C. MONTEITH
EMILY MARIE ORMOND
BECKY & JOHN REILY
NEAL SMITH
TOM STIKO
MILDRED SULLIVAN
CHRISTINE TRATNYER
FRANCIS TYLER
GEORGE WARRINER
BRIGITTE WILLIAMS

THREE HUNDRED AND THIRTY-THREE MEMBERS STRONG!

CACTUS & SsucculENT SHOW & SALE

APRIL 29 & 30

... free admission ...

PREVIEW SALE 10-12 SATURDAY

SHOW & SALE 12-5 SATURDAY
10-4 SUNDAY

information: 310 /822 - 1783

garden room, veteran's memorial bldg.
4117 overland (at culver), culver city

WE WOULD ALSO LIKE TO TAKE THIS OPPORTUNITY TO CONGRATULATE MEMBER **MATTHEW ORMOND** ON HIS MARRIAGE TO **SHARON** AND WELCOME HER AS A NEW MEMBER. WE ARE LOOKING FORWARD TO SEEING YOU BOTH DOWN HERE FOR OUR JUNE SHOW!

★ WE REALLY WANT TO DO THIS RIGHT! SO IF, WE ARE SPELLING YOU NAME INCORRECTLY, OR THERE IS SOMETHING WRONG WITH YOUR ADDRESS OR MEMBERSHIP INFORMATION ON YOUR MAILING LABEL - PLEASE LET US KNOW! CONTACT ELIZABETH GLOVER @ (619)264-6769 OR D'ERDRA SMOTHERS @ (619)279-1408.

★ PLEASE NOTE: THE EDITORS, MAY NEVER SEE YOUR COMMENTS, OR CRITICISMS, UNLESS THEY ARE ADDRESSED TO THEM. **PLEASE SEND LETTERS TO THE EDITOR, PLANT OF THE MONTH ARTICLES, AND ANY OTHER ARTICLES, INQUIRIES, CONTRIBUTIONS, SUGGESTIONS, PUZZLES, POEMS, PHOTOS, ETC. TO:**

Michael & Joyce Buckner, Editors
4822 Santa Monica Avenue, # 103
San Diego, CA 92107

OR TELEPHONE US @ (619) 222-3216. WE REALLY ENJOY HEARING FROM YOU! ★

CACTUS OF THE MONTH:

Buiningia and its relation to Coleocephalocereus

by J. A. Betzler

Buiningia was originally described by F. Buxbaum in Krainz's Die Kakteen in 1971. But any modern mention of Buninginga must take into consideration that it has been reclassified as a subgenus of *Coleocephalocereus*. *Coleocephalocereus* was described by the famous cactologist, Backeberg, in 1938. Fifty years later Pierre J. Braun has made the determination that *Coleocephalocereus* should contain the genus, *Buiningia*, because there are not enough differences to warrant a separate generis rank.

Braun wrote an article in Bradleya (Volume 6, 1988 pages 85-100) and outlined the basic description of *Coleocephalocereus*. The type specimen (founding plant that this genus is based on) is *Coleocephalocereus fluminensis*. The following description describes this group; even *Buiningia*.

All members of this group are columnar, erect to semi-erect in habit and sometimes creeping on rocks. They can attain 5 m (about 15 feet high) in height. The stems can be single to branched, though branching is usually at the base. The color of the stems is green and there are 6 to 35 ribs. The ribs and not sharp as in some cacti but more or less rounded. The spines range in color from yellow, brown, grey, black or red. They can be up to 45 cm long (that's up to 18 inches)!

The cephalium is the special flowering portion of the stem and the flowers are actually produced there. The Cephalium is normally continuous, lateral and usually not interrupted. This flowering area is usually on one side of the stem and sunken into the stem a bit forming a slight flat spot on one side (depending on the species). Usually with whitish wool and strong bristles that have the same color range as the spines.

The flowers are nocturnal and produced at the apex of the cephalium. The outside of the flowers are naked and range in shape from tubular, funnel shaped and sometimes bell-shaped. The flowers vary in length from 2 to 8 cm. Flower color is: cream, white, yellowish, greenish, brownish-olive, reddish-rose or purple. The stamens are produced on the inside of the floral tube. The primary stamens are long and the secondary stamens are progressively shorter. The anthers are yellow with pollen and the filaments are white.

