





JANUARY 1985

Animal Keepers' Forum



dedicated to Professional Animal Care



Executive Editor: Alice Miser
 Managing Editor: Susan Chan
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JANUARY 1985
 VOLUME TWELVE
 NUMBER ONE

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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This month's cover art is of twin infant galagos, commonly called "Bush Babies". The artist is Toshie Nakashima, wife of Koji Nakashima, a keeper at the Japan Monkey Centre. Thanks, Toshie!

Scoops and Scuttlebutt

NOTICE TO MEMBERS ON BIOLOGICAL VALUES BOOKLET

Members are advised that the copies of the First Edition of the 56-page booklet "Biological Values for Selected Mammals" have been sold out and are no longer available from National Headquarters. This joint project between AAZK and the San Francisco Zoo proved very popular as all 1000 copies were distributed. After printing, postage and handling expenses were met and a 50/50 profit sharing was determined between AAZK and the SFZS, a net profit for AAZK of \$488.00.

The San Francisco group (keepers, docents and interns) is researching material for a Second Edition. When this is completed and printing is anticipated, an announcement will be made in AKF.

COMPUTER LIST 'CLEAN-UP' SHOULD RELIEVE DELIVERY PROBLEMS

Administrative Secretary Dolly Clark and AKF Managing Editor Susan Chan have spent many hours going over the computer mailing list for AKF. They have "cleaned" the list--deleting non-renewing members, correcting name and address errors etc. Hopefully, with the January mailing each member should receive his/her Forum properly addressed. If you do not receive your AKF or there is an error on your address label, please let National know immediately. Every effort is made to keep the mailing list current and correct but the computer doesn't always seem to want to include all of the information sent it. Please do not wait several months before notifying National of an error as this may only cause delays in getting your mailings. Above your name on your mailing label appears a code number for your membership status. Professional members are "3"; Affiliate members are "1" and Associate members are "2". Please notify National if your status listing is incorrect. Also, please remember to notify National as soon as possible when you change addresses. Your cooperation is GREATLY appreciated.

FROM THE PRESIDENT

Dear Members,

In 1985 AAZK Professional members will be electing two new board members whose terms will run from 1986 through 1989. For this purpose, the Nominations and Election Committee (NEC) has been reactivated by the Board of Directors at the Seattle conference.

SCOOPS AND SCUTTLEBUTT, Continued

Lynn Villers at the Indianapolis Zoo has accepted reappointment as committee chairperson. Joining Lynn on the committee are: Alan Sharples from the Atlanta Zoo, Denise Robinson from the Philadelphia Zoo, Jan Brigham from the Potter Park Zoo in Michigan and Jay Jasan from the Turtle Back Zoo in New Jersey.

Information about the NEC and the election will appear in AKF during the year. It is my hope that all professional members will exercise their right not only to nominate their peers for a board position, but to vote for the nominees when they receive their ballot.

Sincerely,

Kevin Conway
President AAZK



DIET NOTEBOOK

Here is a unique opportunity to share with other keepers the types of diets used to maintain exotics in captivity. This project has the potential to develop an excellent reference on captive diets but only if you participate.

Forms can be obtained from the Collection Centers listed below and when completed they should be sent to the appropriate center. Please type or print information, use metric units whenever possible and refer to the ISIS or IUCN listings for scientific names.

Please become involved.

- BIRD COLLECTION CENTER: *Kelli Westbrook
Little Rock Chapter AAZK
#1 Jonesboro Drive
Little Rock, AR 72204*
- MAMMAL COLLECTION CENTER: *Terrie Correl
Sedgwick County Zoo
5555 Zoo Blvd.
Wichita, KS 67212*
- REPTILE COLLECTION CENTER: *Brint Spencer
Minnesota Zoological Garden
Apple Valley, MN 55124*
- ALL OTHERS: *South Florida Chapter AAZK
c/o Debbie Burch
17860 SW 112 Court
Miami, FL 33157*



Births & Hatchings

SAN ANTONIO ZOO.....Debi Reed

November 1984 B&H include: Mammals - 0.1 Goeldi's monkey (DNS), 1.0 Three-banded armadillo, 2.1 Lady Grey's waterbuck (1.0 DNS), 1.1 Sand gazelle (DNS), 1.1 Grant's gazelle, 1.0 Thomson's gazelle, 1.0 Dik-dik (DNS); Birds - 1 Hartlaub's duck, 2 Roul-roul, 1 Green jungle fowl, 1 Yellow-headed rockfowl, 6 Zebra finch (2 DNS), 5 Society finch; Aquarium - Seahorses and Lyretailed cichlids.

MILWAUKEE COUNTY ZOO.....Steven M. Wing

B&H for October/November 1984 include: 0.0.1 Red kangaroo, 0.0.1 Vampire bat, 0.0.3 Common marmoset, 0.0.1 Mandrill, 0.0.1 Siamang, 0.0.3 Patagonian cavy and 0.1 Impala.

DALLAS ZOO.....Tami Jones

November B&H include: Mammals 0.1 Mexican fruit bat, 0.1 Speke's gazelle; Birds - 0.0.3 Yellow-fronted canary, 0.0.2 Gouldian finch; Reptiles - 0.0.2 Philippine sail fin lizard (*Hydrosaurus pustulosus*).

BROOKFIELD ZOO.....John S. Stoddard

B&H for November 1984 are: Mammals - 0.0.1 White-toothed shrew and 0.0.2 Spiny mouse; Birds - 0.0.1 Violet touraco and 0.0.1 Orange-bellied euphoria.

TAMPA--BUSCH GARDENS.....Susan Rackley

November 1984 B&H include: Mammals - 0.1 Gemsbok, 5.6 Thomson's gazelle, 0.0.1 DeBrazza monkey, 0.1 Soemmering's gazelle, 1.4 DeFassa waterbuck, 0.1 Scimitar-horned oryx, 0.1 Sitatunga; Birds - 0.0.1 Superb starling, 0.0.1 Purple-naped lory, 0.0.3 Senegal parrot and 0.0.3 Jandaya conure.

