



MAMMILLARIA THORNERI

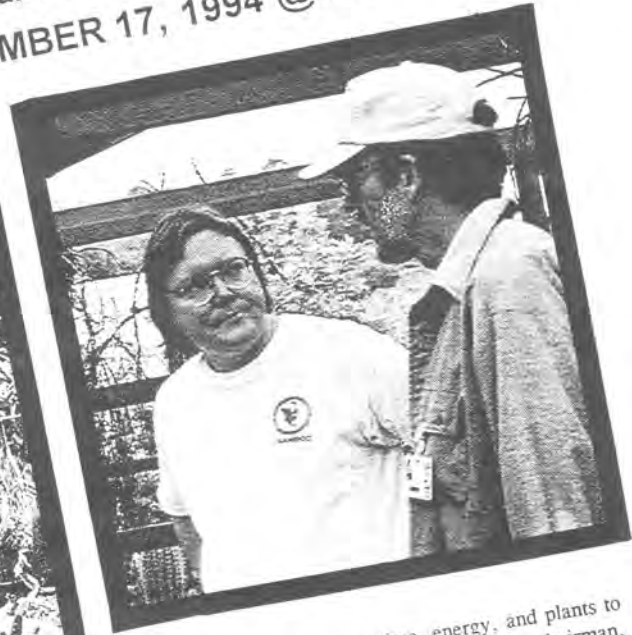
Espinas y Flores

BULLETIN OF THE SAN DIEGO CACTUS AND SUCCULENT SOCIETY
 Affiliate of the Cactus and Succulent Society of America, Inc.

VOLUME XXIX NUMBER NINE, SATURDAY, SEPTEMBER 17, 1994 @ NOON - PICNIC



SDC&SS's "youngest" members proudly standing in front of our award-winning exhibit. Life Members, Floyd Gable and Bob Taylor have contributed much knowledge and love to our society.



Dr. Ed Nolan contributed time, energy, and plants to SDC&SS exhibit and Rick Plant, co-chairman, contributed at least 160 hours of his time for Del Mar Fair and June Show - Thank you! Rick!

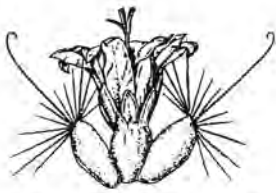
Let's work together!

Happy Lotus Land bus trip participants: Debe DeLollis (Ed DeLollis is photographer), Rick Plant, and Tom & Laura DeMerritt. All of these members truly deserved a day of fun after working so hard on Del Mar Fair exhibit.



Chief landscape engineer and plantscape designer, Michael Buckner scrutinizes the progress. Four years in a row he has been creating the SDC&SS exhibits for the Del Mar Fair. The Best Educational Trophy is always the goal and we have now won it two years in-a-row!





The San Diego Cactus and Succulent Society
Notice! Notice! Notice!

Change in Meeting - Picnic Date!
Saturday, September 17, 1994!

Take note please: Many of our members integral to the SDC&SS Annual Picnic and Rare Plant Auction will be attending the Tenth Annual Huntington Botanical Succulent Symposium, which will be held this year on our normal meeting date: the second Saturday of September. With over 25 San Diego members attending this symposium, the SDC&SS Board of Directors decided to change our picnic date to the following Saturday - Saturday, September 17th. We apologize for any inconvenience this may cause, and hope you all will still be able to attend. Last year's picnic was a blast - don't forget the sunscreen.

Directions to Kate Sessions Park:

Take the Grand - Garnet exit off of I-5; go West on either Grand or Garnet (they run parallel) until you get to Lamont Street; take a Right on Lamont (North) and go approximately .7 mile; Kate Sessions Park will be on the Right.

Picnic will be at the end of the park.

We will put up some signs and you will recognize the plant people!

There will be some shade, however, should you have one of those shade tents or a good camp table - please bring it. Tom & Laura will be bringing a shade tent. Everyone should bring their own lawn chairs and something good to eat for the pot luck. Please prepare dishes that are picnic style and ready to eat: Fried Chicken, Roast Beef, Salads, Fruit, Brownies, Cookies, etc, etc. Cold Beverages, ice, paper plates, utensils, & napkins shall be provided. We will meet and eat at around Noon.

The Rare Plant Auction will start at 2:00 pm. We are planning to have some very special plant material of the utmost quality, show plants and rarities not normally available. To be auctioned *Welwitschias*, *Adenium oleaefolium*, *Cleistocactus* crest, a three-headed six foot *Pachypodium lameri*, a three-foot *Pachypodium geyii*, crests, variegates, and botanical anomalies. You won't want to miss it!

Need more information?

Tom & Laura DeMerritt, Picnic Chairpersons - 270-5544

Michael & Joyce Buckner: Auction materials & Auctioneer - 222-3216

One million thanks to Miles (and Janice) Anderson for the great August program on grafting, and his post-meeting grafting demonstration - Samurai grafting! Wow, is he fast! Miles is a very adept speaker. Everyone thoroughly enjoyed and learned from his program, and the grafted cacti rarities delighted our many members who monthly stalk the sales table. Program Chairperson's from other organizations take note, this program is highly recommended: **MILES' TO GO**, Miles Anderson, P.O. Box 6, Cortaro, AZ 85652; phone (602) 682-7272 and fax (602) 682-0480. "Some are born to cacti, others have cacti thrust upon them."

A special salute to Martin Mooney for his excellent (almost a program in itself) expose' on *Welwitschia*, for bringing in all those marvelous plants and sharing his research with all of us. Thanks, and nice to see Pat, too!

NINTH ANNUAL INTER-CITY CACTUS & SUCCULENT SHOW A SMASHING SUCCESS!

We are pleased to report that many San Diego members were involved in this tremendous show - now considered the largest Cactus & Succulent show in the world. Beverly Kirkegaard judged advanced Cacti with co-judge Jim Hanna. Member Carol Wujcik judged open Cacti; Joe Wujcik was actively involved with registering plant awards and plant container sales. Active-as-usual Roberta Hanna kept busy making the judge's dinners and proceeded to man the cash registers all weekend. Michael Buckner was floor manager, head clerk with Joyce helping out in plant sales. Chuck Everson and Jerry Williams contributed greatly to this show as they have done every year by offering the latest and the best in books and educational materials.

Rudy Lime was awarded a special Rosette for his SMOLA (Succulent medium of Living Art) display, and won two trophies, Best Fouquieria and Best Madagascar Plant other than Euphorbia. Everyone was so delighted with his exhibit this year, he was awarded with extra bonsai pots at the Awards banquet! Marylyn Henderson won The Best Echeveria trophy; Marylyn is now a formidable contender in the advanced category. Michael & Joyce Buckner won the Best Staged Plant trophy. This trophy was donated by Cactus Data Plants (Woody & Kathy Minnich) in 1993 "in honor of Michael Buckner, Larry Grammer & Steven Southwell"; Larry Grammer won in '93, now the Buckner's -- Steve & Rowena you better start staging your entries now!!! Joyce was a little perturbed by the scratch on this relatively new trophy, however, when it was explained that this trophy was a survivor of the January '93 earthquake - she decided it added character. Many times throughout the show we heard the earthquake sigh of remembrance, "I used to have a plant or pot like this."