The fruit is a spherical to egg-shaped berry, occasionally it is club-shaped. The berry can be up to 2.5 cm long and is smooth. Ripe fruits are purple and they may or may not open at the base. The pulp is white and the seeds are about 1 mm long. Seeds are usually globular and black.

Distribution of the Genus *Coleocephalocereus* is exclusively in the Country of Brazil, in the states of: Sao Paulo, Rio de Janeiro, Espirito Santo, Bahia, Minas Gerais.

Coleocephalocereus subgenus *Buninginga* -
The proposal to 'lump' Buiningia into *Coleocephalocereus* was proposed by Ritter in 1968 and Braun made it nomenclaturaly legal 20 years later. Braun agreed that the smallness and coloration of the flowers, as an adaption to pollination by hummingbirds, was not enough of a difference to justify a different genus. There are species of *Coleocephalocereus* (before *Buiningia* was places into this genus) that have similar flowers to *Buiningia*. These species are C. *braunii* and *C. pluricostatus*. The later species is considered a link to the subgenus *Buiningia* and is intense green like many *Buiningia* flowers.

The more or less closed, tubular perianth of *Buiningia* is an adaptation to hummingbird-pollination. Very similar flowers can be found in some *Melocactus* species (*M. warasii*). The small size of the *Buiningia* stem and the early development of the cephalium are not relevant criteria for separation. *Coleocephalocereus braunii* (Diers & Esteves 1985) begins to form a cephalium at a height of only 15 cm.

Nevertheless, the bird pollination syndrome is evident and, therefore, *Buiningia* is best classified as a subgenus, as suggested in Braun in 1984. Braun and other investigators also feel that *Melocactus* is closely related to this group of cacti (Barthlott 1979, Ritter 1988, 1979).

Coleocephalocereus displays a wide variety of gradations in form and function that lead in a neat path from the extremes of *Coleocephalocereus* to *Buiningia*. An example of this is displayed by a reduction and specialization of ceroid columnar growth: *C. braunii*, *C. decumbens*, *C. estevesii* and subgenus *Buiningia*. Early development of the cephalium is displayed in *C. braunii* and *Buiningia*. Longer that usual juvenile growth in this genus is displayed on *C. goebelianus*, *C. estevesii* and *Buiningia*. There is a lot crossover in flower shape, color, and length in the two subgenera as well. There remains one unique feature that distinguishes *Buninginga* from *Coleocephalocereus*; and that is hummingbird pollination. Because this pollination syndrome is the one unique feature to this group of plants it was 'lumped' with its other relatives.

Whether or not someone will further 'lump' *Coleocephalocereus* into the closely related *Melocactus* remains to be seen, this action seems to be on hold for the time being though.

Cactus of the Month

Below is a list of the *Coleocephalocereus* and their respective authors:

Subgenus *Coleocephalocereus*:

Group 1. Base of stem lacking long curled spines.

1. ***C. fluminensis* (Miquel) Backeberg.**
   variety *fluminensis*
   variety *braamhaarii* P. J. Braun
2. ***C. decumbens* Ritter**
3. ***C. diersianus* Braun & Esteves**
4. ***C. paulensis* Ritter (perhaps a subspecies of *C. fluminensis*)**
5. ***C. pluricostatus* Buining & Brederoo**

Group 2. Stem with long colored spines at base.

6. ***C. braunii* Diers & Esteves**
7. ***C. buxbaumianus* Buining & Brederoo**
8. ***C. estevesii* L. Diers**
9. ***C. flavisetus* Ritter**

Group 3. Seeds elongate, pear-shaped.

10. ***C. goebelianus* (Vaupel) Buining**

Subgenus *Buiningia* (F. Buxbaum) P. J. Braun

11. ***C. aureus* Ritter**
12. ***C. brevicylindricus* (Buining)Ritter**
    variety *brevicylindricus*
    variety *longispinus* (Buining) Ritter

13. ***C. elongatus* (Buining) P. J. Braun**
14. ***C. purpureus* (Buining & Brederoo) Ritter**

Bibliography:

Braun, Pierre J., 1988. On the Taxonomy of Brazilian Cereeae (*Cactaceae*).

Bradleya 6:85-99.