METRO TORONTO ZOO.....Harry Hofauer

B&H for August and September 1984 include: Mammals - 0.0.1 Hamadryas baboon, 0.1 African elephant, 1.0 Grevy's zebra, 2.0 Reeve's muntjac, 0.1 White-tailed deer, 1.0 Springbok, 1.0 Wood bison, 0.1 Domestic yak, 0.0.1 Plains rat, 0.0.4 Slender-tailed meerkats; Birds - 0.0.1 Brushland tinamou, 0.0.2 Australian wood duck, 0.0.2 Nicobar pigeon, 0.0.2 Ring-necked dove, 0.0.1 Pied imperial pigeon, 0.0.1 Zebra dove, 0.0.1 Tawny frogmouth; Amphibians - 0.0.2 Green and black arrow poison frog, 0.0.13 Surinam toad; Fish - 0.0.34 White-cloud mountain minnow, 0.0.20 Australian rainbow fish and 0.0.265 Brichardi cichlids.

MIAMI METROZOO.....Lori Bruckheim

B&H for October and November 1984 include: Mammals - 1.0 Thomson's gazelle, 0.1 Eld's deer, 0.1 Blackbuck, 1.0 Sable antelope, 1.0 Dama gazelle, 0.3 Eland, 0.1 Defassa waterbuck, 0.1 Grant's zebra, 0.1 Scimitar-horned oryx; Birds - 0.0.6 Green junglefowl (0.0.2 DNS), 0.0.6 Java tree duck (0.0.4 DNS), and 0.0.1 Sacred ibis.

BIRTHS AND HATCHINGS, (Continued)

WILDLIFE SAFARI.....*Laurie Marker*

On 6 and 8 October, 1984, two cheetah litters were born at Wildlife Safari in Winston, OR, producing seven cubs. Tamu, a 3½ year old who bred with Backup, gave birth to 1.0.1 cubs on 6 October. Due to apparent maternal neglect, these cubs did not survive. Sativa, a 9 year old veteran mother bred to Shaka, gave birth to 1.4 cubs on 8 October. These are Shaka's first offspring and Sativa's fourth litter. All five cubs are doing well. These births raise the total number of cheetahs born at the drive-through wild animal park to 91 cubs from 21 litters. Since 1982, Wildlife Safari has maintained the North American Regional Cheetah Studbook.

ASSINIBOINE PARK ZOO.....*Phil King*

Selected B&H from January through October 1984 include: 1.1 Arabian camel (0.1 stillborn), 2 Ring-tailed lemur, 5 Pere David's deer (0.1 stillborn), 2 Snow leopard, 15 Chinese water deer (0.1 DNS), 3 Black & white ruffed lemur, 1.4 California bighorn sheep (0.1 stillborn), 4 Canadian lynx, (2 stillborn, 2 DNS), 2.7 Alpine ibex (2 DNS), 4.4 Afghanistan markhor, 1.0 Bactrian camel, 1 White-handed gibbon, 1 North China leopard (DNS), 3 Siberian tiger, 1 Spectacled langur. Also hatched was 1 Northern bald eagle.

PHILADELPHIA ZOO.....*B. Bahner*

November B&H include: 1 Slow loris (DNS), 1 Chimpanzee, 1 Red and white crane, 3 Brimstone canary and 2 Prehensile-tailed skinks (1 DNS).

BRONX ZOO.....*Margaret Price*

October and November 1984 B&H include: Mammals - 1.0 Blackbuck, 2.0 Minnie Down's mouse, 1.0 Phyllostomas bat, 0.1 Lowland gorilla, 2.0 Sambar deer, 3.1 Brow-antlered deer, 1.0 Proboscis monkey, 1.0 Axis deer, 1.0 Wisent, 1.0 Formosan sika deer, 0.1 Yak, 3.0 Pen-tailed bettong, 0.1 Mongolian wild horse, 1.0 Slender-horn gazelle, 1.0 Large Malayan mouse deer, 1.0 Gaur, 2.0 Acouchi; Birds - 1 Mauritius pink pigeon, 1 Red bishop weaver, 2 Red-crested cardinal, 1 Purple gallinule, 2 Malayan peacock pheasant, 1 White-quilled black bustard, 3 Green wood hoopoe, 2 Red-crested touraco, 1 Congo peacock; Reptiles - 4 Texas ratsnake, 5 Red-tailed ratsnake, 1 Sinaloon milksnake, 18 Indian python and 4 California kingsnake.

LINCOLN PARK ZOO.....*Susan Moy*

The B&H for October and November 1984 include: Mammals - 2.0.8 Short-tailed fruit bat, 0.0.5 Geoffroy's tamarin (DNS), 1.0 Grevy's zebra (DNS), 1.0.1 Pygmy marmoset (1 DNS), 0.0.1 Owl monkey, 0.0.1 Lowland gorilla, 0.0.1 Chimpanzee, 0.0.1 Sooty agouti (DNS), 1.0 Bactrian camel; Birds - 0.0.2 Sunbittern (DNS), 0.0.1 Nicobar pigeon, and 0.0.2 Superb starling.



AAZK KEEPER TRAINING VIDEO TAPE PROJECT

The goal of the AAZK Keeper Training Video Tape Project is to produce quality video tape training programs suitable to supplement existing in-house training of entry level keepers. These tapes are not intended to be a complete training program in themselves. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes. Two tapes are currently available.

Zoo Keeper Safety; An Attitude Adjustment - This 18-minute program does not attempt to address the numerous variable specifics of this subject. It presents a safety approach to the job of zoo keeping, and promotes constant awareness and personal responsibility for safety.

A Zoo Keeper's Introduction to Feeds and Feeding - A half hour introduction to the complex subject of feeds and feeding of zoo animals. Topics covered include what, when, and where to feed.