Ed Nolan and Carol Wujcik were official photographers. Ed also clerked, and Ed & Karla's plants won many ribbons - scoring high in points. Overall Sweepstakes and high points went to Woody & Kathy Minnich. Jerry Williams and Chuck Everson of Rainbow Gardens won the Best Epiphytic trophy and Best Gasteria trophy. SDC&SS members from Santa Barbara Catherine & Mike McCammon won the Best Chilean Cactus trophy. The show this year was particularly well organized and good vibes, helpful hands and shared information were available to all. Charles & Joanne Spotts worked above and beyond - the banquet was the very best this year, Joanne! Woody Minnich was given a well deserved standing ovation for all the many years he contributed so intensely to making this such a wonderful show. Other hard working and active participants who are also SDC&SS members included: Joe and Susan Clements, Duke Benadom, Ellen Low, Larry Grammer (who won many trophies including the People's Choice Award for his fantastic *Dioscorea sylvatica*, as par excellence, as usual) Kitty Sabo, Lem Higgs (The Abbey Garden), and Juan Chahinian, who won - guess what - the Best Sansevieria. SDC&SS members commuting to the Arboretum included: H.D. & Marilyn Scott, Phil Favell, Alan Weiss, Dorothy Byer, and Dylan Hannon. Next year, perhaps again we can fill a bus as we did in 1991 and 1992.

WELCOME!! WE HAVE LOTS OF NEW MEMBERS WELCOME!!!

MILES & JANICE ANDERSON
JOHN & BECKY REILY
WOODY & KATHY MINNICH
JILLIAN BELDING
SHIRLEY BELLERO
MARSHA BOOTH
FERN HARRISON
ANN & TOM KEENAN
MARK ISSENBERG
MARISSA PATINO
RON PETERSON
BRIAN & RENIE O'CONNELL

EMILE & PATRICIA PIERRE
VIRGINIA REYNOLDS
H.D. & MARILYN SCOTT **
TOM SHERRARD
DAVID WARREN
AVIS & DOUG TROXLER
PAUL STEWART
SAM WILSHIRE
STEPHANIE ZARRABI
MILES MAYO*
GEORGE & NOBUKO BERGMAN

* HAPPY BIRTHDAY, KID!

** THE SCOTT'S JOINED US AT THE TRI-CITY SHOW LAST WEEK - VERY NICE PEOPLE!
AND SCOTTY REALLY KNOWS HOW TO MAKE A TERRIFIC POOL SIDE MARGARITA!!!
HEAR THAT REGALEMENT COMMITTEE?



AUGUST 1994 BRAG TABLE WINNERS

Judged by Woody Minnich

CACTUS

First: JOHN WILLIAM'S *Lobivopsis* hybrid
Second: DON PATTERSON'S *Copiapoa laui*
Third: DON PATTERSON'S *Mammillaria*
saboeae var. haudeana

SUCCULENT

First: RUDY LIME'S *Adenium obesum*
Second: RUDY LIME'S *Ipomoea batata*
Third: MICHAEL PARVIN'S *Ceropegia*
woodii



PREFACE TO FRED KELLER'S ARTICLE ON TOM MacDOUGALL

Tom MacDougall was obviously a very special man, adventuresome, scientific, mysterious, alive. We are pleased to have this personal article written about him by another special man, Fred Keller. When you look through your cactus & succulent collection you will find many plants which were either described by Tom MacDougall or named in his honor: *Ortegocactus macdougallii* (Alexander), a beauty from San Jose Lachiguiri, Oaxaca; *Furcraea macdougallii*, an unusual upright grower discovered in Chiapis; *Tillandsia macdougallii* (L. B. Smith), an epiphytic Bromeliad from Puebla south to Tehuacan; *Mammillaria guiengolensis* (Bravo and MacDougall), from Cerro Guiengola, four miles west of Tehuantepec, Oaxaca; and *Pterocereus gaumeri*, a genus named by Tom MacDougall and Dr. Faustino Mirand in 1954, meaning winged Cereus. Indeed, the botanical world was blessed to have such an astute intrepid individual. Thanks Fred.

Thank you Fred Keller! Lotusland (and our docent) were terrific!



Dear Michael and Joyce:

Thank you for your very kind note. Needless to say, I really enjoyed taking your group through Lotusland and learned a lot in so doing -- always the situation we hope for as docents. Thanks to you and the group for your help in filling in additional insights.

As you may be aware, I have not written any newsletter pieces for some time and I am afraid that as in so many things -- if you don't use it you lose it.

Seeing my *Cryptocereus* in bloom reminded me of Tom MacDougall hence the enclosure for your consideration.

Best regards.

Sincerely,



A Man of Two Seasons: Tom MacDougall

by Fred Keller

My *Cryptocereus anthonyanus*, an unusual "rick rack" epiphytic cactus from southern Mexico, has just bloomed and reminded me of Tom MacDougall, its discoverer, and the brief association which we had.

In 1960 I was employed as a chemist for a pharmaceutical company and was engaged in a study of plants used in native medicines as sources for new and useful drugs. One of our biochemists had read of a papaya relative, *Pileus mexicanus*, reputed to contain a unique enzyme deemed worthy of further study and wished to obtain a sample for evaluation in our laboratories. At the time we had no source for botanicals in Mexico and were somewhat at a loss as to where we might start to develop a contact. Being a member of the Cactus & Succulent Society, I called Scott Hasselton the CSSA Journal editor, and asked his advice. He recommended Tom MacDougall as the best person to contact and shortly provided addresses in New York and Tehuantepec where he might be reached.

We began a correspondence with MacDougall who expressed an interest in helping to obtain experimental quantities of plant materials from this area. Later in the year we were able to meet him for dinner in New York at a time when he had returned from the field and we were attending a conference. By that time I learned more of his particulars and had read more about him.

Tom MacDougall divided his life into two seasons spending the propagating season in New York where he was employed by a nursery specializing in Rhododendrons; the remainder of the year he spent in Oaxaca and Chiapas where he was engaged in plant exploration and also collected animals (birds, herps, [herpetology - reptiles] and small mammals) for the Museum of Natural History in New York. His overriding interest was a study of the Chontals, a native people of the region. As the seasons changed he migrated by bus from Tehuantepec to upstate New York and back and maintained this routine in excess of 30 years. In the course of his studies he published an abundance (80+) of semi-technical papers on botanical topics as well as a like number of technical descriptions, by others, resulted from his discoveries. His expertise and interests were wide ranging. Botanical discoveries comprised Bromeliads, Begonias, Gesneriads, and Orchids, as well as Cacti and Succulents. His love of the native peoples and intense interest in their customs led him to acquire great knowledge of some of their mystical drug related religious rites, where he was an interested and trusted observer and confidante. This knowledge led to his acting as guide to groups engaged in the scientific evaluation of the *Psilocybe* mushrooms, the hallucinogenic Morning Glory (*Rhynchosia* species) and a Sage (*Salvia divinorum*) which is similarly employed.

Tom MacDougall, or "Don Tomas" as his many friends call him. At the request of Abbey Garden, Tom has kindly transcribed his extensive field notes dealing with cacti and other succulents over the past thirty years, and copies of these notes will be deposited at Huntington Library, Kew Gardens and the University of Mexico.



In the course of our correspondence, we had often extended an invitation to MacDougall to visit should he be passing through the Los Angeles area. Lo and behold, one morning I received a call from the front lobby that a Mr. MacDougall was there to see me. The fact that Tom was there at all was surprising in itself. The roads in the San Fernando Valley would start and stop depending upon whether or not major landholders had dedicated a right-of-way. The situation was bad enough at that time that the running joke said that the first aptitude tests for prospective employees was whether or not they could find the laboratory. MacDougall had walked from the bus line and when the road had given out found himself north of our location when he inquired at an orange grove. When the laboratory location was pointed out, rather than retracing his steps, he took a direct approach and scaled two eight foot cyclone fences bordering a concrete flood control channel. At the time he was in his mid-sixties.