Please bring in any of these plants that you have in your collections - Thanks

SUCCULENT OF THE MONTH: ENCHOLIRIUM VS. DYCKIA
BY DOROTHY BYER

The genera *Dyckia* and *Encholirium* are members of the Pitcairnioideae, one of the three sub-families of the Bromeliaceae or pineapple family. Most members of the Pitcairnioideae are spiny leaved terrestrials and more or less xerophytes.

The greatest number of the 124 *Dyckia* species are found throughout Brazil, with a few found in Argentina, Bolivia, Paraguay and Uruguay. Northeast Brazil is the provenance of all 22 species of *Encholirium* described to date. The first encholirium was discovered by Dr. von Martius in 1819. He also discovered the little known *Dyckia dissitiflora* in some dense scrub (Caatinga) in October 1918. Recently, *Dyckia dissitiflora* was given wider attention when a color photograph appeared in the new book Bromeliads in the Brazilian Wilderness by Elton Leme and Luiz Claudio Marigo. Closely following the discoveries of the first encholirium and the first dyckia was another dyckia discovery in 1833. This one became very popular as a garden plant and has remained so. It was the small colorful and relatively spineless *Dyckia remotiflora* found

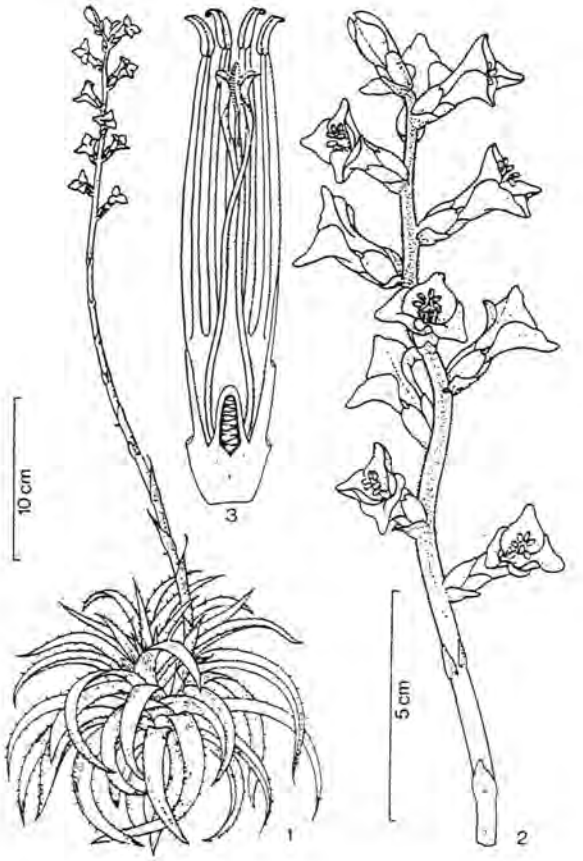


Fig. 75 *Dyckia remotiflora* Otto and Dietr.: 1 flowering plant; 2 inflorescence; 3 longitudinal section through flower.

by Otto and Dietrich, German botanists. A few other discoveries were made between 1833 and 1860. During the last two decades of the 1800's great strides were made in describing new species. Few new species are now being described but many varieties are being recognized.

The name *Encholirium* was assigned by the discoverer von Martius. Encholirium means "sword lily" for the tall simple inflorescence. The name *Dyckia* wasn't decided upon until 1833 when Schultes.f. named the genus for Prince von Salm-Dyck.

Vegetatively many species of both genera resemble each other. The leaves of most encholiriums have a little coarser spines than the dyckias and in general are somewhat larger plants, but all of this accounts for little in identification because of the great variation in both genera. They range in size from the chestnut colored *Encholirium heloisae* and the tiny silvery *Dyckia frigida* and *Encholirium subsecundum* with leaves to one meter long. *Encholirium heloisae* is classified as *Dyckia heloisae* in Lyman Smith's