AAZK KEEPER TRAINING VIDEO TAPE PURCHASE AGREEMENT RESPONSIBILITIES AND RESTRICTIONS OF THE BUYER

- 1) The tape may not be duplicated or made available to any person or institution for the purpose of duplication.
- 2) The tape may not be utilized for any commercial purpose.
- 3) Should the buyer decide the tape will not be useful to their training program, the undamaged tape may be returned within 14 days of receipt for a partial refund - \$10 for BETA and VHS, \$18 for 3/4 inch.

I, the undersigned, accept the responsibility for the restrictions listed above.

NAME _____ (Type or Print)

SIGNATURE _____ DATE _____

ORGANIZATION/INSTITUTION _____

SHIPPING ADDRESS _____

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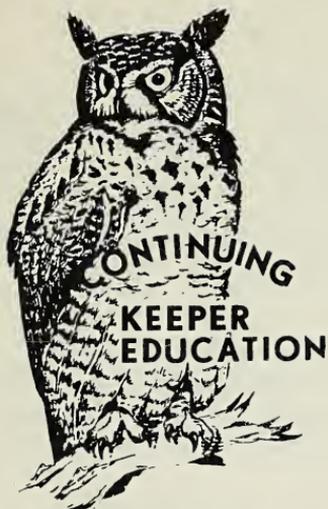
TELEPHONE () _____

TAPE TITLE _____

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Make checks payable to AAZK KEEPER TRAINING VIDEO TAPE PROJECT.

Mail to: B. Wayne Buchanan
 Woodland Park Zoological Gardens
 5500 Phinney Avenue North
 Seattle, WA 98103



MANUAL REVIEW PROJECT UPDATE

Submitted by Beth Poff
Coordinator of Manual Review Project

The purpose of the Manual Review Committee is to identify existing training manuals in use at various zoos and to publish a listing of what manuals are available and their contents.

We are in the process of getting permission from the different zoos to use the training manuals which we have already collected and are searching for additional manuals. In the future the Manual Review Committee will be expanded

to identify other types of training materials, such as video tapes, books, articles, etc. The benefit to you from the work of this committee will be to assist you as a keeper either in self-improvement or to give guidance in developing a training program at your own zoo.

I ask that you please take the time to fill out the following questionnaire to assist the Committee in locating additional training materials. I know that you have been requested to fill out many forms lately, but the collection of information such as this is valuable in assisting committees to carry out their projects. So, please fill in and return the form now before you forget about it. Thank you.

Complete the following and return to: Beth Poff
Mill Mountain Zoological Park
P.O. Box 13484
Roanoke, VA 24034

Name: _____

Where You Work: _____

Circle One

- YES NO 1. Does your zoo have a formal keeper training program?
- YES NO 2. Does your zoo have its own training manual?
- YES NO 3. Does your zoo utilize the following:
- YES NO a. AAZPA Animal Husbandry Training Manual
- YES NO b. Formal training lectures
- YES NO c. Books or articles
- YES NO d. Videotapes
- YES NO e. Other

For any "YES" answers to number three, please describe in more detail. _____

CONTINUING KEEPER EDUCATION, Continued

Continuing our professional education means sharing in what we all know. AAZK always provides the means to do this and encourages all our members to participate. It has been very exciting to see the number of fine articles published in the AKF that are appropriate for inclusion in the "Zookeeping Husbandry Fundamentals" book that we are writing. The book has been divided into topic sections that include an introduction on the History of Zoos and Zoo Keepers; who we are, the basic concepts we have, the specifics of care of various animal groups, and our concerns such as medical care, animal and keeper safety, public education and sources for tools and information.

The editorial team is now identifying sources of information and articles that have already been written. If you have ideas and contributions to this project, please contact editors Pat Sammarco and Jim Ellis. Over a dozen associate editors are assisting in writing this text on captive animal care. Individuals may ask you for more specific contributions in time and will appreciate your contributions.

This is the time to consider participation in the various regional workshops and specialist conferences that will fill the spring and summer months. Watch for dates and registration information in the Forum, and let the editors know if you find out about meetings that other keepers would find of interest. Remember that these conferences give you educational opportunities and occasions to be an ambassador for AAZK, if you choose. Contact President Kevin Conway for information on representing AAZK at such meetings.

*submitted by Pat Sammarco, Coordinator
AAZK Education Committee*



NEW HIMALAYAN TAHR EXHIBIT OPENS AT METRO TORONTO ZOO

A magnificent new mountain exhibit for the Metro Toronto Zoo's herd of Himalayan tahr opened to the public in November and provides a 7.5 meter, year-round exhibit.

The mountain is constructed of 225 tons of a concrete mixture which is sprayed over a steel frame. The frame, consisting of 6.3 tons of steel, was shaped to resemble a rock formation, typical of the steep terrain of the Himalayas. The concrete was applied in several layers to the frame and a special concrete dye was used to give the mountain a natural color. For the final step of construction, artists creatively shaped and textured the last layer of the concrete.

Tahr are native to the Himalayan Mountains, inhabiting the steep cliffs and inaccessible areas of that range. Their climbing abilities are excellent and these skills have been demonstrated as the herd has made the mountain their home. Visitors have been particularly delighted to watch the herd's youngsters keep up an almost continuous game of "king of the castle".

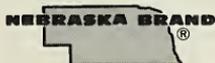
Work has already begun on a similar, but larger home for the zoo's herd of North American Dall's sheep. Exhibits such as these not only attend to the biological needs of the species but also give the visitor a feel for the animal's natural environment.





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REHABILITATION OF RED KANGAROO
WITH DOWNEROO SYNDROME

By
Laura Schuchard, Keeper
Louisville Zoological Garden
Louisville, KY

Zeke is a male red kangaroo. He was just nine months old when he was rendered immobile for no apparent cause. Our zoo had only had him for about two weeks before this incident. On 20 May, 1983 Zeke was found in his shelter unable to stand. The most he appeared able to do was turn himself over with his tail. He was taken to the animal hospital for examination. Neither the x-rays, bloodwork, or the physical examination turned up anything. So Dr. Foster started him on a regime of antibiotics, pain medication and vitamins.

