

sonorensis

Arizona-Sonora Desert Museum Newsletter • Vol. 7, No. 1 • Fall 1985



Feature Article

BACKSTAGE

A behind-the-scenes look at who
and what makes the Desert Museum tick.

DIRECTOR'S REPORT

We received wonderful, enthusiastic comments from many of you on our last issue of *sonorensis* about the ASDM docent program. Thanks to all of you who told us you enjoyed it. Certainly without our docents it would be difficult to implement our educational programs to the extent we do. Without our employees, however, it would be impossible to operate at all. That is a fact of life, of course, but often those who are not here every day don't think about what it takes to keep the museum running smoothly ten to twelve hours a day—depending upon the season—every day of the year. That is what the main article in this issue is about.

There are 87 full-time and part-time employees at the Desert Museum. You won't see most of them when you visit. They work behind the scenes in all of our departments doing everything from animal food preparation to computer programming. In order to maintain its position among the world's finest natural history institutions the ASDM must be managed as a business. With an operating budget approaching \$2.9 million a year, it is a labor intensive business which depends upon quality, dedicated people to make it work. I'm very proud of every Desert Museum employee. Often we neglect to thank these loyal, hard-working people enough. You're going to meet many of them when you read this issue. Unfortunately, we can't include them all, but I want to express my gratitude to every one of them publicly for their excellent work, and their loyalty to and pride in the Desert Museum.

We had a busy summer with classes for children, new interpretive activities on the grounds, making preparations for the opening of the Mountain Habitats in late December this year or early January, 1986, remodeling the gift shop, and planning for one of the most exciting years in the museum's history. Please read the article in this issue about a new incentive to attract more members to the ASDM. You can benefit not only by earning additional guest passes for yourself, but also by attending a full-day free Desert Ecology Workshop if you bring one or more new members.

By the next issue of *sonorensis*, the Mountain Habitats will be open. These one-of-a-kind animal enclosures will make a twenty-year dream a reality. I hope you'll plan to bring your family and friends to the museum to tell them with great pride that the habitats exist because of your support.

Dan Davis
Director

sonorensis Museum News

COLT BENEFITS MUSEUM

Our special thanks also to Marinel Poppie, D.V.M., owner and manager of Alpine Arabian Stud in Tucson, who has graciously offered to donate the proceeds from the sale of the Arabian colt, "The Karatie Kid," to the ASDM to benefit the Mountain Habitats Project. The colt, sired by champion Arabian "Hai Karatie," will be auctioned publicly at Alpine Arabian Stud at 11650 East Speedway on Sunday, October 6 at 1:00 p.m. At this writing the sale had not taken place. If you are reading this before October 6 you still have time to bid for the colt to benefit the museum.

EXCITEMENT OCCURS BEHIND THE SCENES

Most of the leading periodicals, especially institutional ones, have gathered about themselves a group of writers. These people are usually specialists in their fields of natural history. For example, the ASDM is fortunate to have on its staff a young man who is interested in fossil packrat middens that have existed in some caves for thousands of years. Then there is the gentleman who writes about reptiles and amphibians having spent a lifetime studying and sometimes nurturing these creatures. Unlike some other authors at the museum, however, he was once almost collected as a specimen himself. He and a companion were sleeping in a pick-up truck after a long day searching for specimens in Mexico. On this expedition they were held up at gunpoint, all of their possessions stolen and threatened to the extent that the Curator said, "I felt as though I was standing on the brink of a canyon waiting to be pushed over."

Indeed all of our natural history curators have led exciting lives in wilderness areas seeking information on the lives of some scarce or possibly common animals, some of which become museum specimens. In fact, the Desert Museum has produced and is producing some very fine young writers and this journal is proof of the pudding.

William H. Carr
Co-Founder/Director Emeritus

FOUNDATION, LOCAL COMPANY CONTRIBUTE TO MOUNTAIN HABITATS

The Museum has received a grant in the amount of \$25,000 for the Mountain Habitats Project from the Burlington Northern Foundation representing El Paso Natural Gas Company. In addition, employees of Tucson's Johnson Controls voted to contribute \$1,000 to the Mountain Habitats Project as part of the company's 100th anniversary in business. We express our appreciation to the Burlington Northern Foundation, El Paso Natural Gas Company, and Johnson Controls for their generosity and support.

ASDM/SMITHSONIAN SEMINAR SCHEDULED FOR MARCH

In March, 1986 the Smithsonian National Associates Lecture and Seminar Program will be coming to Tucson. The Arizona-Sonora Desert Museum is proud to be co-sponsoring a special seminar on animal communication with the Smithsonian on Friday, March 21st. A series of 14 seminars will be conducted on a variety of subjects at various museums throughout Tucson. The events will be filled by reservation only with variable ticket prices. The program at the ASDM will be \$35.00 per person.

Dr. Michael Robinson will be featured at the Desert Museum's program on, "Animal Communication: Classic Studies and New Discoveries." Dr. Robinson is a well known animal behavior expert. One of his specialties is the chuckwalla, an important research animal at the ASDM. The seminar will be conducted from 10:00 a.m. to 4:00 p.m. on March 21st at the Desert Museum. The program will include visits to some of the enclosures on the museum grounds to observe how animals communicate.

Additional information on this special program will be available after January. Interested ASDM members should contact Interpretive Naturalist Rich Dulaney at 883-1380, extension 275 for more information and reservations.

1986 ASDM TRIPS TO INDIA/NEPAL AND GALAPAGOS ISLANDS FILLING

Response to the announcements of ASDM trips next year to the Galapagos Islands and to India/Nepal has been excellent. Both trips are filling up.

The 15-day Galapagos Islands Experience is scheduled for Wednesday, May 14, 1986 through Wednesday, May 28, 1986. The trip to the Nepalese and Indian Deserts and to mysterious Ladakh will be from September 8, 1986 to September 29, 1986. Some vacancies are available for both, but if you're interested you should act immediately to be assured of a reservation. Call Jean Morgan at 883-1380, extension 217 for itineraries and reservation forms. In addition to providing a once-in-a-lifetime experience, part of the cost for each participant includes a tax-deductible contribution to benefit the Mountain Habitats project.