As some members of management were away from the office, I hurriedly made arrangements to take Tom to the Huntington, where Myron Kimnach had recently relocated, and also set up an introductory meeting for the following day. Myron was extremely accommodating and was faced with a logistical problem of his own, as George Kalmbacher was also visiting that day and our times overlapped. Tom was rather anxious to learn whether the collection numbers on his findings had survived as in many other locations this had not been the case. Fortunately, he seemed reassured by Myron's

interest in Epiphytic Cacti and Echeverias and hopefully was as impressed as I was on viewing the study collection. I learned later, that this proved to be the only communication between the two as their paths had not crossed in the field. At the end of the day we brought Tom back to downtown Los Angeles and made provision to pick him up in the morning and introduce him to others on our staff from whence he could resume his journey. My inability to listen brought about a small contretemps as I understood him to say that he was staying at the Biltmore an unlikely hostelry for one living such as ascetic existence! In the event it turned out that the hotel was the Baltimore, a modest place across from the bus station. MacDougall bore the mixup with equanimity and as in most things was unruffled by small setbacks.

He had a strong common sense approach which precluded his dwelling on the unimportant. He continued up to Santa Barbara where he was to bring specimens to Rudolf Ziesenhenn, a Begonia specialist. I visited his nursery recently and mentioned Tom's visit. I was shown an unusual Begonia which MacDougall had found in a cave and was yet undescribed. In our conversation I was reminded that Tom had been imprisoned briefly on suspicion of trading in antiquities just before starting on that return trip. He related this in his usual taciturn manner regarding it as very serious, yet another unfortunate mistake which through the intervention of those who knew him was surmounted and was not something to be dwelled on.

Tom MacDougall lived a frugal existence undeterred by a quest for material wealth. In his efforts on our behalf he seemed reluctant to bill us to the point that we advanced funds unasked for out of concern that he was unduly using his own which he could ill afford. When he did suggest an amount in written correspondence, it was always modest and would be followed with a question mark as though it were perhaps too high. I always felt that this was in part a reflection of his wish not to get too deeply involved in a commercial venture which might tempt him to stray from working towards his own interests. He had the reputation of being revered by the Mexican natives with whom he worked being commonly referred to as "Don Tomas". Tom MacDougall died of natural causes in Oaxaca in 1973.

The eminent Bromeliad specialist, David Barry, once said of his own life that he could take comfort from the thought that after his passing he might be remembered from his surviving plant introductions. In a like manner, Tom MacDougall could have derived the same satisfaction. I consider it a privilege to have known him and am always pleased to recall him when seeing his discoveries in my own and other collections.

References

Stix, Judith S., *Cactus & Succulent Journal (U.S.)* XLVI, 117 (1974)

"Plant Exploration in the States of Oaxaca and Chiapas. The Cactus and Succulent Field Notes of Tom MacDougall 1936 to 1971" prepared for the *Cactus & Succulent Journal*

Much of the material in this piece was presented orally in somewhat different form at a "Member's Night" meeting of the Santa Barbara Cactus & Succulent Society

HUNTINGTON BOTANICAL GARDENS

ELEVENTH SUCCULENT PLANTS SYMPOSIUM



DISCOVERY AND EXPLORATION IN THE WILD & CULTIVATION

HUNTINGTON BOTANICAL GARDENS ELEVENTH SUCCULENT PLANTS SYMPOSIUM Saturday, September 10, 1994

DISCOVERY AND EXPLORATION IN THE WILD AND CULTIVATION

- *Discovery Through Artistic Rendition*
Dorothy Byer, Vista, CA
- *Where Have All the Collections Gone?*
James P. Folsom, Director, Huntington Botanical Gardens, San Marino, CA
- *Sphaero Worship, In the Field and Under Glass*
Steven Hammer, Mesa Gardens, Belen, NM
- *Haworthias: They Don't All Look Alike*
Bob Kent, Poway, CA
- *Tales of Huntington Expeditions*
Myron Kinnach, Huntington Botanical Gardens, San Marino, CA
- *Forty Years of Plant Hunting: Thrills and Discoveries*
John Lavranos, Johannesburg, South Africa
- *Ex Africa Semper Aliquie Novi: Succulent Plant Discoveries in East Africa*
Leon Newton, Nairobi, Kenya
- *As the Asclepiad Turns*
Darrel Plowes, N'Djanena, Chad

Time: Continental breakfast and registration start at 8:00 A.M. Programs are 8:45 A.M. – 6:00 P.M. and include speaker presentations, plant sales, silent auction of rare and unusual succulents, desert garden & conservatory tours, refreshments, & lunch. Optional dinner with prizes.

Registration: Symposium — \$60.00; Saturday dinner — \$20.00.

Mail your name, address, and check payable to **Huntington Library** to:

Succulent Symposium, Huntington Botanical Gardens
1151 Oxford Road, San Marino, CA 91108
(818) 405-2162, FAX (818) 405-2260

Registration deadline is August 30, 1994. We cannot guarantee meals for late registrants.

Endangered Species Information Now Available Through Internet

The Fish and Wildlife Service recently placed several electronic information items on its Information Resources Management Library Server, which makes these items accessible to users of Internet and the Service's Wide Area Network. These items include:

- The List of Threatened and Endangered Species (entitled, "Endangered and Threatened Wildlife and Plants"), current as of June 30, 1994, and to be updated monthly;
- The Plant Notice of Review (entitled "Plant Taxa for Listing as Endangered or Threatened Species. Notice of Review"), as published September 30, 1993;
- The Endangered Species Act of 1973, as amended through the 100th Congress;
- Species Maps that indicate listed species and proposed species by state and territory, current as of June 1, 1994;
- Species Maps that indicate Category 1 listing candidates and candidate species by state and territory, current as of December 31, 1993.

The Library Server can be accessed through cc:mail within the Service and through Internet E-mail software from outside the Service. If you address a new cc:mail message to R9IRMLIB (the Library Server's cc:mail address), type the retrieval command — Send ES Instructions — on the subject line and send the message, you will receive the complete list of "send" messages (retrieval commands) available on the Library Server for the Endangered Species Program. This list will change over time as more information is added to the Library Server. For example, the new Animal Notice of Review will be added once it has been published in the *Federal Register*.

Those from outside the Service with Internet E-mail capabilities should use R9IRMLIB@mail.fws.gov (the Library Server's Internet address) to access the above information.

Calendar of Coming Events

☉ September 10, Saturday, Huntington Succulent Symposium: lectures, sales, dinner, rare plant auction at the Huntington Botanical Gardens. Call (818) 405-2160.

☉ September 17, Saturday, San Diego Cactus & Succulent Society Annual Picnic and Rare Plant Auction. (This event is usually held in July.) Call Tom DeMerritt @ 270-5544. Pot luck lunch @ noon, families & guests all welcome! Bring a Frisbee, football, or horse shoes - we play, too!

☉ October 8th, Saturday, San Diego Cactus & Succulent Society meeting with Aloe Specialist Brian Kemble. Plants of the month are *Cussonia* & other succulent *Aralias* by Michael Buckner, and the cactus is *Copiapoa* by Thomas Knapik. The Nomination Committee for SDC&SS 95-96 officers will be forming at this meeting, if you would like to volunteer for this committee or run for an office – please inform a present SDC&SS Board Member or Officer. The board meets at 11:30 in kitchen next to room 101 before general meeting.

☉ October 15, Saturday, California Native Plant Society Plant Sale, 10:00 am to 2:00 pm, Joan Stewart @ 277-9485.

☉ October 22 & 23, Saturday & Sunday: The 23rd Quail Botanical Gardens Plant Sale and Fund Raiser. Info (619) 436-9236, Barbara Weiler.

☉ November 3-4-5-6 Huntington Botanical Gardens Fall Plant Festival. Call (818) 405-2160 for more information.

☉ November 12, Saturday, Catherine & Mike McCammon of Santa Barbara will present a slide show presentation of their recent trip to South Africa. Plants of the month: Canary Island succulents by Phyllis Flechsig and the cactus is *Arrojadoa* by Joe Clements.

★ December 10th, Noon, the Annual San Diego Cactus & Succulent Society Holiday Banquet and Plant gift exchange. Election of 1995-96 officers. Please pay you 1995 dues in advance to receive your plant gift at this event.