From the beginning his appetite and bowel movements were normal. He also appeared mentally alert from the first day. As a matter of fact, his attitude seemed quite bright for an animal in his predicament. His personality turned out to be a life-saving asset displayed through his will to live. His food and water had to be placed directly beside his head or else he couldn't reach it. His head and ears were all that he could move.

It was at this time that physical therapy began. At first this consisted of back and forth movements of all his limbs to prevent muscle atrophy. Therapy took place several times a day for short periods. Soon afterwards he stopped using his tail, so he had to be turned manually to prevent his circulation from stopping. His preference though was to lay on his right side. Gradually therapy was increased as he began to show slight signs of improvement like stretching movements, slight jerky motions, and clutching his hands into fists.

He began moving around a little while lying down. Sometimes he would push himself around while laying, turn himself over with his tail, and occasionally lay on his sternum. During therapy he also began flexing his toes while his legs were being worked. To help him sit in an upright position on his own, a hay bale was used like a table to lean against and the wall to lean on if necessary. Soon afterward grain was offered on his make-shift table to entice him to try and stand for longer periods. The amount of time that he stood varied from day to day according to his moods.

On 9 June, a new form of exercise was added to his therapy routine. A Johnny Jump Up[®] was utilized at this point to help strengthen his legs. A Johnny Jump Up is a child's swing which is hung in a doorway by a spring. With an extra hole added to accommodate his tail, Zeke was afforded much vital exercise needed for his recovery. The Jump Up was hung from a low limb of a shade tree. At first the Jump Up supported all of Zeke's weight and was gradually lowered to put more weight on his legs and tail. During this time, Zeke's weight increased from 16 to 18 pounds.

Hydrotherapy was implemented on 22 June. A large, disinfected garbage can was used for hydrotherapy since it was the largest available container. The first several times that this therapy was done, the Jump Up was used in conjunction with the bath can to give him extra support. Once he got a little stronger the hydrotherapy was done without the Jump Up. This was especially good for his legs and tail, although his arms did

REHABILITATION OF A RED KANGAROO WITH DOWNEROO SYSDROME, Continued

get exercise from holding on to the sides and from his attempts to escape from the can.

One form of exercise or another was done daily throughout the summer. We did experience problems with overheating and hives on his tail and legs during this time, but by the end of August he was up to 27 pounds and quite a bit stronger than before. Unfortunately he was not nearly strong enough to hop on his own.

On 8 September he was partially immobilized for more tests and a spinal tap. Again, as before, the results showed nothing. So his therapy routine continued. However, by this time he was starting to outgrow his hydrotherapy bath can and his Jump Up, which was increasingly more difficult to put him in due to his increasing strength. Zeke could now hold his own weight, but needed someone to balance him in order to stay upright.

During the winter months I became Zeke's crutch so that he could start hopping on his own. His strength continued to grow steadily but slowly. He became much more agile as well as playful. On the worst of winter days, Zeke got his exercise roaming the halls and offices of the animal hospital.

By now he was standing on his own as well as hopping for short distances. As his strength increased so did his stamina. He often enjoyed wrestling with his human counterparts. His "four hops and fall" routine increased until one day he kept going and had to be chased down. By spring it became necessary to exercise him on a halter and leash. At times it was difficult to tell who is walking whom.

On several afternoons Zeke was taken to the Australian exhibit for exercise and introduction to the other animals. On 20 April, 1984 he was moved to the Australian exhibit. He was confined to the shelter in the evenings and let out during the days. Interactions with the other 1.2 kangaroos went very smoothly. Nearly one year after his ordeal began, we let him stay outside around the clock. There were no apparent problems with the transition. He did drop about five pounds in the first couple of weeks, but soon gained it back.

On 19 September, he was again given a physical and everything was fine; his weight had increased to 65 pounds. Zeke now permanently resides in the three-quarter-acre Australian exhibit with the other 1.1 Kangaroos, 2.1 Wallabies, Black Swans and Emus.



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

ENVIRONMENT
(Lighting)

In Part VI of this series I discussed temperature. When discussing environment, the keeper should remind the novice that temperature and light are interrelated. Many physiological problems of captive reptiles can be avoided or overcome if light and temperature are rhythmically controlled. For example, the animal's photoperiod should be well coordinated with its required thermal cycle. These cycles are best controlled with the use of a timer. Wide-spectrum light such as Vitalight® (Duro Test) or Chroma Lamp® (General Electric) is recommended (1). A constantly lighted environment should always be avoided; it is extremely stressful, and reptiles may either refuse food or regurgitate if they do feed. Furthermore, a constantly lighted environment interferes with breeding and fertility. Reptiles indigenous to temperate zones may require 14 to 16 hours of light and 8 to 10 hours of dark. Those from tropical environments may require 10 to 12 hours of daylight and from 12 to 14 hours of dark.

Although it is preferable to use wide-spectrum lights as the basic light source, incandescent lamps provide excellent daytime heating. By experimenting with wattage and distance, an animal's temperature preference can easily be met. General purpose, clamp-on utility lamps are practical for this purpose.

Ultraviolet light is necessary for vitamin D production in many reptiles; however, the keeper should stress to the novice that ultraviolet rays are filtered by glass, most plastics, and are reflected by wire screen. Also, to avoid burns, overheating, and in some cases, hypervitaminosis D, the novice should never expose his pet reptile to prolonged artificial ultraviolet light. If an animal is housed outside or by an open window, ambient temperature (time of year) should be considered, and reptiles must always have access to shade. When left in direct sunlight, snakes have been observed to expire by overheating in as little as 15 minutes. Table 1 lists suggested artificial sunlight exposure times (2).

Table 1, Suggested Sun Lamp Exposure Times*

Reptile	Exposure Time Minutes Per Day
Young turtles and crocodilians	5 - 10
Young lizards	3 - 5
Young snakes	1 - 2
Adult turtles and crocodilians	10 - 20
Adult lizards	5 - 10
Adult snakes	2 - 4

*UV requirements, if any, have not been established.