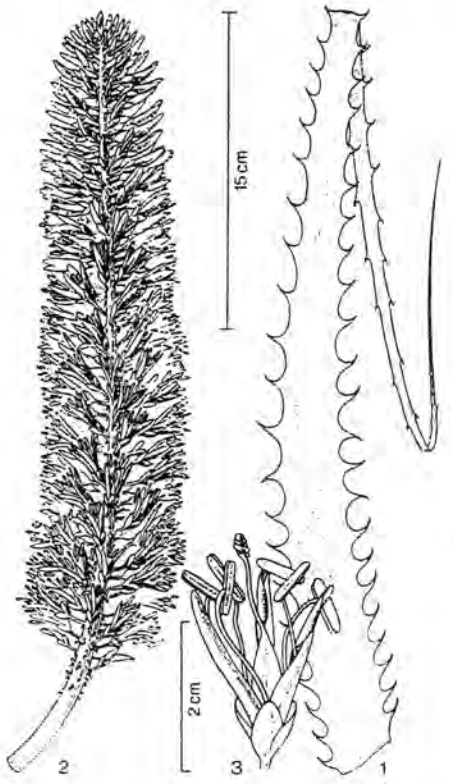


Fig. 76 *Encholirium spectabile* Mart.: 1 leaf; 2 inflorescence; 3 flower.

comprehensive work Flora Neotropica Monograph No. 14 (Pitcairnioideae). Recently the reassignment was made. There may be other species open to questionable classification.

It is primarily the inflorescence that tells us whether the plant in question is a dyckia or an encholirium. Just based on numbers of species of each described and the number of species of each genus in cultivation, one's chances of being correct in guessing dyckia are a great deal better since there are very few encholiriums of any species in cultivation. Assuming that one of each were flowering, the differences would be very evident.

The scape (peduncle) of encholirium is terminal and erect while the scape of dyckia is lateral and curves upward. With terminal inflorescence, the rosette eventually dies after making offsets (pups). The lateral inflorescence has no effect on the longevity of the rosette and it survives to flower again and again and also to make pups or stem divisions. With one exception (*Encholirium horridum*) the inflorescences of encholiriums are simple racemes with white, yellow or green flowers with pronounced pedicels while dyckias have either simple spikes or openly branched inflorescences with more or less widely spaced flowers, sessile or on short pedicels, in shades of orange with a few yellows and a few reds.

The differences in anatomy of the flowers are distinctive. Encholirium petals are linear with rounded tips. The shape of dyckia petals are between an oval and modified diamond and the center tip often has a claw-like projection. The petals are adnate (joined) at the base forming a short tube and the stamens are also fused to the basal tube. Encholirium petals and stamens are free.

The seeds of dyckia and encholiriums also differ slightly. Dyckia seeds have a broad wing that almost completely encircles the periphery while encholirium seeds have a dorsal-apical wing that extends backward.

As we might expect culture for both is very similar except that most dyckias are a little more hardy. Potting mix for both should have at least ⅓ pumice, perlite or other porous material, ⅓ coarse sandy grit, and ⅓ good humusy material. It cannot be stressed enough that these plants need ample root room and are often observed drastically underpotted. Also, even though they are capable of surviving with very little water, they will be much handsomer plants if they are watered freely, especially in the warmer months. Even in the winter, most of them should not remain dry for extended periods or leaves will develop brown, dried tips. They should be fertilized sparingly with balanced fertilizer in the growth period.

If you can cope with the spines, these plants are colorful, rewarding garden and pot subjects.