ON THE COVER

Our new bear cubs, one of which is pictured on our cover, have been putting on a wonderful show for visitors in their temporary enclosure until the Mountain Habitats are ready for them. The orphaned cubs, a male and female, were acquired from the Montana Parks, Fish and Wildlife Department. The eleven-month-old bears are not siblings. Weighing about 15 to 20 pounds when we got them, the bears will eventually reach 250-300 pounds or more at maturity. Photo by Dave Beal.

UP-COMING DAILY AND SPECIAL INTERPRETIVE PROGRAMS FOR THE FALL

One of the most visible staff members on the grounds is Interpretive Naturalist Rich Dulaney; however, much of his time behind the scenes is devoted to the creation and coordination of interpretive programs with the curatorial staff and docents. The results of this team effort are seen every day in the joyful faces of visitors who experience the unique personal interpretation which makes the Desert Museum so special. Following is the regular interpretive program schedule for Fall, 1985:

Guided Tours—10:00 a.m., 11:00 a.m. and 1:00 p.m. Meet at the entrance patio.

Live Animal Demonstrations—9:30 a.m.,

10:30 a.m. and 1:30 p.m. Using various desert animals such as reptiles, invertebrates and small mammals and birds, these talks explore how animals survive in the Sonoran Desert.

Live Great Horned Owl Demonstration—

Daily at 10:30 a.m. The demonstration shows how owls capture prey and survive in the desert. Talk meets at beaver/otter area in middle of grounds.

The above programs are free for members and visitors.

Special Interpretive Programs

Interpretive Naturalist Rich Dulaney will be conducting the following interpretive events during October, November and December. Please let us know by post card or phone call to Rich Dulaney, 883-1380 extension 275, if you will be planning to attend any of these programs. The programs are free to members and visitors.

"Halloween Animals"—Thursday, October 31, 1985, 3:30 p.m.-4:30 p.m. Owls, bats, spiders and many other animals associated with night prowling at Halloween will be featured for this traditional program. Live animals will be displayed and myths and legends will be discussed. Meet at Ocotillo Ramada.

"Understanding Birds"—Mondays, November 4, 11, 18, 25 at 3:00 p.m. Using live birds on exhibit and by using "conditioned" birds perched on hands, we will explore the fascinating world of birds. Bird flight, diets and how the museum cares for birds will be discussed. Meet at the walk-in aviary.

"The Last Day of the Year Tour"—December 31, 1985, 9:00 a.m. to 12 noon. Sign up early for this popular event. The tour of the museum grounds will highlight the big changes during 1985. A detailed look at the new Mountain Habitats project and some of the animals going on exhibit will be featured. Come and explore the Plant Department greenhouse and learn about the "perfect desert tree." Group size is limited to 25.

PRESIDENT REPORT

The business of the Arizona-Sonora Desert Museum is natural history education; however, the business of the ASDM is also business, and one which is managed extremely well by a team of talented and dedicated people.

My five-year association with the ASDM, as an elected Trustee, member of the ASDM Foundation and Advisory Council member has been primarily involved with the business end of the institution. As a businessman this is where I feel most

comfortable, and therefore I want to share with you some observations about the management of the Desert Museum.

Last Labor Day the Desert Museum celebrated its 33rd birthday. In this short time the institution has grown from an intimate group of motivated experts and interested supporters who began with practically no reasonable funding to cover the cost of operations. It is now the strongest natural history museum in Arizona with the largest membership and the biggest budget. The cost of operations for the coming fiscal year is \$2.8 million. In my first year with the Desert Museum the operating budget was \$1.9 million. Cost containment is stringently practiced at the Desert Museum and this simply reflects the increased cost of doing business. Each year during this period the budget has been so well projected that the actual operating expense has varied only slightly from the budget estimate. This speaks well of management since only the expense side of the budget is truly controllable. The income side of the budget must be based upon our best estimated projections of what our visitation will be a year in advance. You members are responsible for making the task of income projection far easier, because our membership base and your generosity with Annual Giving has given us the confidence to count on your continued support.

During my term as President of your Board of Trustees the priority will continue to be absolute support of excellent management of the museum based upon fiscal responsibility. In that regard, your Board of Trustees just approved an administrative realignment designed to make the Education Department and the Visitor Services and Museum Security functions, and Special Events and Group Scheduling more efficient and cost effective. It is this sort of continual monitoring of the museum's operation which allows it to stay within budget and increase services. This issue of *sonorensis* emphasizes the talents of many employees you never see. They are a credit to the Desert Museum and to the management team who had the wisdom and foresight to hire them.

As you know, we can look forward to the opening of the Mountain Habitats soon. This project will add to the museum's international reputation as a leading institution in natural history interpretation. It will also be a tribute to you and others among the ASDM's 16,000 members. Without you there would be no Mountain Habitats project. Thank you.

David D. Cohn
President, Board of Trustees



Without the large filtration plant for the Beaver-Otter-Sheep enclosure, these exhibits would not operate. Maintenance Department staffer Luis Cota cleans filters which use diatomaceous earth to keep the constantly recirculating water in the enclosures clean for the animals.

BACKSTAGE

A behind-the-scenes look at the Desert Museum

The underpinings of any institution or business are fascinating. For example, the creation of this magazine is the result of the work of hundreds of people who had to produce the paper, ink, film for photographs, color separations, typesetting, printing, labels for mailing, graphic design, writing and editing copy and on and on. We infrequently think about the complex networks involved in supplying us with the services we desire. It is only when something goes wrong that we discover some of those complexities, or when those offering the service want to share the intricacies of their operation. So it is with this issue of our newsletter.

Director Dan Davis asked department heads to submit ideas and copy to us so we could give you some sense of what goes on behind the scenes at the Desert Museum. This is by no means a definitive piece. There are numerous important functions at the museum which are not covered here, but space limitations would not permit their inclusion. The museum could not run as well as it does without every single employee it has and each needs to be commended for his/her contribution.

After reading this issue we think you'll have an even better appreciation of your museum. The Editor.

MAINTENANCE DEPARTMENT

They Make It Sparkle Plenty

In a visitor survey at the ASDM some years ago, respondents were asked to comment on their general impressions of the museum. The most frequent comment had to do with the cleanliness of the grounds. Keeping the grounds litter free is a function of the Maintenance Department, one of the most important departments at the museum and one of the most talented.