Vocabulary form our last meeting: Listen, read, and learn.

Areole - The most distinctive feature occurring in some form throughout the cactus family and in no other is the presence of spines in areoles. Areole is the diminutive of area, and it refers to a special, clearly marked area above each leaf or above the normal position for a leaf. The areole produces spines – usually in the mature plant, and always at some juvenile stage. (Benson, Lyman, *The Native Cacti of California*, Stanford University Press, 1969)

Cam Plants - A particular type of photosynthesis, crassulacean acid metabolism (CAM) has evolved in several families. In CAM the stomata of plants open at night, when the temperature is lower and the humidity of the air is higher. These plants store carbon dioxide, using organic acids – namely malic acid – during the night when the stomata are open. Carbon dioxide is released during the day when the stomata are closed but light is available for photosynthesis to transform the Carbon dioxide into sugars, CAM is not only efficient in the economic use of water but is also highly effective in capturing Carbon dioxide from the air.

MEMORABLE MOMENTS

BY FRANK THROMBLEY

It is 10:00 AM on a cloudless blue-sky day. A perfect picture day. The three of us have just had a couple of fish tacos and Joey Betzler is thinking of Kelly Griffin; Tom Parks is thinking of Sonia Barker Fricker, in England; I am thinking of our new member from Siberia, Russia. What is the common denominator? Seed.

Echinocereus pacificus - *Echinocereus polyacanthus* var. *pacificus* per Nigel Taylor is the earliest flowering species of the genus. The type locality is in the Arroyo San Carlos and so on this day of April 13, 1994 we left Ensenada and travelled south to Maneadero and then east, following the Rio San Carlos.

The Rio San Carlos no longer reaches the Pacific Ocean but over thousands of years has developed a Bajada or Alluvial Plain. Rich with sandy loam it is now a broad agricultural valley. After two miles on dirt road we leave this Bajada and now see the river with running water which will disappear into the sand plain. This is also our first stop at the foot of the Arroyo. Which has an abundant variety of plant species: *Stenocereus gummosus*, *Myrtillocactus cochal*, *Ferocactus viridescens*, *Mammillaria dioica* (thousands of them!), *Dudleya species* and many other interesting plants. We stopped to see the *Echinocereus maritimus*, which is more robust than those that grow on the coast, to see if it is flowering yet. Although we did see one or two flowers, as a group these were just forming buds.

We now travel into this deep Arroyo and after about six more miles we find *Aesculus parryi* (the Baja Buckeye) in flower. This is of the family *Hippocastanaceae* or Horse-Chestnut. After crossing this fast moving river 15 times and going ten miles from Highway 1 at Maneadero we come to the site of *Echinocereus pacificus*. The plants grow on a very steep rock face of the Arroyo and the river runs between us and the plants. We walk across the river which is about 8" deep at the shallow parts. That is, Tom and I walk in water. Joey, who is much younger and more agile, jumps from rock to rock for his crossing. The plants are growing in a very limited area, no more than a mile in length along this river. The plants have flowered and some of them have set seed, which are not developed to the "ripe" stage. Although we find a few flowers in bloom the plants do not hybridize with *Echinocereus maritimus*, populations which are only eight miles downstream. This is probably due to the respective flowering periods. We decide to come back here for the seeds in two weeks and make plans for April 29, 1994.

Dr. George Lindsay botanized in this Arroyo when doing research for his thesis on the subject *Ferocactus*. *Ferocactus viridescens* grows in this region from the coast to about 1200 feet elevation above San Carlos Hot Springs. The *Ferocactus viridescens* that grow at the site of *Echinocereus pacificus* are cylindrical in form. Joey measured a plant which was 20 inches tall. Tom and I measured plants 18 inches tall on the previous trip. Dr. Lindsay measured plants three feet tall and 14 inches in diameter at the 1200 foot elevation. He said they resembled *Ferocactus acanthodes*. These plants have not yet flowered.

Friday, April 29, 1994 is another beautiful day. We stop again at the Ensenada fish market for tacos. However, the "we" on this day includes Bob and Lee Thrombley, my son and daughter-in-law. They also brought their Siberian Husky, Smokey. Carey Sharp, director of horticulture at the Wild Animal Park, came along to keep a watchful eye on the two old geezers, (Tom and Frank). Joey Betzler brought 40 lbs of camera goodies with him and wants to hike up to the ridge of this range.

The river has more water flowing and is quite rapid. Joey has to walk the water this time, for the rocks he used in his first crossing are now submerged. He is off on his climb with all the camera equipment and we wish him luck.

Tom is the first to start collecting seeds. He has to obtain seeds from different clones and keep them separate so that Sonia and her botanist friend in England can study the plants for possible differences. Lee and Smokey are walking the river and Bob is helping Tom. Carey and Frank go up the river to a plant that I know has seeds. We do collect fruit with seeds but the crop is not plentiful.

The *Echinocereus pacificus* flowers have to be pollenized from different clones for successful fertilization. That is to say each clone is not self compatible, gosh, what a thing to say about this beautiful plant. My belief is that when these plants were in flower we had a very long period of rain and or cloudy days which did not help the pollinizer. Hence, a small crop of fruit this year.

Joey is back from his 2,000 foot climb that only he and a mountain goat could negotiate. He reports that the *Echinocereus* and *Ferocactus* did not grow above the 20 to 50 yards of where we found this very limited site of *Echinocereus pacificus*.

A very memorable two days in the Arroyo called Rio San Carlos.

SUCCULENTS OF SAN DIEGO COUNTY

by Dylan P. Hannon

With both the richest flora and most southerly location of any county in California, it is perhaps not surprising that San Diego County should also contain a higher number of native succulent plants than any other area of similar size within the state. A majority of these by far are represented by the cacti. Other species belong to the Nightshade, Sunflower, Spurge, Agave, Milkweed, Ice-plant, Bursera, Stonecrop, Ocotillo and Purslane families. Only native, indigenous species are considered in this paper.

Besides these main families, which each have one or a handful of succulent species growing in San Diego County, there are three other groups which deserve mention for their notable succulence as a strategy in dealing with harsh local environments, even though they are not likely to be found in cultivation.

The first are the cucurbits, or members of the Cucumber Family. Species growing in our area include the "Wild Cucumber", *Marah macrocarpus*, and several gourd species: *Cucurbita digitata*, *Cucurbita foetidissima* and *Cucurbita palmata*. All of these plants possess a greatly enlarged main root below ground, which might be labeled a "caudex", except that no one has apparently been successful in raising one of these roots in a container situation beyond first or second season after transplantation. They are not difficult to grow from seed, although they may still resent even gradual exposure of the main root.

The second group is of small parasitic plants in the families Lennoaceae, Orobanchaceae, and Ericaceae. They lack chlorophyll and occur in sand dunes, chaparral, sage scrub, and coniferous forest habitats, where they are infrequently to very rarely observed by humans. Essentially succulent in all their parts, from roots to flowers, our native parasitic plants in some cases apparently belong to a complex relationship involving a 'host', such as a pine tree, and a primary 'parasite', such as a fungus, and these herbaceous flowering plants we call parasites may be only opportunists taking advantage of a much older symbiotic association between the fungi and conifers.

The third group of succulents outside the 'mainstream' is comprised of some of the major components of our coastal saltmarshes, such as Pickleweed or Glasswort, (*Salicornia* spp.), Saltwort (*Batis maritima*), Salty Susan (*Jaumea carnosa*), and Sea-Blite (*Suaeda esteroa* and *Suaeda laxifolia*). While these highly succulent plants are not impossible to cultivate in pots (even pots without drainage holes, which are perhaps more appropriate), due to their being of annual habit, lax, untidy growth form or overall size, they are best left along our coast in their own specialized habitat. It has been estimated, using vintage photographs, that over 90% of original coastal salt marsh has been decimated, mainly by "filling-in", to accommodate industry and pleasure (marinas, etc.) in Southern California.