References

1. Lazzlo, J.: Observations on two new artificial lights for reptile displays. *Int. Zoo Yearbook*, 9:12. 1969.
2. Barnard, S.M.: Unpublished

(Editor's Note: Part 8 of this series will deal with humidity. Please also note that in Part 6 published in the November 1984 issue of AKF, the following error occurred: In paragraph #1, it was misprinted that "To avoid burns and hypothermia these animals..." It should have read "To avoid burns and hyperthermia these animals..." . Our apologies to the author for this misprint.)



Chapter

South Florida Chapter AAZK

The South Florida AAZK Chapter is pleased to announce the following newly elected officers for 1985:

President....Scott Fuller
Vice Pres....Vince Gibaldi
Secretary....Lori Bruckheim
Treasurer....Kim Livingstone

We are also pleased to announce that Rachel Rogers was appointed Conference Chairman. We are all very busy, anxiously preparing for the National AAZK Conference that will be held in Miami in October. We look forward to seeing you all there!

News

Please send Chapter News to Lee Payne, Chapter Affairs Coordinator at the Detroit Zoo. Also send a copy of news to: AKF Editorial Offices, 635 Gage Blvd., Topeka, KS 66606.

Little Rock Zoo Chapter AAZK

Newly elected officers for the Chapter for 1985 are:

President.... Debbie Jackson
Vice Pres....Chris Rasums
Secretary....Deby Nagel
Treasurer....Syd Tanner

Rocky Mountain Chapter AAZK

Keepers at the Denver Zoological Gardens began working to form an AAZK Chapter over a year ago. We were chartered early in 1984. Elections were held in November. New and re-elected officers are:

President....Dennis Roling
Vice Pres....Sharon Areen
Treasurer....Bill Loessberg
Secretary....Rex Pruitt
Corres. Sec....Ann Rademacher

Special thanks to outgoing officers Susie Haeffner and Mary Patterson for their help in organizing.



TREATMENT OF "MOUTH ROT"
IN *Python molurus bivittatus*

By
Charles Smith
Zoo Dept., Worcester Science Center
Worcester, MA

The following is a brief account of "mouth rot" in an adult python and the resulting treatments administered for this condition.

On 7 May 1984, a 3.3m Burmese Python weighing 15.3kg was received by our zoo department. The snake was turned over to us by the previous owner in need of immediate attention for a moderate case of "mouth rot". The snake needed daily treatments, which would be dangerous for a single person to do on a snake of this size. Although the snake hadn't eaten in over six months, it seemed in generally good health, showing good muscle tone and skin condition.

Upon examination, it was found that a considerable amount of the tissue surrounding the teeth in both the upper and lower left side of the jaw was extensively involved. There was also much swelling throughout the entire left side of the head. Preliminary treatment consisted of swabbing the affected area with Betadine® and applying Panalog® to the mouth.

On 14 May 1984, Dr. William Walker of Newton, MA excised as much of the necrotic tissue around the teeth as possible and irrigated the area with peroxide. Two assistants were present to restrain the snake. The snake was also given 1cc Gentacin® I.M. and 75cc's Lactated Ringers® S.C. Follow-up treatment consisted of cleaning out the mouth every day (removing dead tissue, swabbing with peroxide, and applying Betadine), injection of 80cc's Lactated Ringers® and 1 cc Gentacin® IM every third day for 14 days.

After 14 days of treatment, much of the swelling around the head had disappeared. However, much of the tissue within the mouth itself was still quite involved, with large open areas of infected tissue. At this point I contacted Dr. Charles Sedgwick, formerly of the San Diego Zoo, and now affiliated with the Wildlife Clinic at the TUSVM in Grafton, MA. Dr. Sedgwick suggested vitamin therapy as well as changing the caging conditions. The snake had been housed in a 4-foot fiberglass cage to prevent any further irritation or abrasion to the mouth, but was moved to a much larger cage measuring 3.6m x 2.5m x 2.5m. Climbing limbs as well as heat lamps (to provide a temperature gradient) were placed in the cage.

From 1 June through 1 September the snake was given weekly injections of .5cc ascorbic acid I.M. as well as two minutes daily under ultra-violet lamp. The use of the U.V. lamp in the effectiveness of the treatment was not known, however, we felt such exposure could only help to improve the snake's condition.

After twenty weeks of such treatment, it appears that all outward signs of infection are gone and the snake has eaten on five occasions: 9/29, 9/30, 10/12, 10/23, and 10/24. We are unsure which aspect of the treatment to attribute the success to, although it may well be a combination of two or more factors. We would like to thank and acknowledge the help of both Dr. Walker and Dr. Sedgwick. Anyone interested in more specific information on the preceding, please feel free to contact me.



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RESEARCH UPDATE: PLANTS IN PRIMATE EXHIBITS

By
Sue Maloney
Horticulturist
Woodland Park Zoological Gardens
Seattle, WA

This paper reports the preliminary findings of the WPZG Plant Research Team's survey on plants in primate exhibits. Team members include Keepers Gregg Thompson, Chuck Harke and Judie Steenberg; horticulturist Sue Maloney; and volunteers Barbara Questad, Joyce Ford, Kathy Long and Elizabeth Worden. This project was funded by a research grant from the American Association of Zoo Keepers, Inc. Final results will be mailed to survey participants and others in January 1985.

Green plants are becoming major elements in the design and renovation of zoo exhibits now that zoos are moving towards housing animals in naturalistic settings. Strategies for the long-term displaying of animals with plants vary depending on a wide variety of factors. Not the least of these is the budget of the zoo for plant care, the behavior of the animals toward their environment, and the conditions provided for plant health.

Because little information has yet been collected on this subject, we formed the plant research team in late 1983. Our goal is to collect and disseminate information on the subject of plant and animal interactions in zoo exhibits.

The team initially contacted 182 zoos and aquaria. These institutions were asked to participate in a series of surveys designed to give details of the successes and failures they were having with planted animal exhibits. A total of 115 of them agreed to participate, a very positive 63% response. The initial survey sent to these 115 zoos and aquaria was on plants in primate exhibits.