Maintaining a facility as complex as the ASDM is no ordinary job. Maintenance personnel must be keenly aware of extremely sensitive animal areas. Work must be scheduled carefully and coordinated with the departments responsible for animal care. Nesting birds, breeding cycles and newly born animals take precedence over all but

extreme emergencies. Because of the priority placed upon animal care the maintenance staff is on call 24 hours a day in case there is even a chance one of the animals in the museum's care could be in danger. Over the years Maintenance Manager Dan Allen has spent more nights than he'd like to remember during emergencies such as power outages, flooding and equipment breakdowns.

Every major exhibit at the museum is checked every day to be sure all systems are working properly. One of the most fascinating facilities at the museum is the huge underground water filtration building where all of the equipment for the Beaver-Otter-Sheep exhibits is housed. Most visitors don't realize the building exists but without it these exhibits would be inoperable. It requires constant checking and servicing. In addition to this daily routine the Maintenance staff is responsible for upkeep of museum vehicles and any special projects assigned by the Director. Recent projects of this sort include help with remodeling of the gift shop and construction of a new large storage for the Administration and Business Offices.

Maintaining the variety of structures at the museum from adobe buildings constructed in the 1930s to newer concrete and masonry buildings and artificial rock work structures

provides a challenge to the Maintenance staff gladly accepted and ably met. These "invisible" people are a major reason for the museum's success.



There is more to keeping our paths in top shape than meets the eye. Maintenance Department staffers Mel Norris and Ernest Lopez.



EARTH SCIENCES CENTER

A Talented Troglodyte

What has 10,000 specimens, hundreds of varieties, is stored in a cave, and the average Desert Museum visitor sees only about 100 on a typical tour? Our world-renowned collection of minerals of the Sonoran Desert, valued at over one million dollars, and irreplaceable at any cost. Also of great value and irreplaceable is our Conservator of Collections, Mr. Robert G. Middleton, who has worked with some of the world's finest mineral collections at such institutions as the American Museum of Natural History, the National Museum of Canada, and the Academy of Natural Sciences of Philadelphia.

Why is a full-time specialist needed to care for our own Desert Museum collection, and what is the function of a Conservator? The questions are linked together, because the management of an important collection is as multifaceted as the gems it contains. Like the

10,000 specimens stored meticulously in his vault, Bob Middleton is rarely seen by the public. Most of his day is spent caring for the minerals, but he also takes time to converse with the Curator of Earth Sciences and with other curators, mineral dealers, and collectors world-wide concerning matters of curation, exhibition, acquisition, deaccession, and research.

The Desert Museum collection has just become accessible to interested scientists and mineral enthusiasts everywhere. With the completion in August of the Computer Mineral Inventory, our entire collection can be accessed and listed in myriads of useful ways. Curators of museums as far away as Yale University have asked us for information not only on our collection but on our method of computer inventory. The inventory took two years to complete, and it is the most accurate one we know of.

One afternoon, Middleton appeared concerned and distracted and upon questioning him, we were told that several mineral specimens had been listed as "Germany." For accuracy of inventory, he had to determine whether they were from the Federal Republic of Germany or the German Democratic Republic. Do you know which of these we call East Germany and which is West

Germany? Such were the details to be overcome in creating and finalizing the inventory.

More commonplace responsibilities of the Conservator include physical care of the specimens, whose properties range from brittle and delicate to ductile and manageable. Some are soluble in the cleaning solution, others are ruined by fresh air and sunlight. With painstaking care, Middleton routinely carries from display to ultrasonic cleaner and back gorgeous museum pieces as fragile as potato chips and more valuable than his automobile.

Bob Middleton has often joked that he is the world's most experienced mineral mover. And it appears that his restless spirit that takes him each summer to the Australian outback has somehow affected his sparkling wares. Specimens of all colors, sizes, and values dance a constant, confusing round between display and vault, lab and public tour. When a Zen master was asked how he kept his cow in this world of 10,000 distractions, he said, "I allow her not one inch of straying from the path." Such is Bob Middleton's care of his charges, and perhaps ultimately the most important and time-consuming part of his job is making sure at all times that his 10,000 distractions do not stray from their paths and become 9,999.

BUSINESS OFFICE

Helpful On All Accounts

Business Office personnel handle much more than money. PBX Operator Mary Powell (top right) sits at the nerve center of the ASDM during regular business hours. In addition to receiving all incoming telephone calls, first aid and other emergencies are coordinated at the main switchboard. Plant Department Landscape Supervisor Vicki Phelps (left) is a member of the eight-person volunteer First Aid Team which responds to injuries as minor as the removal of cholla cactus joints to incidents as serious as heart attacks. The first person most visitors see at the museum is in the ticket window. Clerical Bookkeeper Samantha Stuckey (bottom right) and other Business Office staffers relieve Ticket Office personnel when necessary. The contribution to the museum's public relations is enhanced tremendously by our Ticket Window personnel who occasionally need to handle sensitive matters.



PLANT DEPARTMENT

Try And Be Natural

Much of the Plant Department's work is like housework: it isn't noticed unless it isn't done. Most of the museum's 15 acres open to the public appear natural; it takes great effort to keep up that appearance. It is a truism that wherever humans go, nature recedes. The museum's developed exhibits and its 470,000 annual visitors greatly influence the natural balance. Paths alter drainage patterns, drowning some plants, starving others. Because no plants grow in the paths, the rain that falls on them is available to the plants along the margins. This would soon result in a dense, tall hedgerow of desert broom and other shrubs, a most unnatural situation. Pathside pruning and weeding are thus major chores.

On the other hand growth is retarded by

the numerous visitors who step off the paths, crushing plants and compacting soil so that water and air can't penetrate. Many hours are spent repairing such damage.

The Desert Museum is a dynamic place, and is continually rerouting paths and building new exhibits. The disturbed areas which result from these activities are carefully replanted so that visitors can't tell that the areas were ever anything but natural desert. This entails not only planting cacti and palo verde trees, but more important, lots of small cover plants such as bursage and brittlebush.