The remaining succulents are discussed below under "Leaf Succulents" and "Stem Succulents". There are a few which actually fit both categories, viz., Sea-Dahlia (*Coreopsis maritima*) and Sea Kisses (*Calandrinia maritima*). The latter is a rare, dwarf shrubby plant in the Purslane Family (Portulacaceae) which may be easily overlooked during its dormant season in June through November, when a majority of the plants discussed below are more or less dormant as well. Sea-kisses occurs only where maritime influence is prevalent, such as on coastal bluffs, and on various soils types, usually within coastal sage scrub habitat. As a consequence, an originally uncommon plant has become quite scarce due to coastal development. To come across one of its typically very small populations in spring can be just cause for a neighborhood block party! The foliage is glaucous, with leaves about 3-4 cm long, and the satiny, magenta colored flowers are borne on stalks up to 15cm tall.

Sea-dahlia is a member of the Sunflower Family (Asteraceae) and has succulent yet finely divided leaves and brittle, semi-succulent stems. This plant grows in an even more restricted area of our coastal zone than Sea-kisses, where it enjoys the constant cooling of oceanic influence. It is more frequently observed by nature seekers, due in part to its being generally more common and to its large, bright yellow daisy-like flowers borne on long, ascending stalks. The seedling quickly develops a conspicuous taproot, often with the uppermost part just exposed, and could probably be trained as a caudiciform specimen over time. Sea-Dahlia generally favors north-facing slopes in the wild, and makes an excellent addition as an accent plant in xeric gardens in coastal areas with a mild Mediterranean climate.

LEAF SUCCULENTS: Crassulaceae, Portulacaceae, Solanaceae, Agavaceae, Aizoaceae.

The Stonecrop Family (Crassulaceae) is arguably the most conspicuous family of San Diego's leafy succulent flora, with three genera represented: *Crassula*, *Dudleya*, and *Sedum*. Of these, *Dudleya* is by far the most diverse and interesting. In coastal areas, *Dudleya lanceolata*, *Dudleya pulverulenta* (Chalk Lettuce), and *Dudleya edulis* (Lady's Fingers) are frequently encountered in both chaparral and sage scrub habitats. Less commonly found are four members of the subgenus *Hasseanthus*: *Dudleya blochmanae*, *Dudleya blochmanae* ssp. *brevifolia*, *Dudleya multicaulis* and *Dudleya variegata*. These diminutive geophytes die back to small tuberous root(s) in the summer. *Dudleya viscida*, resembling *Dudleya edulis* but with brighter green, sticky leaves and pink flowers, resides primarily around Oceanside and on Camp Pendleton. Also found on the coast, but only in the Tijuana Hills along the border, *Dudleya attenuata* ssp. *orcuttii* is a dwarf plant with terete, glaucous leaves; it is common further south in Baja California. In the desert, *Dudleya arizonica* and *Dudleya saxosa* are infrequently observed. Finally, *Dudleya alainae*, the most recently described San Diego *Dudleya*, is restricted to the transmontane zone near Banner.

For those used to thinking of *Crassula* in its fantastically diverse South African sense, it may be somewhat of a disappointment to behold any of the several native San Diego county species. All are tiny annual plants which grow in seasonally moist areas (*Crassula aquatica*) or are more widespread in areas of coastal sage scrub and chaparral (*Crassula connata*, with three varieties, *Crassula saginoides* and *Crassula solieri*). Though they dry up in the summer, they can make interesting seasonal companion plants for other containerized native succulents in much the same way that mosses are utilized in bonsai. Finally, the large and widespread genus *Sedum* is reported for San Diego by one collection made in the Aqua Tibia Wilderness area of *Sedum spathulifolium* ssp. *yosemitense*.

In the same family as *Calandrinia*, two species of *Lewisia* occur in our mountains, *Lewisia brachycalyx* and *Lewisia nevadensis*. The genus takes its name from Meriwether Lewis of the Lewis & Clark expedition to find the so-called Northwest Passage in 1804-1805. All the species are leafy rosette plants of varying degrees of succulence, sometimes with only a few leaves, and bear frequently showy displays of chicory-like flowers in pastel shades of white, pink, orange and red. Those occurring in the San Diego area, being rare in the first place and growing at high elevations in seasonally wet areas, unfortunately cannot be expected to succeed in cultivation for most hobbyists in Southern California. However, several of the more northerly species, which grow at lower elevations and under less specialized conditions, can be managed in pots with a shady, dry summer rest.

SUCCULENTS OF SAN DIEGO COUNTY - D. HANNON CONTINUED

The Solanaceae, or Nightshade Family, does not generally boast many succulent representatives, but at least *Lycium* (the Box-thorns) contains a number of shrubs which have highly succulent leaves. In San Diego county there are seven native species of *Lycium*: four on the desert (*L. cooperi*, *L. fremontii*, *L. parishii*, and *L. torreyi*), one on the coast (*L. californicum*), and two which occur curiously in both areas (*L. andersonii* and *L. brevipes*). Most promising for the horticulturist is probably *Lycium californicum*, which is relatively compact and spreading in habit and is possibly trainable as a bonsai specimen. The small flowers are lilac-colored, followed by small red-orange berries.

In the Agave family (Agavaceae), *Agave* and *Yucca* each have two native species in San Diego County, although by a very long stretch *Nolina* is sometimes also included here. Species of *Nolina* typically possess a large, mostly underground caudex, a sort of "woody" plate-like structure which sports tufts of saw-tooth edged, fibrous leaves; it is probably also something of a stretch to give *Nolina* any status as a true succulent. Many of the yuccas are no less succulent than any given *Agave*, and the two species in our area, *Yucca whipplei* ssp. *whipplei* and *Yucca schidigera*, both coastal denizens, are no exception. The first of these is also known as Our Lord's Candle and forms attractive bristly rosettes of many narrow, bluish grey-green leaves and terminates a life of perhaps one to two decades by sending up a towering mast of very showy, creamy white flowers. *Yucca schidigera* (Mohave Yucca) also occurs on the coast as well as on the western edge of the desert region in San Diego county. The leaves of this yucca are dull green and may be slightly fibrous-edged, and the plant usually branches from the base. It also produces a large inflorescence, with whitish flowers strongly suffused with brown, but flowering does not end the life of the plant.

Our *Agave* species, *Agave deserti* in desert areas and *Agave shawii* on the coast, both make fine subjects for the collector of succulent plants or for the gardening enthusiast with a xeric bent. *Agave deserti* is on the small size for an *Agave*, with rosettes of whitish blue-grey leaves up to about 0.5m across. While *Agave deserti* is common in rocky and sandy areas of the desert, *Agave shawii* is very localized within the county. It is known definitely in San Diego only from Point Loma, where it still resides at Cabrillo National Monument, but may well have been growing naturally at a few other sites which have long since been urbanized. *Agave shawii* can be seen growing in abundance on lava flows on the coast south of Rosarito in Baja California.

Popularly known as "mesembs", members of the Aizoaceae (formerly Mesembryanthemaceae) or Iceplant Family are well represented in the San Diego area, although only two are believed to be indigenous. These are the Sea-Fig (*Carpobrotus aequilaterus*) and Western Sea-Purslane (*Sesuvium verrucosum*). The first is found on sandy beaches and immediately adjacent areas and is (or was) often planted for coastal erosion control. *Sesuvium* occurs in alkaline areas near the coast, more often in association with freshwater bodies. There is still some debate whether these two species, and hence the family as a whole, are native to the California Floristic Province, or whether they will be eventually added to the ranks of other, more frequently encountered non-native mesembs in our area, such as the annual ice plants (*Mesembryanthemum crystallinum* and *Mesembryanthemum nodiflorum*) and others.