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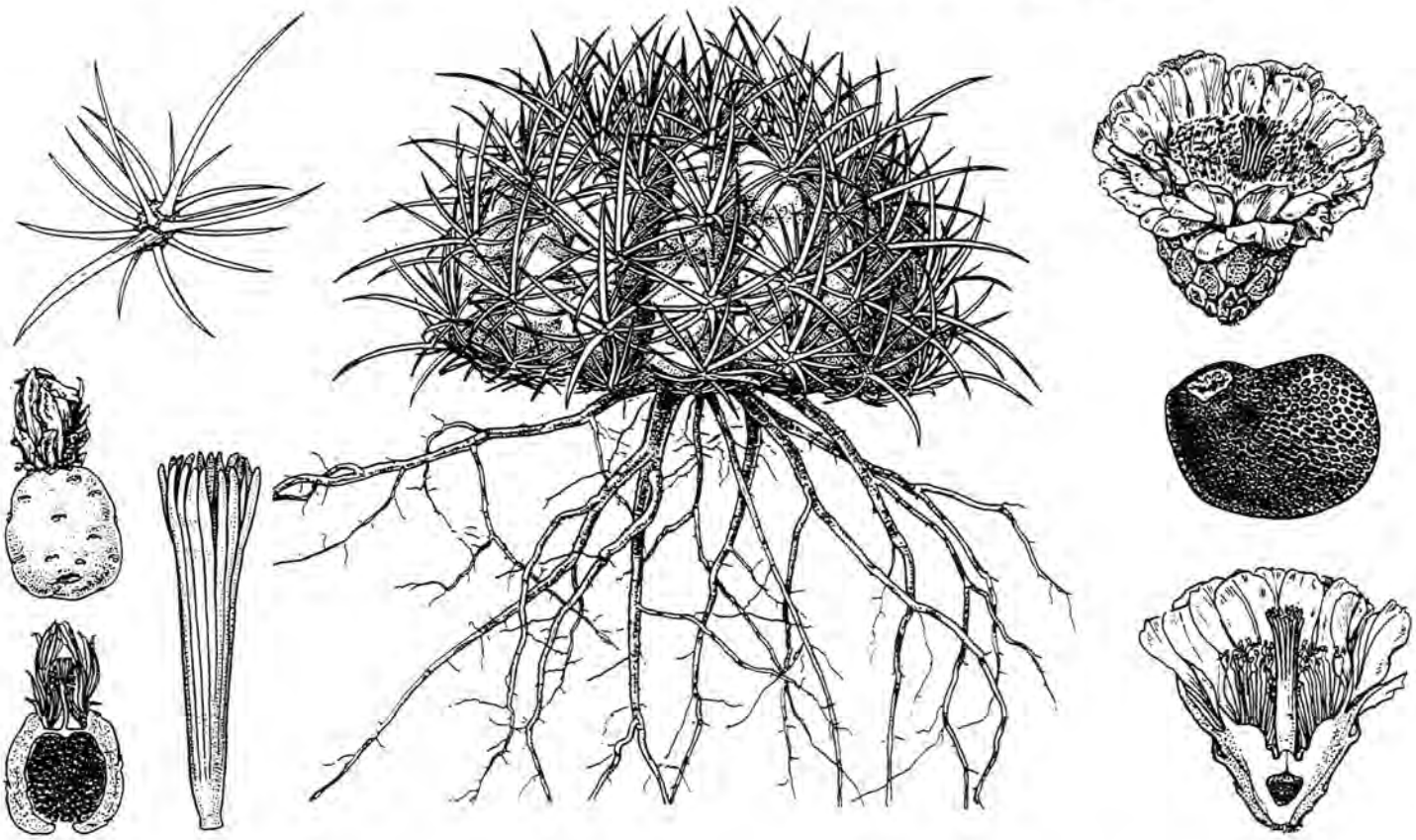
San Diego Coastal Barrel Cactus

by Frank Thrombley

Is *Ferocactus viridescens* an endangered species in San Diego County?



Illustrations by Lucretia Hamilton, **The Native Cacti of California,** *Lyman Benson, Stanford Univ. Press, Stanford, CA, 1969*

The only habitat for this plant in the U.S.A. is in San Diego County. It grows on our hillsides from its northern limits of Escondido south to the Mexican border, and from the Pacific coast to upwards of 40 miles inland. I have observed plants east of the city of Santee.

Jim Dice, in 1979, rescued many of these plants from their demise of bulldozer blade — another new housing development was in progress. Jim showed some of these plants at a SDC&SS meeting and proposed replanting some of them at the Border Field State Park for the purpose of conservation.

I met Woody Minnich in the year 1980 and in discussing Ferocactus he said: *Ferocactus viridescens*, in his opinion, was the closest description of what a Ferocactus would look like. Woody, in spite of its size, I think you were right.

In 1980, John Meyers, who was a member of SDC&SS told me of a colony of these plants in the Bernardo Heights area of Rancho Bernardo. In studying these plants I estimated that there were at least 1000 *Ferocactus viridescens* at this site. All met their death by that machine called a bulldozer. During this same period of time the Industrial Park at Rancho Bernardo was being developed. One of the original developers wrote to both the Palomar and San Diego Cactus Societies offering them the opportunity to collect the Ferocactus at their site. Bob & Beverly Kent and myself collected a few plants. Bob also found one that was twelve inches high. Later a botanical group from Palomar collected over 300 plants in this locality — a majority of these plants went to the Wild Animal Park. In lieu of planting each one, they were placed on the ground in a very close group. Occasionally watering was done which resulted in all but a few plants rooting themselves in the ground. A few of these plants were later given to the Los Angeles and San Diego Zoos, Quail Gardens, the new zoo with a controlled environment in Indianapolis, the Tijuana Estuary State Park in Imperial Beach, and the Native Plant Society's Garden at the Wild Animal Park.