The public rarely sees the museum's horticulturist; his work is off exhibit. Of the nearly 400 species of plants on the museum grounds, very few can be purchased from nurseries and must be grown at ASDM. At any given time the propagation area holds about 8,000 plants designated for several uses. At the present time most of the space is occupied by plants designated for the Mountain Habitats. There is also a scientific collection of cacti which are too delicate or rare to plant on the museum grounds. Several species are being evaluated for possible introduction as new landscape plants. Some

special plants, such as rock figs and rare agaves, are grown specifically for plant sales.

Since few of these plants have been cultivated before, considerable research is conducted to learn how. We experiment with seed treatments, soil mixes, watering and fertilizing regimes, and test for tolerance to sun, shade, heat, frost, and pests.

Since most of the Sonoran Desert's plant species aren't grown in nurseries, we have to collect them before we can propagate them. This involves excursions ranging from a day in the Huachuca Mountains to two weeks in Baja California. A trip may have a definite goal, such as to collect manzanitas in the Catalina Mountains for the Mountain Habitats (with a permit, of course!), or a vague one, such as to explore southern Sonora for plants which may be suitable for our future Tropical Riparian Habitat. A lot of work goes into these trips, from planning the itinerary, obtaining permits, and gathering the collecting gear to the meticulous recording of collection localities and conditions, caring for the plants until they reach the museum, and establishing them in the propagation area.

We can't run down to Mexico whenever we need some seeds to grow, we must store the fruits (literally) of our infrequent collecting trips. The Plant Department's seed bank contains about 600 species in long-term storage. Some of these, particularly agaves and boojums, remain viable for only a couple of years at room temperature, so they are kept in a freezer. Portions are removed for sowing as needs arise, or are distributed to sister institutions on request.

Only the products of research generally reach the public's awareness, and few people realize how much work lies behind those products. Most of the Plant Department's research focuses on developing and testing new plants for desert landscapes. Some of the museum's introductions are Baja fairy duster, red-flowered queen's wreath, several small to medium sized species of agave, and a purple-flowered Palmer penstemon hybrid.

The most promising achievement to date is the "Desert Museum Hybrid" palo verde. By the time this tree is first released in 1987, eight years of research will have gone into it. Curator Mark Dimmitt collected seeds from a natural first-generation hybrid in 1979. Of the second-generation progeny one was quite different from the others, and was planted in his backyard. By 1983 the tree, growing on poor caliche soil, was over twelve feet tall and wide, and clearly had inherited the best qualities from its ancestors: fast growth, small, non-messy leaves, upright growth habit, huge flowers, apparent pest resistance, and bonus quality no ancestor possessed—thornlessness. At this point serious research began. Chemical analysis revealed its precise



DOONNA ALLEN

EDUCATION DEPARTMENT

Touring The Stars

Paramount Studios' popular television situation comedy, "Webster," filmed its premiere episode for the new season at Tucson's Tanque Verde Guest Ranch in July. Series stars Alex Karras and Susan Clark visited the ASDM while they were in the Old Pueblo, and Emmanuel ("Webster") Lewis was given a special tour of the museum by Interpretive Naturalist Rich Dulaney.

ancestry. Careful measurements were taken for comparison with the three palo verde species commonly grown in Arizona. And most important, a method of cloning had to be developed, so that the tree could be multiplied and made available to the public. (Seeds from hybrids don't produce faithful replicas of their parents.) In 1985, a method of rooting cuttings was discovered, and small-scale production began. These first trees will be released at the April 1987 plant sale. A method of mass propagation, such as tissue culture, is still being sought. Rigorous testing under different climates, soils, and cultural methods has only begun, and another decade will pass before the true potential of this new tree is fully documented.

SMALL ANIMALS

Smaller Is Not Simpler

The fundamental responsibilities of the Small Animal Department at ASDM are to provide quality care for the animal collection and to present exhibits which are attractive, naturalistic and educational. These goals require coordinated effort by a staff of qualified personnel trained in a variety of functions and duties. Professional animal keepers are the backbone of any quality program of this nature. Tremendous responsibilities rest with the keepers on a day to day basis with regard to welfare of their animal charges and the presentation of the many varied and often complex environmental exhibits in which the animals are featured. Because of the broad taxonomic diversity covered by the Small Animal Department, i.e., reptiles, amphibians, fishes and invertebrates (mostly arthropods), a certain degree of specialization among the staff is highly beneficial. However, in order to meet scheduling requirements, it is necessary for each staff member to demonstrate sufficient versatility to cover back-up animal care needs in the absence of other keepers.

The keepers' typical workday consists first of examining each area they will be responsible for and identifying urgent priorities which require immediate attention. Any problem which directly threatens the welfare of an animal is dealt with first. Otherwise, appraisal of each exhibit is the first priority to rectify aesthetic or functional problems which need attention. The objective is to have each exhibit at its best so that each will reflect a positive

impression on the visitor. Typically, the keeper cleans the inside of the exhibit glass, examines the interior decor for disarray and rearranges artifacts, cleans the interior backdrop, and removes fecal matter. Water receptacles and other necessary hardware are hidden from public view whenever possible to maximize the desired effect of looking through a window into a natural microhabitat. Not only are aesthetic and decorative aspects of the animal's habitats presented, but efforts are also made to provide as normal environmental parameters as possible. Factors such as appropriate temperature options (usually in the form of thermal gradients which allow ectothermic animals to select for their preferred body temperatures at any given time), proper lighting intensity and ultraviolet quality, and humidity are fundamental to successful



DAVE BEAL



DAVE BEAL

Top. Thousands of minerals are stored in our mineral sales area and prepared for sale by Conservator Bob Middleton.

Middle. For months the Plant Department staff has been collecting full grown trees and holding them in preparation for planting in the Mountain Habitats. Maintenance Department Supervisor Dan Allen is dwarfed by the hole necessary to properly plant this specimen in the bear enclosure. This is one of hundreds of trees and shrubs which will be part of the Mountain Habitats project.

Bottom. Small Animal Department Keeper Matt Finstrom measures a Gila monster, one of the many reptiles cared for off-exhibit which require daily attention.



DAVE BEAL

captive management of many lower vertebrates and invertebrates. These features also promote good physical and psychological health, reproduction, and normal behavior which greatly increases overall exhibit value. Exhibits in which the animal subjects are able to carry out normal life functions are far more interesting and effective for the visitors than those which simply show the specimen.