Why primate exhibits first?

The team chose to survey primate exhibits for several reasons. Primates are often the most popular animals to the public who may tend to anthropomorphize them. The zoo's image improves when it can provide a lush, plant-filled environment for its most popular animals.

Primates as a group can damage plants extensively, though zoos have seen some remarkable successes. Since budget couldn't be the only reason some zoos were successful while others weren't, the team wanted to see what other factors might be at work. And since most zoos do not have great numbers of planted primate exhibits, the team was confident that not much time would be asked of the people completing the survey.

Response to the Survey

A total of 51 zoos and aquaria from the United States, Canada, Great Britain and Australia responded to the primate survey. Twenty-two of them reported having no primate exhibits at all, or no primate exhibits with plants in them. Twenty-eight returned surveys on a total of 41 primate species. A total of 64 zoos did not respond at all; follow-up contact will be made.

RESEARCH UPDATE: PLANTS IN PRIMATE EXHIBITS, Continued

Primates Being Exhibited with Plants

Walker's Mammals of the World lists eleven families of primates including Man. The zoos that responded to this survey are exhibiting primates from five of these families with plants.

Gorillas are the most exhibited primates. Eleven zoos have planted gorilla exhibits. The gorilla is a member of the *Pongidae* family which also includes orangutans, gibbons and chimpanzees. This family is native to the tropical forests of equatorial Africa, southeast Asia, Sumatra, Java, and Borneo. Participating zoos are currently exhibiting eight species of *Pongidae* primates in 35 separate planted exhibits.

The second most exhibited primate family is the *Cercopithicidae*, or old world monkeys and baboons. These primates are native to varied habitats from Africa to Southeast Asia. Most primates in this family are arboreal though baboon species are terrestrial. The zoos in this study are exhibiting fifteen species from the *Cercopithicidae* in twenty planted exhibits.

The *Lemuridae* family consists of lemurs, acoumbas, and makis native to wooded areas of Madagascar and the Comoro Islands. These are arboreal primates except for the terrestrial ring-tailed lemur. Zoos are currently exhibiting five species of *Lemuridae* in sixteen planted exhibits. Eight of these planted exhibits house ring-tailed lemurs.

The *Callithricidae* family consists of marmosets and tamarins, native to the South American tropical forest. They spend most of their time in trees and shrubs and occupy tree cavities at night. Eight species of this family are currently being displayed in thirteen planted exhibits.

The last primate family being exhibited with plants is the *Cebidae* family. These are new world monkeys such as the squirrel, cebid, spider, and woolly monkey. Native from Mexico to South America, these primates are agile runners, jumpers, and arboreal swingers. Zoos are currently exhibiting five species of *Cebidae* in twelve planted exhibits.

Trends Noted in the Survey

The real value of this survey will come from the plant lists to be published in January 1985. From these, a zoo planning to renovate a barren enclosure will find out what plants have been tried in other zoos, and which zoos will have more information. Surveys are usually an unreliable means by which to glean scientific facts since the accuracy of the information reported cannot be guaranteed.

However, some trends were quite obvious to the team. First, there is extreme variability in the use of scientific nomenclature for both animals and plants in zoos today. In future surveys, zoos will be asked to use the scientific names for animals currently in use by ISIS. If ISIS manuals are not available, Walker's 4th Edition of Mammals of the World is recommended. Hortus 3 continues to be the recommended source for plant nomenclature.

Another trend noted in the survey was that for most primate species a wide range of results was found. Some zoos had observed little plant damage, while other zoos reported massive destruction. Many factors combine to determine the overall success of plants in exhibits, but what is noteworthy is that in almost every primate species, at least one zoo could claim success with planted enclosures. For the zoo horticulture field, this was tremendous news!

RESEARCH UPDATE: PLANTS IN PRIMATE EXHIBITS, Continued

Not all zoos are trying to imitate natural habitats for zoo animals. Some simply want to provide some greenery to camouflage a concrete wall. This is often dependent on the zoo's budget if not also on the zoo's statement of purpose. What is significant is that even zoos that are doing only minimal plantings in exhibits are reporting successes.

Zoos are having success using the plant materials available locally. Some zoos such as San Diego are fortunate to have a climate and budget that allows them to use tropical plants from the area of animal origin. Other zoos such as Woodland Park have a climate that allows them to use a wide variety of imitative plant materials. Though native to temperate climates, these plants can be planted and pruned to create an outdoor "tropical" exhibit that animals can use year-round.

Other zoos are using outdoor exhibits only during the summer, allowing the plants to rest during the cold winter months while the animals are indoors. Other zoos are planting their indoor enclosures as well, using tricks of illusion by planting around the outside fencing or bringing in soil and planting what once were concrete box-like cages. Regardless of the methods or plant species used, all of them have been shown to work, with varying results.

Another trend noted in the survey was that zoos have been using toxic plants in or near primate exhibits for years with no problems noted. Plants such as yew, privet, and vinca are being used with no ill effects so far. Trees with toxic bark such as black locust, oak, and cherry are being used for perches in exhibits with no ill effects. Much needs to be research on an animal's ability to detect the toxic properties of plants. It isn't enough to go ahead and use toxic plants inside primate exhibits on a grand scale, yet some zoos have tried their use and they would be worth consulting before trying it elsewhere.

The success of a planted primate exhibit may be partly due to the ratio of numbers of animals to the area of the exhibit. At Woodland Park Zoo, where there are two gorilla exhibits, the large enclosure with five animals in it has five times the area of the small exhibit with one animal. Plant health in the large enclosure far exceeds that of the small enclosure.

This can't be proven, however, since many other factors are at work. Browse programs appear to be a definite factor in the success of some primate species, though not all. Animals that can occupy their time eating and playing with browse will not spend as much time damaging live plants.

The budget given to plant care at a zoo is a definite factor in the success of a planted exhibit. Time spent watering, fertilizing, pruning, and re-planting will all help determine the long-term growth rate and health of plants. Many surveys expressed the fact that plants died not from animal damage but from lack of care by the zoo staff.