In 1983 SDC&SS Life Member, John Pasek took me out to the San Diego /Miramar Landfill to show me a colony of the Ferocactus. There were approximately 50 to 60 plants with one real find: John pointed to a plant that had 25 heads. All the heads were between four and ten inches in diameter — a most remarkable plant! John marked each plant with regard to compass direction. He then transplanted all of them to the south side of the San Diego Parks Commissions greenhouse in Balboa Park. The intent was to replant them at the original site when the landfill was complete in the area they came from. I believe that John did this before he retired from the Park Commission. Unfortunately, the cespitose Ferocactus had to be broken up for the transplanting.

In the winter of 1994, Paul Steward, a member of SDC&SS, showed me a colony of these plants which are in a city park within the City of Poway. In the summer of 1994 a brush fire burned through this colony, severely burning 75% of them. As of this writing a small quantity of them will surely not live — only approximately 50% of the burned plants have a chance to survive. The 25% that were not badly burned will probably all be okay. However, all of the Chaparral which protected them from the hot summer sun has been destroyed. Paul will be watching this colony for the next few years and hopefully will give us a report on his findings.

In 1981 or 1982, an article I wrote on conservation for the Espinas y Flores ended with the following statement: "In ten years the ten mile stretch of Interstate Highway 15 from Lake Hodges to the Miramar Naval Station will not have a *Ferocactus viridescens* left in habitat."

The area between Lake Hodges in Escondido and San Ysidro at the Mexican border is a series of hills and canyons — ideal growing areas for *Ferocactus viridescens*. Unfortunately, in the past ten years thousands of these plants have been killed in the name of progress.

Presently, there are no *Ferocactus viridescens* to be found. The colony in Poway is at peril not only because of the fire, but also because of the new Industrial Park. East of I-15 at Penesquitos the housing and industrial areas have all but eliminated native plant live. The area at Mercy Road on I-15 I have not yet studied. The extension of Mira Mesa Boulevard to Sorrento Valley brought more housing and industry — I had found at least 500 *Ferocactus viridescens* in those hills — all gone now. East of I-15 at Miramar Naval Air Station the Ferocactus are as yet undisturbed. Too, it is quite possible that some Ferocactus may be on other areas of Navy property.

Jumping down to Proctor Valley Road near upper Otay Reservoir, there were hundreds of Ferocactus growing throughout this large area. There are still a few on Telegraph Hill, but very few were left along Proctor Valley Road. Housing developments are spreading their tentacles and the native plants are disappearing. The entrance to Border Field is closed to vehicle traffic, however, one could walk into the area, but I forgo that option.

This article did not answer the question. But in my opinion if *Ferocactus viridescens* are not yet endangered, they will be in the not too distant future.

A Little More about Ferocactus viridescens:

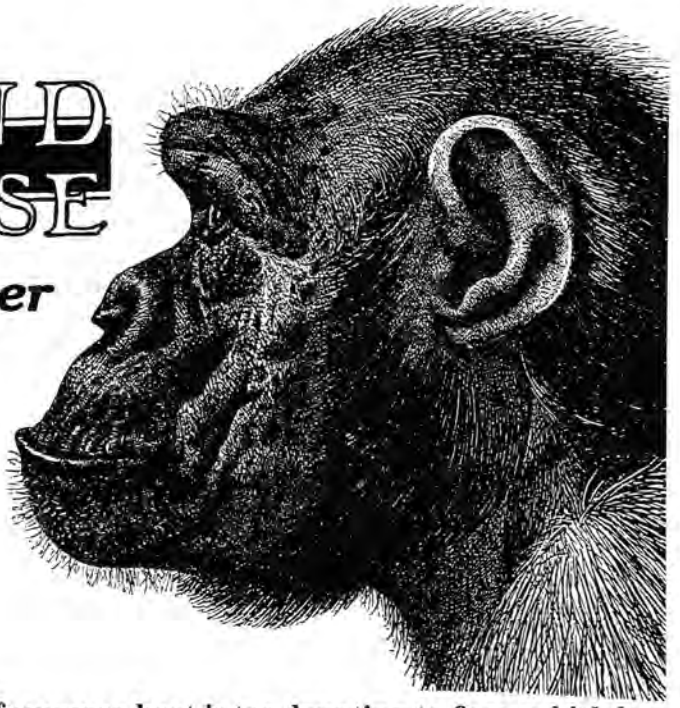
Ferocactus viridescens **San Diego Barrel Cactus family**: Cactaceae.
California Native Plant Society List 2: Plants rare, threatened, or endangered but more common elsewhere (North coastal Baja California, Mexico).
R.E.D. Code ***(Rarity - Endangerment - Distribution formula)***: 1 - 3 - 1.