The curatorial staff provides guidance in arranging exhibit presentations, but it is the knowledge and creativity of the keepers, combined with pride in their work, that enables the exhibits to reach their potential.

Animal health is managed in two basic ways. First, efforts are made to optimize the environment, diet, social setting, infection control and sanitation so as to reduce the incidence of disease. Quarantine, infection control and sanitation are mandatory requirements in the control of pathological

problems in a diverse animal collection. Secondly, prompt recognition, diagnosis and corrective action of medical problems is essential to successful remedy. Here again, the keepers are the first line of defense against the development of serious health problems in the collection. When such problems are detected, they are immediately reported to the curator who coordinates corrective measures with the veterinarian. Because ASDM does not have a staff veterinarian, animal cases may be consulted by telephone, taken from the museum to the veterinary clinic, or in non-urgent cases, held for examination by the veterinarian during his routine visits. Once a therapeutic procedure is established, the curator coordinates administration of the treatment with the appropriate keepers. Normally, it is the keeper who administers the medication or otherwise facilitates the required procedure. SAD has made tremen-

dous progress in reducing avoidable mortality in the collection largely due to the dedicated efforts of the keepers and the veterinarian. These efforts have reduced the need to collect replacement specimens from the wild on a frequent basis, thus enhancing the institution's reputation in conservation. Reproduction in the collection is steadily increasing which enables self-sustaining collection maintenance in some cases. This general trend is essential to the future stability of the collection, particularly with protected species or those endemic to Mexico. Most of the successful breeding projects are the result of planning based on a knowledge of natural reproductive cycles and the environmental cues which influence or control them. The curatorial staff and the keepers collaborate in designing appropriate schedules for seasonal changes in temperature, humidity or light cycle as well as times to



CHRIS HELMS

GIFT SHOP

Savvy Souvenirs

ASDM Gift Shop concessionaire Jim Hills opened the redecorated gift shop last August. The merchandise is now more accessible, traffic flow is significantly improved, and, best of all, the Gift Shop will now reflect the educational philosophy of the museum. Reaction by visitors, staff and volunteers has been excellent. Please accept Hills' invitation to visit, browse and, of course, shop.



CHRIS HELMS

RESTAURANT

"Hamburger" Needs No Translation

Over 450,000 visitors a year eat and drink an enormous amount. Three full-time and eight part-time ASDM restaurant employees (Manager Gerry Ringelberg and Shirley Harmon, above, chat during a lull) meet the demand every day. During a typical winter month the restaurant serves over 5,000 hamburgers, 3,500 hot dogs, 1,800 orders of french fries, 11,000 cold drinks as well as salads, sandwiches, several Mexican food dishes and "specials" Monday through Friday.

During the course of the year restaurant employees come in contact with people from foreign countries who sometimes have difficulty ordering. Fortunately, among the staff we have those who speak Spanish, French and one who can sign for the hearing impaired. We don't call our restaurant "full service" for no reason.

introduce or separate sexual pairs to achieve the best results. Because of limited space and personnel time, many breeding projects are staggered so as to control productivity which might otherwise inundate the collection with large numbers of progeny at one time. In most cases, the goal is to achieve sufficient reproduction to provide future replacements

for the wild-caught stock when they are lost to normal attrition.

A cornerstone of professional animal management programs is the record system. Evaluation of both successes and failures depends to a large extent on our ability to review and appraise what has been done. The keepers maintain the fundamental records

on animals under their care.

Few outside observers can appreciate the challenging and often complex underpinnings of a living museum. The responsibilities inherent in the custody of wildlife in captivity and the requirements attendant to their exhibition and quality life support are extensive.

BIRDS AND MAMMALS

Ecosystems and "Zoo Chow"

The main function of the Birds and Mammals Department is the daily care of the museum's large animal exhibits and their inhabitants. These exhibits and their occupants are in a sense artificial ecosystems. In a real ecosystem energy flows from the sun through the plants, the herbivores, the carnivores, and

the decomposers. All are intricately woven in a web of energy passages and energy gains and losses. This complex web preserves the system. In the artificial ecosystem of a live museum exhibit the energy flow is quite simple. Energy flows through the food provided and through the hard work of the animal keepers.

At the Desert Museum food must be provided for 250 birds and 100 mammals on a daily basis. The animals eat 52 pounds of meat every day, 28 pounds of grain, 10 pounds of fruit, 20 pounds of vegetables, 25 pounds of hay, and one ounce of vitamins. Meat may take the form of a five-pound frozen block of "Zoo Cat Food" to live, wiggling mealworms or a pint of whole blood for our off-exhibit colony of vampire bats. Grains also run the gamut from safflower seed or piñon nuts to Arizona Feeds Horse Chow.

Each animal's diet is formulated on the

basis of what it would eat naturally and on what is available. For instance, the beaver receives a base of rat chow and monkey biscuits, a few pieces of sweet potato, apple, carrot and corn, and a few aspen branches. There is no such thing as "Beaver Chow." The wolves receive a base diet of dry dog chow plus a little "Zoo Cat Food." Also once a week the wolves get beef leg bones. The jaguars receive "Zoo Cat Chow," which is a blend of horse meat, beef by-products, vitamins and minerals. Once a week, on the day the animal keepers call "goodie day," many of the carnivores are offered a whole rabbit, rat, or chicken to naturally pluck, tear, and crunch. For each species there is a specific diet design and for each individual a specific amount.

The animal exhibits as artificial ecosystems are not large enough to provide their own food, nor large enough to handle the waste and wear of the animals within.



Most people would benefit from the diets designed by our Birds and Mammals staff for some 400 animals under their care. Acting Curator of Birds and Mammals Peter Siminski is stocking one of the refrigerators in his area with top grade produce for many of the animals.

According to the second law of energy, all systems tend toward disorder unless energy is added to maintain the order. The animal keepers are the energy necessary to maintain the order. They clean the exhibits and feed the animals. But this is not all they do. Through an understanding of their animal charge and careful observation the keepers are first to recognize health problems. Most wild animals are not prone to show any signs of weakness. If they did they would be the first to be eliminated by a predator. So to recognize a health problem is not easy.