The means by which animals are introduced to plant-filled enclosures will determine the survival of the plants. Several zoos noted that the success of their exhibits was partly due to the fact that the plants had been given six months to a year to become established before animals were allowed into the area. Once an animal is allowed into an exhibit, damage will be usually most severe during the first few weeks. If extra care and replanting can be given to the plants during this time, generally plant damage will decrease dramatically once the animal gets used to its new environment.

RESEARCH UPDATE: PLANTS IN PRIMATE EXHIBITS, Continued

Another factor in the destruction of plants is the actual size of the animal. Small tree branches can survive small primates much better than they can heavy primates. Some tree species can endure more weight than others. Weeping willow may be adaptable with those primate species that spring off of tree branches. Willows are much more pliable than trees with brittle wood.

Using dead tree branches, stumps, rocks, and other natural elements inside exhibits will reduce the amount of time a primate may have to spend in living trees and shrubs.

Conclusions We Can Make

The plant research team was very pleased to see the number of institutions that agreed to participate in the project. Zoos of the world are moving in the direction of keeping plants and animals together and the response shown demonstrates the need for more shared information.

The plant lists to be published are certainly not the only place to look for new ways to exhibit animals, but they can direct you to zoos that have tried them.

Subsequent surveys will be sent to zoos in the future. We hope zoos will continue to respond as they did for the primate survey. In addition, the plant research team will publish a bibliography of literature on the topic of plant and animal interactions in zoo exhibits.

If your zoo has not been contacted to participate in this research project and wishes to do so, contact the plant research team at the Woodland Park Zoological Gardens, 5500 Phinney Avenue North, Seattle, WA 98103. (206) 25-5498. The interest surveys were mailed to Zoo Directors; the primate surveys and a questionnaire were mailed either to the Zoo Director or Horticulture Staff.



T.V. WORTH WATCHING

Marty Stouffer's 'Wild America' Series
Returns for Third Season on PBS Stations

Beginning 10 January, wildlife film enthusiasts can begin a 10-week odyssey into the world of North American wildlife when Marty Stouffer's 'Wild America' series returns for its third season on PBS. The series has earned both critical and viewer praise for its film quality, concept and narrative. According to the November 1983 Report on PBS Programs, 'Wild America' was rated as the number one regularly-scheduled series. Among the many awards earned by this series are: Best Outdoor Documentary from the Michigan Outdoor Writers Association; Certificate of Special Achievement from the Humane Society of the United States; Gold Medal/Television Documentary from the San Francisco International Film Festival and Winning Television Series from the Outdoor Writers Association of America.

T.V. WORTH WATCHING, Continued

The third season will include ten, halfhour presentations. They air at 8:00 p.m. EST (check your local listings for airing times in your vicinity)

Upcoming programs and airing dates for the third season are as follows:

- All-American Animals -- 10 January
- Feathered Jewels (Hummingbirds) -- 17 January
- Ringtailed Rascals -- 24 January
- Canyon Creatures -- 31 January
- Wolverine Country -- 7 February
- Fascinating Fishes -- 14 February
- Wild Refuge -- 21 February
- Fishers in the Family, Part 1 -- 28 February
- Fishers in the Family, Part 2 -- 7 March
- Photographing Wildlife -- 14 March



Second Caribbean Green Turtle Tagging Trip Announced

For the serious field person, the New York Zoological Society (NYZS) offers an unusual opportunity to work on the renowned turtle beach of Tortuguero, in Costa Rica. The NYZS program, now in its second year, is designed to support and augment on-going sea turtle research sponsored by the Caribbean Conservation Corporation (CCC). The NYZS will assemble five teams to work during the July-September 1985 turtle nesting season. Teams will be escorted by a NYZS staff member and will be supervised by a core staff of CCC personnel.

Green turtle research at Tortuguero has been directed by Professor Archie Carr of the University of Florida for the past 29 years. This breeding colony is the largest in the Caribbean, and the nesting beach is protected by the 19,000 hectare Tortuguero National Park. Dr. Carr's research on sea turtles there has led to a worldwide interest in the biological mysteries and conservation needs of these endangered reptiles.

The NYZS initiative will measurably bolster the Tortuguero field studies. In 1984, the program was fully subscribed and our 36 participants were rewarded with a rare, if rigorous, tropical experience. Excellent food and housing (by local standards!) are assured at the CCC Green Turtle Station. The work, however, is tough, with miles of nighttime beach walking and tagging sea turtles (2,500 seen in 1984) often in heavy rain. A strong commitment and a good will are required. But if exposure to sea turtles and a fine tropical rainforest and its wildlife appeals to you, please write to us. Participant fees are \$1500 and include roundtrip airfare from Miami, local travel, food and accommodations in Costa Rica.

Departures from Miami are tentatively scheduled for 12 July, 26 July, 9 August, 23 August and 6 September. Each team period will be of 18 days duration, 14 days at Tortuguero plus 4 days in transit. Optional tours of the great parks of Costa Rica prior to or after your Tortuguero field work can be arranged.

Additional information and applications are available from John Behler, Curator, Department of Herpetology; or Susan Bruml, Travel Coordinator, New York Zoological Society, Bronx Zoo, Bronx, NY 10460.



ELEPHANT SET

UNIFORM COMMANDS NEEDED FOR CAPTIVE ELEPHANT MAINTENANCE



By
Ron Ringer
Lead Elephant Keeper
Topeka Zoological Park, Topeka, KS

At the recent Elephant Symposium in New Orleans, a wide range of topics from elephant management to veterinary care were discussed. But it became apparent that one topic would be discussed more than others. That topic was basic elephant handling.

The days of importing Asian elephants into the U.S. is gone, with very little chance of it returning. This situation has given rise to the planning for Species Survival Plan (SSP) for Asian elephants. Although many details have to be worked out before this program can be implemented, there are several things that we, as keepers, can start now.