Ferocactus viridescens is rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time. It is however, endangered throughout its range. Although its Mexican habitat is widespread in northern coastal Baja California, this is an area with much rapid new development taking place.

State - Federal Status: C2 - Insufficient information to support Federal listing at the present time.
Locations: Plants found in Jamul Mountains, Otay Mesa, National City, Point Loma, Imperial Beach, Picacho Peak, El Cajon, Poway, Del Mar, La Jolla, La Mesa, Rancho Sante Fe, and Escondido.
Habitat: Chaparral coastal scrub, valley and foothill grassland, vernal pools.
Life form: Stem succulent.
Blooming: May - June.
Notes: Seriously threatened by urbanization, vehicles, and horticultural collecting.
Source: CALIFORNIA NATIVE PLANT SOCIETY INVENTORY OF RARE AND ENDANGERED VASCULAR PLANTS OF CALIFORNIA, February 1994, Special Publication No. 1, fifth edition.

WISE AND OTHERWISE

by Michael Buckner



How refreshing, the whinny of a packhorse unloaded of everything!
Zen saying

"For some animals, the challenge of summer heat is too daunting to face, which has to led to the extreme form of heat avoidance — estivation, which means spending the summer in a dormant state. As in hibernation, body temperature falls to approximately the temperature of the air in the burrow, and the rates of metabolism and respiration are reduced. By entering a state of torpor in a cool burrow, the Mojave ground squirrel avoids the life-threatening heat of late summer and early fall, not appearing outside until autumn rains and cool weather make the world more hospitable.

Estivation is an important survival tactic for some desert invertebrates, too. Single-celled protozoans, though essentially aquatic animals, can survive in the desert by remaining protected in secreted outer layer, or cyst, from which they emerge when the soil is damp with rain. During estivation, the mouth of a desert snail's shell is covered by a thick diaphragm so effective in reducing evaporation that, four or five years after they were collected, snails exhibited in dry display cases in the British Museum of Natural History were revived by being placed in water."

from **Taking the Heat** by Jerry Dennis, WILDLIFE CONSERVATION Magazine, July/August 1991.

"Excursions may be truly said to be the life of the botanist. They enable him study the science practically, by the examination of plants in their living state, and in their native localities; they impress upon his mind the structural and physiological lessons he has received; they exhibit to him the geographical range of species, both as regards latitude and altitude; and with the pursuit of scientific knowledge, they combine the healthful and spirit-stirring recreation which tends materially to aid mental efforts. The companionship too of those who are prosecuting with zeal and enthusiasm the same path of science is not the least delightful feature of such excursions. The various phases of character exhibited, the pleasing incidents that diversified the walk, the jokes that passed, and even the very mishaps or annoyances that occurred — all become objects of interest, and unite the members of the party by ties of no ordinary kind . . ."

Prof.J.H. Balfour, in the **EDINBURGH NEW PHILOSOPHICAL JOURNAL**, July, 1848.

EXTINCTION HERE AND NOW — San Diego County has more species of rare and endangered plants and animals per square mile than anywhere else in the continental United States. So San Diego is as much at the center of the global "biodiversity crisis" as the Brazilian rainforest or the African savanna.

— Our Weakening Web: The Story of Extinction, opening statement at San Diego Natural History Museum Exhibit on display March 4 - May 29, 1995.

A friend of ours was walking down a deserted Mexican beach at sunset. As he walked along, he began to see another man in the distance. As he grew nearer, he noticed that the local native kept leaning down, picking something up and throwing it out into the water. Time and again he kept hurling things out into the ocean.