An attractive enclosure, a bowl of water, and food daily are not enough to create a healthy environment for the exhibit animals. The animal keepers try to create an environment that is conducive to the expression of many of the animals' natural behaviors. This may mean providing the Harris' hawks with a proper nesting platform and sticks of the proper size and flexibility for the hawks to express their natural nesting behavior. For the beaver the keepers make a monthly trip to Mt. Lemmon to harvest a

Animal Keeper Kerry Hoffman is dressed like a character out of a low budget "Star Wars" movie. The shield, helmet and rake are necessary to protect keepers from injury if attacked by one of the eagles when the enclosure is being serviced.

couple of trembling aspens.

Safety is another concern. Daily the animal keepers come in contact with potentially dangerous situations. Proven safety rules must be rigidly followed, and a back-up plan is in place in order for the keepers to function safely when caring for the museum animals. Safety procedures as simple as shifting the jaguars to an adjacent pen for feeding and cleaning are a must. Failure to do this would result in an exchange of energy perhaps a little too intimate for the keepers. This simple procedure is followed with most of our dangerous animals. In some cases the keepers do routinely enter a pen with a potentially dangerous animal. Wolves are notoriously difficult to shift to another pen, so two keepers service their yard. One watches the wolves while one cleans the yard. Our golden eagles are very aggressive during the nesting season. The eagle keeper must don a flak jacket and helmet, and carry a shield to ward off the attacks of the protective eagles. Even a lowly beechny jay can be a nuisance if he tries to pound little holes in your head while you scrub out its water bowl. The keepers usually wear a pith helmet when servicing his pen.

Each day, even Christmas Day, the animal keepers are using their energy to maintain the order in each of the miniscule ecosystems which we call animal exhibits.



A CALENDAR OF *Special Events* FOR *Members*

FALL-WINTER 1985-86

This year marks a record for new Desert Museum memberships. For all you new members, and for you "tried and true" members of many years who may never have participated in our field program, we would like to extend an enthusiastic invitation to join us in one of these exciting educational events. There is something especially for you in this calendar.

Back by popular request is our "Avra Valley: Man and the Land" trip in which we trace earth history and man's interactions with his environment from the time of the Big Game Hunters through modern agriculturalists and cement makers. With the Central Arizona Project heading south and changing the landscape, this trip may provide some unrepeatable memories. A geological "Fossil Discovery Trip" will carry us into the Ages of Fish, of Dinosaurs, and of Mammals, putting our view of southern Arizona into a whole new perspective. Our "San Esteban Island Expedition" promises to make research breakthroughs in our awareness of the rare San Esteban Island chuckwalla, all made possible by participating museum members. Preview Meetings for each trip—free and open to the public—are well worth attending. Please note them on the calendar and bring a friend.

A brand new idea in short events for members combines our appreciation of nature with our enjoyment of hand-crafts in a "Wreathmaking Workshop" timed for Christmas season preparations. Our traditional Desert Harvest Bazaar should not be missed for good shopping and always great fun for the family.

These activities—and more—will bring us meaningfully in touch with the desert and our place with it. We look forward to sharing some of these special natural history experiences with you.

Coordinator Members' Special Events Program

OCTOBER

DISCOVERING SOUTHERN ARIZONA'S FOSSILS Friday-Sunday, October 25-27

Dinosaur bones. Snail shells. Ancient turtles. Mammoth bones eroding out of the arroyo walls! Geologic history in southeastern Arizona unfolds before our very eyes and is rich with vivid evidence of drastically different landscapes and lifeforms found here over the last 600 million years.

In this fabulous activity-packed three day expedition you will see rocks formed during every era of Earth's history. Designed for vigorous fossil and geology buffs aged 12 to 80, this tour will take us via vans to a variety of off-the-beaten-path outcrops and mountains where everyone will have an opportunity to discover and collect their own treasures and specimens. On our last geology expedition to the Mogollon Rim country there were a few rare finds which were so unique that they are now on display at the Museum's Earth Sciences Center!

Because we think the impact of rock hammers can be pretty significant, we will only collect at quarry sites where our effect will be minimal. In addition to our excellent geologist guide we will have a staff of experts to help us in identifying the many interesting insects, birds and plants which inhabit this extended arm of the Chihuahuan Desert in Arizona.

Prepare for some camping. The first night will be spent in the campground at Cochise Stronghold in the Dragoon Mountains. Bring your own sleeping bag and pad. Delicious camp cookery and campfire cheer will be provided. The second night we will lodge in an atmosphere reminiscent of the heyday of copper mining activity in Bisbee, the historic Copper Queen Hotel.

Fee of \$160.00 (non-members \$190.00) covers transportation, camp meals, permits, lodging, a great learning packet, and delightful knowledgeable guides. Meals at hotel are on your own. Trip departs Friday morning, October 25, at 8:30 a.m. from the southwest corner of El Con Mall and returns Sunday evening to the same point. Young people under eighteen should be accompanied by an adult.

The public is welcome to our trip Preview Meeting at the ASDM Education Classroom on the evening of Thursday, October 17, 7:00-9:00 p.m. to learn more about the fascinating marine life that swam inland seas covering southeast Arizona or giant reptiles and mammoths which trudged through the mud in ages past. Be sure to mark your calendar and join us.

NOVEMBER

DESERT HARVEST BAZAAR Saturday and Sunday November 23 and 24 9:00 a.m.-4:00 p.m.

The air is charged with an atmosphere of festivity as children squeal their responses to puppets on stage or busily grind mesquite beans Indian style on real prehistoric mortar stones. Watching a cartoon artist make a story of desert animals come alive on paper, their captivated eyes express what everyone is feeling—a sense of fun and exciting learning. That's what the Harvest Bazaar is all about.

Now in its sixth year as a unique educational event and fund-raiser, Harvest Bazaar is a don't-miss-it-affair. Access is what we are providing—access to unique hand-crafts made by native Indian tribes, access to rare cacti, succulents, or beautiful gemstones which cannot be found just anywhere, access to current information about desert tortoises and birds of prey with hands-on demonstrations by knowledgeable docents, access to the best in new literature about the desert for kids and adults, and access to the very authors who are writing about the desert!