STEM SUCCULENTS: Euphorbiaceae, Asclepiadaceae, Burseraceae, Fouquieriaceae, Cactaceae.

Nearly as familiar as the cacti nowadays, the genus *Euphorbia* is a large one whose distribution covers many of the more arid regions of the globe. However, the "succulent phenomenon" has struck almost exclusively in southern and East Africa, and New World succulent Euphorbias remain few. One of these is *Euphorbia misera*, a shrubby plant which grows as a component of a special type of coastal sage scrub found primarily in the extreme southwest of our county, on hills in the South Bay area and the Tijuana Hills, as well as a few stations to the north. Easily overlooked at a casual glance, up-close the plant reveals its silvery, knobby stems, succulent at least enough to draw it into the catch-all "succulent bonsai" category. The leaves, which are shed during the hottest months, are an attractive pale dull green and rounded in outline, while the cyathia (a compact, specialized flower head which resembles a flower) are maroon and green and striking up close.

Somewhat in parallel to the previous family, the Asclepiadaceae, or Milkweed Family, contains a rich assortment of succulent species in the southern and eastern portions of Africa, while the New World, still rich in species overall, is conspicuously wanting in succulent representatives. In the San Diego area, *Asclepias albicans* (Wax Milkweed) and *Asclepias subulata* (Rush Milkweed) are desert species, though the later is infrequently found near the coast, as at Dehesa, etc. *Asclepias albicans* has more or less terete greyish or whitish stems growing erect and tall and in *Asclepias subulata* the stems are shorter and more compact.

While succulent traits are not in any event usually associated with *Asclepias*, they certainly are with *Sarcostemma*, with several African species found occasionally, if not forlornly, in collections of succulent plants. Of the two species occurring naturally in San Diego county, *Sarcostemma cynanchoides* ssp. *hartwegii* may be loosely called succulent. It is found sporadically in both desert and coastal areas, where its abundant spaghetti-like grey-green stems scramble through low shrubs. The clustered flowers are pinkish and only marginally showy.

Well known to many readers, the Elephant Tree (*Bursera microphylla*) is an often fantastically configured large shrub or small tree whose occurrence in the United States is quite limited. Besides a few stations in southwestern Arizona and a few more at low elevations on rocky slopes in our desert to the east, it is primarily found to the south in Baja California and just into Sonora across the Sea of Cortez. As with other members of the genus *Bursera*, whose members are increasingly in demand to meet the current succulent bonsai craze, *Bursera microphylla* is perhaps best regarded as a soft-wooded shrub. Its leaves are scarcely succulent, and if compared to the likewise soft-wooded Peruvian Pepper (*Schinus molle*), there is little difference in the consistency of the various parts of either plant, except that the trunk(s) of the Elephant Tree are proportionately more swollen, or pachycaul. Happily, this trait holds true for seed-grown plants, which can become attractive specimens within a few years of germination when grown "hard". Beyond this species, there is a tantalizing, semi-confirmed report of *Bursera hindsiana* from the eastern flank of Rabbit Peak in the Santa Rosa Mountains, just over the San Diego county line in Riverside county. It is only "semi-confirmed" because the report stems from a gift to Rancho Santa Ana Botanic Garden in Pomona, California, of fruits collected by a prospector who encountered a small group of shrubs he recognized as something unusual. When grown up at Rancho Santa Ana, senior staff botanist Dr. Robert Thorne quickly recognized it to be *Bursera hindsiana*, which otherwise is known from much further south in Baja California. This population awaits the intrepid explorer and lover of soft-wooded succulent plants, especially if he/she carries along a plant press!

SUCCULENTS OF SAN DIEGO COUNTY - D. HANNON CONTINUED

More generally known to desert visitors is Ocotillo (*Fouquieria splendens*), which like the burseras is perhaps called succulent more often because it is amendable to cultivation with cacti and the like rather than having any true succulence. A physical description scarcely needs recounting here, while attention can be called briefly to the other members of the genus, the only one in the botanically odd and isolated Fouquieriaceae. Found only in Mexico, these other species make excellent candidates for container culture, with their sometimes swollen main stem(s) (especially *Fouquieria columnaris*, the Boojum Tree, *Fouquieria purpusii* and *Fouquieria fasciculata*) and distinct spination, which is derived from the petioles (leaf stalks) of leaves produced on new shoots. Leaves may also be produced from short axillary shoots borne along the main stem between the spines (the stem axis scarcely being evident) as when the Ocotillo first leafs out in spring. A few species are spineless and closely resemble members of *Bursera*.

Finally, we are left with the cacti, made "last" in keeping with the author's false reputation as a noted anti-cactologist and advocate of generally less spinose fare*. The following genera are represented in San Diego county: *Opuntia*, *Bergerocactus*, *Echinocereus*, *Mammillaria*, *Ferocactus*, and *Echinocactus*.

The opuntias are well represented by both pad species (subgenus *Platyopuntia*, the prickly pears) and those with terete or cylindrical stems (subgenus *Cylindropuntia*, the chollas). The taxonomy of this genus, especially the chollas, is complex and seemingly ever-changing, even within the California flora. This is due in part to populations which may intergrade and/or hybridize with others, and to morphological characteristics which can be highly plastic both among and between populations. Twenty taxa are recognized as occurring in San Diego county (Beauchamp, 1986). The most common species on the coast are *Opuntia littoralis*, a low, spreading pad species with pale green stems, and *Opuntia prolifera*, a viciously-armed cholla with greyish green stems which may grow to some 2 meters in height, usually in small to large colonies. Just how many individuals comprise such colonies is an interesting question, since the plant is apparently much more inclined or able to produce joint propagules rather than seed-bearing fruits. In the desert, the Opuntias are much more prevalent, with large cholla species often comprising the most conspicuous element of the large shrub landscape. Chief among these are *Opuntia bigelovii* and *Opuntia echinocarpa*, with gold to straw colored spines. While such spination is highly attractive, these Opuntias, like other temperate desert plants, often resent residency on the coast and either will grow miserably or lose most of their color and luster - whether grown from joints or as seedlings. Air quality is one of the suspected reasons for this.

Bergerocactus and *Echinocactus* each have only one species in San Diego county, the former being entirely monotypic and otherwise found in northern coastal Baja California, where it is quite common. In San Diego only a few small stands are known, most notably on Point Loma, where it can be seen within Cabrillo National Monument, and in the Tijuana Hills on the U.S. - Mexico border. The erect stems, which branch and sprawl at the base to form dense patches, are densely clothed in golden spines, giving an overall appearance similar to that of some of the *Haageocereus* of coastal South America (Peru and Chile). Miraculously, this plant has escaped the net of rabid genus lumpers of late, possessing as it does a combination of characters which make for ready and defiant independence.

In contrast *Echinocactus* was once a repository for just about everything but *Bergerocactus*, though it now is usually held to comprise about a dozen species centered in northern Mexico. It is rare in San Diego county, represented by a local occurrence of *Echinocactus polycephalus* var. *polycephalus* near Palo Verde Canyon in the desert.

Echinocereus engelmannii is the sole species of the Hedgehog Cactus genus to be found in San Diego county, not counting a citation of *Echinocereus triglochidiatus* var. *mojavensis* by Benson, which may actually be from a locality in Imperial County (Beauchamp, 1986). *Echinocereus engelmannii* is commonly found as var. *engelmannii* on rocky slopes and alluvial fans and washes in the desert, and var. *munzii* has been found above 1200 meters east of Cuyamaca Lakes and at Chariot Canyon.