As our friend approached even closer, he noticed that the man was picking up starfish that had been washed up on the beach, and, one at a time, he was throwing them back into the water.

Our friend was puzzled. He approached the man and said, "Good evening, friend. I was wondering what you are doing."

"I'm throwing these starfish back into the ocean. You see, it's low tide right now and all of these starfish have been washed up onto the shore. If I don't throw them back into the sea, they'll die up here from lack of oxygen."

"I understand," my friend replied, "but there must be thousands of starfish on this beach. You can't possibly get to all of them. There are simply too many. And don't you realize this is probably happening on hundreds of beaches all up and down this coast. Can't you see that you can't possibly make a difference?"

The local native smiled, bent down and picked up yet another starfish, and as he threw it back into the sea, he replied, "Made a difference to that one!"

— One At A Time by Jack Canfield & Mark V. Hansen, CHICKEN SOUP FOR THE SOUL, c. 1993, Health Communications, Inc., Deerfield Beach, FL

There is no other door to knowledge than the door Nature opens; and there is no truth except the truths we discover in Nature.

Luther Burbank

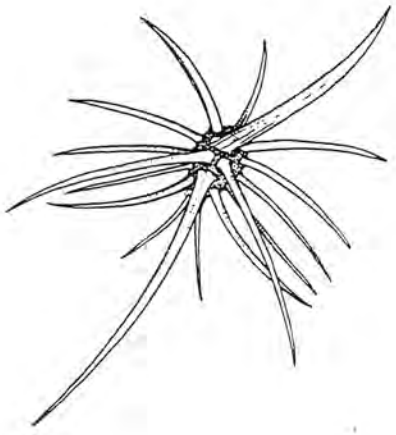
Sweating allows man to exist in the desert. Sweating is controlled by centers in the hypothalamus which have set points keyed to temperature. Overheating can be prevented by the loss of one cup of sweat per hour, but it's easy to lose more without sensing it because in the desert, sweat evaporates the minute it reaches the skin surface. But there is a limit to how much cooling can be provided by sweating before the loss of constituents of the blood — chloride, sodium, potassium, lactic acid — begins which can bring on muscle cramping and severe electrolyte imbalance.

At 104 degrees F, one must evaporate an equivalent of 1.5 percent of one's body weight per hour to maintain a constant body temperature. I do a quick calculation: at 110 pounds 1.5 percent of my body weight is 1.65 pounds. Since a pint's a pound the world around, to replace what I lost means at least a quart of liquid since, in addition, the body produces about eighty calories of heat per hour through metabolic activity. Dissipating this through sweat requires another five ounces of water per hour. In other words, an hour's wandering has started me toward a two-percent deficit.

I look with new respect at the bighorn sheep than can lose twenty percent of its body weight (or a thirty-percent loss of total body water), ...

At two-percent loss of body weight due to loss of body water, thirst for some may already be fierce, accompanied by anorexia and flushed skin and increased pulse rate. Small increments of debit have large symptoms: at four percent the mouth and throat go dry; by eight percent the tongue feels swollen, salivary functions cease and speech becomes difficult. After ten percent the ability to cooperate, or even operate, is gone. At twelve-percent loss, circulation is so impaired that an explosive heat rise deep in the body is imminent, and deep body temperature rises dangerously fast. Death follows, although lethal limits may be as high as eighteen- to twenty-percent loss of body weight. If liquid is available, recovery can be nearly complete an hour after drinking.

Cabeza Prieta by Ann Zwinger from WORDS FROM THE LAND - ENCOUNTERS WITH NATURAL HISTORY WRITING, edited by Stephen Trimble, Peregrine Smith Books, Salt Lake City, c.1988.



ADDRESS CORRECTION REQUESTED

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The San Diego Cactus and Succulent Society, Inc. is open to all persons interested in growing cacti and other succulent plants. Meetings are held the second Saturday of each month (except Sept. and Dec.) at 1:00 PM in room 101, Casa del Prado, Balboa Park. Executive Board meetings are open to all members; call any officer or director for the time and location. Annual dues are $10.00 per single member per year, $5.00 for each additional member within the same household. Single copies of Espinas y Flores are $1.00 per copy sent within the USA; foreign subscriptions are $20.00. Affiliated with the Cactus and Succulent Society of America, Inc. Fax available - please call editor at (619)222-3216 for number.