This fall's Gem and Mineral Show and Sale boasts a dazzling collection of colorful mineral specimens which will inspire both the pro and young amateur collector. (Prices in the less-than-one-dollar range may turn a novice's allowance into a neat collection!) And for the veteran collector this is the place known world-wide to pick up surprisingly rare museum pieces too. Our inventory is constantly changing and is never the same as previous shows. Featured this year is a large array of beautifully cut and polished petrified wood. If you've ever wished for a set of handsome bookends reminiscent of Arizona's Petrified Forest now is the chance to find them. In addition, you can experience fossil discovery for yourself with a hose, a pail and our popular fossil finders' kits. Some of the fossil finds for sale this year were collected on a recent members' trip to an area rich with evidence of Paleozoic marine life. The treasures hidden in these inexpensive kits could easily be as significant as the discovery of unique Sea Urchin plates and spines made by members on that trip.

The Cactus and Succulent Sale is always full of new surprises for plant buffs and for gift hunters who want to give something really special. There will be an array of hand grown species to enjoy in a sunny window, on your patio or in your garden: white spined



Many of the exciting desert plants available for purchase at the Desert Harvest Bazaar are propagated at the Desert Museum by the Plant Department staff.

Mammillopsis with satiny red flowers, seedling boojum trees, native figs and elephant trees, perky century plants and spiny personality-plus cacti. In addition, there will be an assortment of attractive succulents from other deserts of the world whose hardiness has been tested and proven for Tucson's climate.

Most important of anything provided at this museum event is good information which our wonderful staff and well-informed docents give you freely and gladly. What a great weekend to share with family and friends! It's of course in the free-admission area near the Education Building, and for members this is 10% off on all purchases. See you here the weekend before Thanksgiving.

JANUARY

**SAN ESTEBAN ISLAND EXPEDITION:
A 10-day Desert Watch research trip
to study island chuckwallas in
the Sea of Cortez
Saturday-Monday
January 11-20, 1986**

**Preview Meeting ASDM
Friday, January 10, 1986
7:00-9:00 p.m.**

The museum's Curator of Small Animals and support teams of members and scientists have made two expeditions thus far to the remote desert island of San Esteban to research the little-known chuckwalla. Their new findings have been impressive and have whetted the appetite of herpetologists for more. Results are already being positively felt in our captive breeding program. Mid-January, when weather conditions will be excellent on the island for the human animal, is the next scheduled opportunity for members to actively participate in this exciting research. Wind is in our sails! By participating on this tax-deductible adventure you can help make the future captive breeding and survival of this chuckwalla in the wild a success.

Research on the chuckwallas will be conducted with the goal of minimal impact on all life of the island. Procedures will involve observations of behavior, photographic documentation, measurement of blood chemistry, weights and sizes, and sampling for natural disease. Data from the research will be invaluable in guiding zoo management programs for the animal and in conserving a healthy genetic reservoir for the future.

Your talents and energetic labor as part of the research team could be enormously important to the future of the San Esteban

chuckwalla. In addition, we know this expedition will be deeply rewarding for you. There is no better way to learn than on an active research project like this. You will learn to understand the vegetarian lizard as few people ever will. You'll also learn the fascinating geologic study of the forces which created its island home and will come to know the unusual endemic plants and marine birds that share Isla San Esteban with the chuckwallas. Trip members should be prepared for the personal challenges of hard work, desert hiking, and group participation.

A Preview Meeting, set for Friday evening, January 10 at the ASDM Education Classroom, 7:00-9:00 p.m., is free and open to anyone interested in a vivid slide program about the Sea of Cortez and the chuckwallas. Curator Howard Lawler will also introduce the center of interest itself—live chuckwallas to view first hand. There will also be a tour of our behind-the-scenes chuckwalla breeding project, one-of-a-kind project in the zoo world.

Fee of \$1,595.00 covers caravan transportation from Tucson to Kino Bay and return, eight days double occupancy aboard the well appointed support yacht *Baja Exporador*, excellent cuisine on board, a complete learning packet, a team of expert naturalist guides and a coordinator from the Zoo and Aquarium Travel Association. A deposit of \$250.00 will hold a place on a first-come basis.

For a detailed brochure and itinerary please contact ASDM Special Events. For registration, deposits, and information on tax deduction please contact ZATA directly by calling toll free 1-800-633-4734 or writing soon to Mr. Ray Ashton, ZATA Inc., 1776 Independence Court, Suite 104, Birmingham, AL 35216. For this event *only* please make out your checks to ZATA and mail with a letter of inquiry to the above address.

**MAN AND THE LAND IN
THE AVRA VALLEY:
A ONE-DAY FIELD TRIP
Saturday, January 18, 1986
8:30 a.m.-3:30 p.m.**

From high atop a limestone lookout to the bottom of a Hohokam ballcourt, this day trip, first sponsored last March, has had members enthralled and by request we are running it again.

Avra Valley, that broad vista seen from the entrance of the Desert Museum, is an area often neglected by touring Tucsonans as just a place to pass through on the way to Kitt Peak. Scientifically, however, it is better known, and is beginning to be understood as a very important climatological and

biological crossroads. Unexpected plants and animals meet only here naturally. It marks the northeastern limit of such interesting tropical plants as the elephant tree, and the westernmost Turk's head barrel cactus known from the Chihuahuan Desert. It is home of the easternmost chuckwallas and sidewinders in the Sonoran Desert. And it is the prime habitat of perhaps Arizona's rarest plant, the Tumamoca vine, a colorful wild relative of cucumber named for Tumamoc Hill (next to "A" Mountain in Tucson) where it was first discovered.

The rocks surrounding Avra Valley tell illuminating tales of ancient seas full of flower-shaped animals called crinoids, stories of explosive times when molten volcanic rock oozed up from great fissures and relatively quieter times when trumpeting mammoths roamed the grassy savannah where tumbleweed now roll.

Man has lived in Avra Valley for thousands of years, and archaeologists are on the threshold of learning much more about the complex cultures who called this valley home. On our intensive and eye-opening day trip we will visit the best sites in which to experience and understand the geology and biological communities. And we will have the exciting opportunity of seeing an ancient Indian village site in the process of archaeological excavation.