Omnipresent in succulent collections and on the average window sill alike, *Mammillaria* (Fishhook Cactus) is represented in San Diego county by only two species, *Mammillaria dioica* and *Mammillaria tetrancistra*. The former is among a handful of plants, including Jojoba (*Simmondsia chinensis*), Box-Thorn (*Lycium andersonii*, *Lycium brevipes*) and others which occur in our desert as well as on the immediate coast. In some cases these bi-modal distributions meet up much further to the south in Baja California, where conspicuous mountainous features taper off. *Mammillaria dioica* is a small, usually clustering plant which is well-armed with hooked spines, though the spines do not hide the dull green tubercles or the pale yellow flowers produced in February - May. There appears to be an association, perhaps only coincidental, between this cactus and *Euphorbia misera*, as they are commonly found growing together but rarely one without the other. The second species, *Mammillaria tetrancistra*, is infrequently met with on desert slopes below 1200m elevation. Unlike *Mammillaria dioica*, it does not seem at all amendable to cultivation unless grafted, a procedure made worthwhile by virtue of the large pink flowers produced in spring.

Ferocactus (Barrel Cactus) is well-known to many nature enthusiasts, with *Ferocactus viridescens* on the coast and *Ferocactus acanthodes* in the desert. While both species were once common, *Ferocactus viridescens* has been greatly reduced in numbers by urban sprawl, though it is not difficult to encounter colonies on south-facing slopes in coastal sage scrub habitat with a little searching. Uncommonly met with in collections, *Ferocactus viridescens* is an attractive species of small size, up to about 25cm diameter and usually not much taller; it commonly flowers at much smaller dimensions. The body is bright green and bears short, stiff, straw-colored to markedly reddish spines, in the manner of other Ferocacti. Unfortunately, this barrel cactus is the subject of the local cactus candy industry in Tijuana, and such impacts to Mexican populations may be as great as urban development has been to the U.S. compliment of the species. It is not known, however, if the whole plant is taken, roots and all, or whether only the "head" is cut off-- as is done in peyote harvesting-- which allows the plant to regenerate itself later. *Ferocactus acanthodes* attains considerably greater dimensions, even to overhead heights and diameters which defy human encompass. The spination is often conspicuously orange-red, and in both species flowers are yellowish or greenish.

Although the ideal season for viewing these non-traditional wildflowers is essentially finished, San Diego area cacti can be observed at any time of year. The more diminutive species of succulents are worth seeking out after good rains, and some of these will no doubt present a challenge for readers who are botanically inclined, *Dudleya*, *Lycium* and *Crassula* in particular. Happy hunting!!

*The author is currently undergoing radical career therapy to correct this condition.

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, Fish and Wildlife Service
Washington, D. C. 20240

TUCSON

JUNE 18-24, 1995

CONVENTION NEWS

Planning for the 26th Biennial CSSA Convention in Tucson is well underway. Both the national and local convention committees are working hard to see that Tucson '95 will be the best convention ever. The registration forms are being prepared now and will be included in the September - October issue of the Journal.

The slate of speakers is an impressive one, including speakers from Africa, South America, Madagascar, Europe and, of course, the US. The theme of the convention is the ethnobotany of succulents, so many of our speakers will talk on the uses native peoples from around the world have made of the plants that we enjoy so much as a hobby.

During the convention there will be Wednesday field trips to the Desert Botanical Garden in Phoenix, the Boyce-Thompson Arboretum in Superior, the Arizona-Sonora Desert Museum in Tucson, and several of the well-known local cactus and succulent nurseries, including Bach's, Plants for the Southwest, and Arid Lands. There may be several early morning field trips to a Tohono O'odham saguaro fruit harvest camp. Participants should be able to watch, and assist in, the centuries old harvest that has been so important in O'odham culture. There will also be a great selection of O'odham crafts, baskets, and souvenirs available for purchase.

We have both pre- and post-convention trips planned. The pre-convention trip will be a 7 day trip to S.E. Arizona to explore the "sky islands", the mountains of that area that rise up out of the desert. The participants will stay in Cave Creek in the Chiricahua Mountains and make day trips to the surrounding area. The 7 day post-convention trip will explore the Barranca del Cobre in the Sinaloa/Sonora/Chihuahua area of western Mexico. The Barranca del Cobre is frequently referred to as the Grand Canyon of Mexico, and is actually larger than the Grand Canyon. The Barranca is located in an area where tropical and temperate flora and fauna meet, giving rise to a unique biota. The Barranca is also home to the Tarahumara Indians, the famous runners of the Sierra Madre. Participants will have ample time to explore the Barranca and its indigenous flora and fauna and will have the opportunity to meet Tarahumara on their home territory. The experience promises to be a memorable one. The pre and post convention trips arrangements are being handled by Borderland Tours. Please call (800)525-7753 for more information.

The desert surrounding Tucson is some of the most picturesque landscape in the world: spectacular mountains, unlimited vistas, huge saguaros, and chamber-of-commerce sunsets. If you miss this convention, you'll be kicking yourself for years to come!

Looking forward to hosting you in Tucson!

For more information; mail, fax, or e-mail inquiries to:

TUCSON CACTUS & SUCCULENT SOCIETY
1995 CSSA CONVENTION HEADQUARTERS
3560 West Bilby Road
Tucson, Az 85746
Telephone: (602) 883-9404
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BOX SCORE LISTINGS AND RECOVERY PLANS

Category	ENDANGERED		THREATENED		LISTED SPECIES TOTAL	SPECIES WITH PLANS
	U.S.	Foreign Only	U.S.	Foreign Only		
Mammals	56	251	9	22	338	37
Birds	73	153	17	0	243	73
Reptiles	16	63	19	14	112	30
Amphibians	6	8	5	0	19	9
Fishes	63	11	38	0	112	63
Snails	14	1	7	0	22	27
Clams	50	2	6	0	58	40
Crustaceans	11	0	2	0	13	4
Insects	19	4	9	0	32	16
Arachnids	4	0	0	0	4	0
Plants	388	1	83	2	474	184
TOTAL	700	494	195	38	1,427	483

Total U.S. Endangered 700 (312 animals, 388 plants)
Total U.S. Threatened 195 (112 animals, 83 plants)
Total U.S. Listed 895 (424 animals, 471 plants)

* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, chimpanzee, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

** There are 386 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of CITES Party Nations:

122

July 1 1994



San Diego Horticultural Society September 12, 1994

7:00-9:00 PM

Meeting Place: Quail Botanical Gardens,
Ecke Building

Come join us at the first meeting of The San Diego Horticultural Society. This is an organization for all interested gardeners, landscape professionals, and homeowners. We will meet in the Ecke Building at the Quail Botanical Gardens on the second Monday of each month. Meetings will include a speaker, plant forum, plant sale, and a plant raffle.

September 12*.....New plants for San Diego gardens-Steve Brigham, Horticulturist at Buena Creek Gardens.

October 10*.....Native plants and gardens of southeast Australia -Kathy Musial, Curator of Living Collections at the Huntington Botanical Garden.

November 14*.....Landscape designs for southern California gardens -Chris Rosmund, Landscape Designer whose work appears in two new books, "The Secret Garden" by Rosemary Verrey and "Creating the Ideal Garden" by David Stevens. Her designs have also appeared in the LA Times and on "Victory Garden".

Membership dues will be \$25.00 annually. Each month members will receive a meeting notice of that month's speaker and a write-up of the plants discussed at the previous meeting. Meetings will be open to the public.

CACTUS AND SUCCULENT SOCIETY OF AMERICA

an international organization dedicated to education, protection and preservation of some of nature's most unique creations.

JOIN NOW! Your membership will include:

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- the opportunity to obtain rare seeds at nominal cost.
- meeting many other cactophiles, who share their enthusiasm and interest, at meetings, conventions, conferences, and shows.

To join the Cactus and Succulent Society of America, fill in the required information below and send it with your check or money order payable to CSSA. The CSSA will accept personal or travelers checks in foreign currency for the following countries: Australia, Belgium, Canada, Denmark, England, France, Germany, Italy, Netherland, Norway, Switzerland, Sweden, Ireland, Hong Kong, Japan, and New Zealand. All other countries must be in US Funds. Visa or Mastercard also accepted. 5% handling charge added to VISA/Mastercard orders.