Fee of \$20.00 (non-members \$25.00) covers transportation, refreshments, a complete information packet, archaeologist and natural history interpreters. Participants provide your own sack lunch. Meet promptly at the ASDM Education Patio at 8:30 a.m. dressed in layers for possibly blustery weather. Vans return you to the ASDM by 3:30 p.m. Trip is limited to 21 participants so sign up right away if you are interested. You'll be amazed at the richness and lore you can discover in your own "front yard."

FOR PLANNING AHEAD

With 1986 as the Year of Halley's Comet, ASDM members can take advantage of clear desert skies to view this wonder of our lifetimes in two very special activities. We are planning a series of Sky Watch events on the museum grounds in April, and a 4-day camping expedition to the mouth of the Colorado River in the Gran Desierto in March where viewing, by all accounts, should be some of the best on this continent. Check the appropriate box on the registration coupon to have your name and address put on the Halley's Comet event interest list. And be sure to watch the next issue of *sonorensis* for more details.

Special Events Registration

REGISTRATION AND RESERVATION INFORMATION: Registrations are accepted *by mail or in person only* and are processed in the order that they are received. Please fill out the form below and mail with a *separate check for each event*. If one of your chosen events is filled we will return the appropriate check. Notice will be sent confirming your reservation. Please call us if you do not receive your confirmation within 10 days. When a trip deposit is sent, the balance is due one month prior to the trip date.

CANCELLATIONS AND REFUNDS: All cancellations must be received in writing. Due to administrative planning costs and mailings, the charge for cancellations is \$4.00 for amounts under \$20.00, and 20% for events over \$20.00. No refunds can be made within seven days of any day event, or 14 days of an overnight event.

ANY ACTIVITY MAY BE CANCELLED BY ASDM if the minimum number of participants is not met. We reserve the right to refuse service to anyone in the interest of the group if necessary.

AUTUMN-WINTER 1985-1986
REGISTRATION FORM
(clip or copy and mail)

EVENT	DATE	FEE PER PERSON	NUMBER OF PERSONS	AMOUNT OF CHECK
Fossil Discovery Trip	October 25-27, 1985	\$160.00 members \$190.00 non-members**	_____	\$ _____
Fossil Trip Preview	October 17, 1985 7-9 p.m.	Free and open to the public ASDM Education Classroom		
Desert Harvest Bazaar	November 23-24, 1985	Free admission to Bazaar Education Patio Area		
San Esteban Island Chuckwalla Expedition	January 11-20, 1986	\$1595.00 members and non-members	Deposit of \$250.00 to:	
San Esteban Trip Preview	January 10, 1986	Free and open to the public. ASDM Education Classroom	ZATA, Inc. Suite 104 1776 Independence Court Birmingham, AL 35216	
Avra Valley: Man & the Land	January 18, 1986	\$20.00 members \$25.00 non-members*	_____	\$ _____

Please put my name and address on the Interest List for the Halley's Comet Skywatch

To help purchase books and specialized equipment for the Members'
Special Events Field Program, I enclose my tax-deductible contribution of \$ _____

TOTAL AMOUNT ENCLOSED AS SEPARATE CHECKS \$ _____

*Non-members fee includes price of ASDM gate admission

**Non-members fee includes price of ASDM individual admission

QUESTIONS? Call Janice Hunter at 883-1380, extension 273.

SEND A SEPARATE CHECK FOR EACH EVENT PAYABLE TO: Arizona-Sonora Desert Museum
AND MAIL TO: ASDM Members' Special Events Office, Route 9, Box 900, Tucson, AZ 85743

NAME(s) _____ MEMBERSHIP # _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE (home) _____ (work) _____

MEMBERS!

Earn a free full-day Desert Ecology Workshop

In addition to our current incentive to urge you to help attract new members to the ASDM by giving you free the same amount of guest tickets your new member receives, we have added a new and very special feature which will enhance your enjoyment of the Desert Museum. It is simply this: You get a new member for the museum, either an Individual Member for \$30 or a General Member for \$40. You then will not only receive free the number of guest tickets the new member receives, but you also earn a free, full-day Desert Ecology Workshop given by our Education Department and Docents along with the new member. (The new member must pay a \$10 fee for the class in order for you to attend.) We hope this valuable workshop will not only orient new members but will also provide you with new and exciting information about our desert ecosystem.

The workshops will begin at 9:00 a.m. and finish at 3:00 p.m. with a 45-minute break for lunch. Topics include "Plant

And Animal Adaptations," "Live Animal Interpretations" and the "Rock Cycle In Depth." Tours of the grounds with Docents along with special interpretive presentations will provide special insights into the interrelationships of the plants, animals and geology of our area. Attendance at each workshop must be limited to 40 persons, so reservations are necessary for the following dates:

Wednesday, November 20, 1985
Monday, December 9, 1985
Friday, January 17, 1986
Thursday, February 13, 1986
Tuesday, March 18, 1986
Wednesday, April 16, 1986

Please call the Education Department at 883-1380 for details and start talking to your non-ASDM-member friends and relatives now. The more members we have the better we can serve you and our visitors, and the 20,000 school children we reach annually.

Another reason to help bring in new members

The Arizona-Sonora Desert Museum Newsletter, Volume 7, Number 1 — Fall-Winter 1985-1986, *sonorenensis* is published by the Arizona-Sonora Desert Museum, Route 9, Box 900, Tucson, Arizona 85743. ©1985 by Arizona-Sonora Desert Museum, Inc. All rights reserved. No material may be reproduced in whole or in part without prior written permission by the publisher. William H. Carr, *Director Emeritus, Co-Founder*; Mrs. Arthur Pack, *Honorary Co-Founder*; Dan Davis, *Director*; Christopher Helms, *Editor*; Michael Mayer, *Art Editor*. **OFFICERS, BOARD OF TRUSTEES:** David D. Cohn, *President*; M. E. Morbeck, Ph.D., *Vice President*; Todd B. Ackerman, *Treasurer*; Paul W. Cella, *Secretary*; Julia Perry Gordon, *Assistant Secretary*; Bernard L. Fontana, Ph.D., *Immediate Past President*. *sonorenensis* is the Latin, scientific term indicating the species classification of many plants and animals of the Sonoran Desert region.



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