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 CSSA Membership U.S. \$30.00
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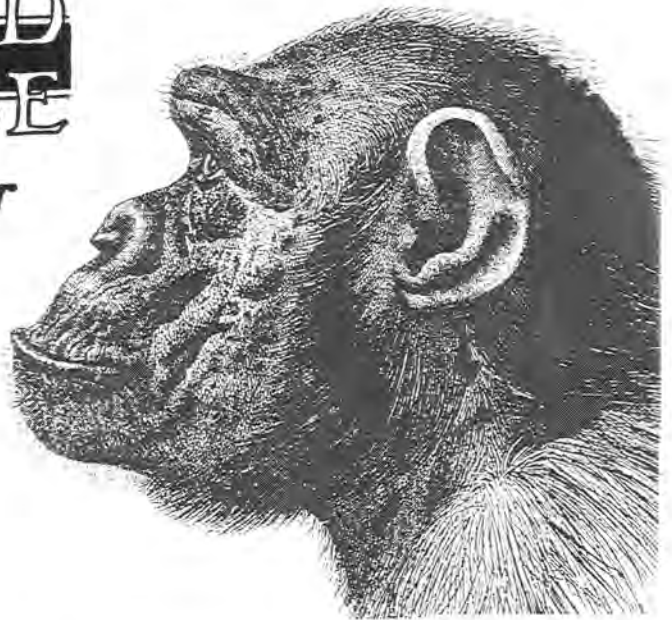
Please use for new membership only!

WISE AND OTHERWISE

by Michael Buckner

"Drink your tea slowly and reverently, as if this activity is the axis on which the whole earth revolves. Live the moment. Only this actual moment is life."

– Thich Nhat Hanh



"Oh, my God," she says. "Oh, look at them all. This is great!"

Urine and feces rain down on us. We look up and we cannot look away. Bats storm across the top of the vault, a torrent of wings and squeaks. They streak to the canyon center and swirl and then funnel off. This is the major flight. The free-tails give a faint echo of the thunder of twenty years ago when perhaps 100 million tiny mammals squealed from the room in the rock wall and took to the night sky, an army of hearts, lungs, and fangs ranging out twenty, thirty, forty miles, beasts ripping the soft abdomens from moths, feasting in the dark hours.

A crescent moon hangs and the bats become fine lines etching the glowing face. In four minutes it is over. A flight that once took hours is now 240 seconds. The cave falls silent.

They are gone.

When Cockrum* finished his banding, 88,176 bats had been tagged. From this he plotted the colony's migration route from Arizona to Sonora and Sinoloa in Mexico. This helped him understand the dying.

When the bodies were examined back in the laboratory, the scientists found dieldrin, toxaphene, and DDT. The colony kept shrinking and Cockrum began to understand why. He had already noticed that bats had deserted Tucson. Once they had roosted in the old buildings of the university campus and were a common sight under the street lights. Then with the massive use of household pesticides they vanished.

He began tracking DDT sales in Arizona. Five hundred and forty thousand pounds were sold in 1965, and by 1966 the quantity had reached 1.07 million pounds. In 1967, 2.52 million pounds were poured onto the land. The agricultural district of the Gila Valley lies within easy reach of the bat cave and they fed heavily there.

That might be part of the answer.

When the United States ended the use of DDT in the late sixties, the colony did not repopulate. Below the border, the use of DDT continued, as it does to this day.

The bats acted as sensors for a world man created but ignored. They roamed the global skin where the insects fly and swallowed the parts per million and per billion that human beings measured and monitored. These chemicals were concentrated in the mother's milk and the young suckled lustily.

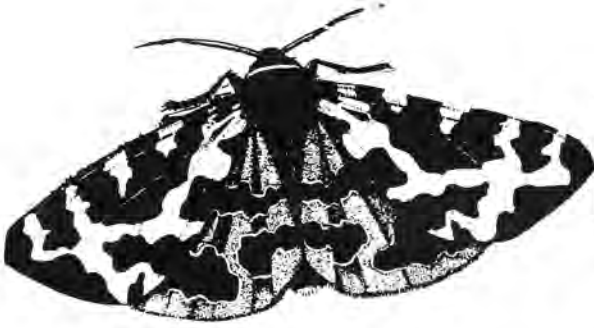
Cockrum thinks the tradeoff was reasonable. He likes bats and hates the idea of man causing the extinction of any creature. But, he hastens to add, he has worked in the Third World.

He puts it this way: would you rather die of a tropical disease in your twenties or perish in your sixties because of toxic chemicals? But of course, no one polls the bats on their views.

They simply die, humans live, the crops grow. It is part of this time in this century."

* E. Lendell Cockrum: University of Arizona professor in the Department of Ecology and Evolutionary Biology.

--Charles Bowden, *BLUE DESERT*, University of Arizona Press, 1986.



WISE AND OTHERWISE

"Familiarity with basic ecology will permanently change your world view. You will never again regard plants, microorganisms, and animals (including people) as isolated entities. Instead you will see them--more accurately--as parts of a vast complex of natural machinery--as, in the dictionary definition, "related elements in a system that operates in a definable manner."

—Paul Ehrlich, ecologist, *THE MACHINERY OF NATURE* (N.Y.: Simon & Schuster, 1986), pg.13.

"Many animal adaptations for desert existence resemble those of desert plants. Common strategies include water storage, heat avoidance, dormancy, drought-tolerance, boundary layers, body orientation, and waterproof integument.

Storage of water is a cactuslike adaptation. Coupled with low metabolic rate during long periods of torpor, this is enough to get some animals through long periods of drought.

The Desert Tortoise, *Xerobates* (= *Gopherus*) *agassizii*, can store about a quart (liter) of water in its body, mostly in its urinary bladder. The scientific name *Gopherus* alludes to its digging ability. The tortoise emerges from its burrow in spring to feed on moisture-rich leaves and flowers, particularly those of ephemeral plants. During this time it accumulates reserves of water and fat that will carry it through a long period of dormancy including summer, fall, and winter.

The Desert Tortoise is on the state list of threatened species. The gentle nature of these animals has made them desirable as pets. Some people use them for target practice. An increase in the number of Common Ravens, probably in association with open dumps, has also threatened tortoises because ravens prey on hatchlings, which still have soft shells. One researcher counted the shells of 250 young tortoises around the nest of a single pair of Common Ravens. In addition, tortoises must compete with cattle, sheep, and donkeys for food. In the face of such competition, malnutrition has cut their reproductive rate, and they are becoming rare. Some studies indicated that Desert Tortoise populations have dropped about 90% in the last 50 years. In the western Mojave Desert their numbers declined 50% between 1980 and 1989.

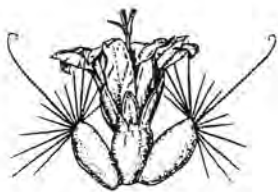
Within its native range in the Mojave and Colorado deserts, certain areas have been set aside as refuges for the Desert Tortoise. It is a crime to collect one or to engage in any activity destructive of its native habitat. It is hoped that such protective measures will enable the population to rebound. Captive breeding and release of juveniles may not be a good idea for tortoises, depending on where the animals were raised. It is not always a good idea to release animals into the desert once they have lived for some time in a moister climate. It has been determined that contagious infections -- in particular, a lung fungus -- may be introduced this way to the wild population."

—Allan A. Schoenherr, *A NATURAL HISTORY OF CALIFORNIA*, Strategies of Desert Animals, UC Press, 1992.

"One of the penalties of an ecological education is that one lives alone in a world of words. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be a doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise.

—Aldo Leopold, ecologist, *A SAND COUNTY ALMANAC* (N.Y.: Oxford Univ Press, 1949), pg.183.

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The San Diego Cactus and Succulent Society

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