In the circus world it is not uncommon to ship an elephant from one circus to another. But there seems to be a common dialogue of basic commands that allows for a smooth transition for both the elephant and handler. Although zoos do share common commands, it is also quite obvious that we establish our own set of commands for each institution. For one reason or another, zoos seem to limit their communication with each other about their elephants' behavior and management.

The time has come for zoos to adopt a policy of cooperation between each other and their circus counterparts. After all, we each share a common interest in the preservation of the Asian and African elephants.

At the New Orleans conference a group of elephant people volunteered to devise a basic set of elephant commands which could be used at any zoo or circus. The volunteers are: Tim Stout, keeper at Seneca Park Zoo, Rochester, NY; Susan Moy, keeper at Lincoln Park Zoo, Chicago, IL; Jean Bromadka, keeper at the San Diego Wild Animal Park, Escondido, CA; Smokey Jones, elephant handler and consultant, Westminster, CA; and myself, Ron Ringer, lead elephant keeper at the Topeka Zoological Park, Topeka, KS.

The idea is to establish a uniform set of basic commands which could be shared by anyone. These commands would allow for the basic care of an elephant and are not going to change anyone's way of working their elephants. The main reason for these commands is to minimize stress on the elephants and the handlers when elephants are shipped for breeding purposes. It would also allow for a common dialogue between all elephant handlers.

Over the next couple of months, our committee will be discussing and putting together this set of commands which will be published in a future issue of AKF. We will also make the list available to anyone who would like a copy.

At this time I would like to ask for everyone's help. You can help by sending me a list of your zoo's elephant commands. This list should include those commands which allow for daily maintenance of your elephants, not specialized commands used for performance-type routines. Please send your list to: Ron Ringer, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

Our committee's goal is to be able to report at the Sixth Annual Elephant Symposium in Cincinnati, OH that 100% of the zoos which exhibit elephants have adopted this list of common commands.



RARE CHINESE MONKEYS GO ON
EXHIBIT AT THE SAN DIEGO ZOO

Washing 30-foot-high exhibit windows, installing educational graphics and brightly colored banners, and planning a proper diet for two Very Important Primates were part of the last minute flurry of activity at the San Diego Zoo as workers prepared for the 21 November opening of a special exhibit for a pair of fascinating and rarely seen Chinese golden monkeys.

The four-month display of the Chinese golden monkeys (*Rhinopithecus roxellanae*) at San Diego marks the first time this mysterious endangered species has been shown outside of Asia. Zoo officials consider the Chinese golden monkey exhibit as a zoological premiere and cultural exchange, as well as a way to call attention to the plight of the giant panda, one of the golden monkey's neighbors in the wild.

An opening ceremony welcoming a delegation of Chinese zoo and wildlife officials was held and a Zoo guide is stationed at the exhibit to give background information on the little-known primates and to answer questions. A Chinese veterinarian and animal technician will stay in San Diego throughout the monkey's four-month visit to advise local keepers on care and feeding.

"Animals as rare and unique as these Chinese golden monkeys will get the best care and attention from our keepers, but there are some parts of the diet we haven't quite figured out," said Karen Killmar, Zoo animal care manager. "A golden monkey diet from the Beijing (Peking) Zoo suggests many fruits and vegetables we can supply, but what is 'millet bread'? And the Chinese list says the golden monkeys must eat 'yellow mud at appropriate time frames.' We're not sure what that means."

The golden monkeys are being displayed in an exhibit which formerly housed douc langurs, a related species native to Vietnam. The exhibit's climbing structure had to be modified to support the heavier golden monkeys (males weigh up to 35 pounds) and the entire enclosure was sterilized to prevent any transfer of potential disease between the Zoo collection and the visiting golden monkeys.

Because they are shy and elusive, golden monkeys are rarely seen even by the people who live in or near the 12 preserves established for the species in 1965. What little is known of the golden monkeys' wild habits and behavior indicates these tree-dwelling primates live in large groups, some including up to 600 individuals, depending on the season and the available food resources. Their diet consists of leaves and fruit, along with a few flowers, birds' eggs, small birds, worms, insects and lichens.

The Ministry of Forestry for the People's Republic of China estimates 10,000 to 30,000 Chinese golden monkeys remain in the wild. The Chinese government classifies the golden monkey as a first priority endangered species. Hunting of golden monkeys has been illegal since the 1960s, but poaching and shooting still take a toll on the wild populations. The yellow-throated marten is the species' chief natural predator.

The San Diego Zoo's premiere exhibit of Chinese golden monkeys was arranged in cooperation with the Chengdu Zoo, a sister zoo in the capital city of Sichuan province, and the Chinese Wildlife Conservation Association.



AN ETHOGRAM REPRESENTING THE BEHAVIOR
OF A CAPTIVE TROOP OF BLACK-HANDED SPIDER MONKEYS
(Ateles geoffroyi) AT THE AKRON ZOOLOGICAL PARK

By
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Animal Care Supervisor
Akron Zoological Park, Akron, OH

Statement of Purpose

As the Animal Care Supervisor of the Akron Zoological Park, and the park's primate keeper, the behavior of animals is of daily interest to me. Having worked with this troop of Black-handed spider monkeys for several years, I found myself wondering if they were getting all that they needed to be healthy, vibrant animals. Was the nutritional intake well-balanced? Did they need something to busy themselves with? Did they have enough branches to properly brachiate? Why does that female always sleep alone? The questions were, and still are, unending.

My desire to know as much as possible about this species, and the more demanding need to supply them with the best possible care (both physical and mental), lead me to this research. This ethogram, and the many doors it has opened in my mind, will help me begin to accomplish both of these goals.

Selection of the Study Group

The black-handed spider monkeys were selected for many reasons. Listed below are the most important factors in their selection.

1. The need for captive behavior research in zoos is quickly becoming established. The Akron Zoo is striving to implement a behavioral research program of its own.
2. Reproductive information on this species is inadequate. To begin learning more about the reproductive cycles, breeding postures, and habits of this species, an ethogram of typical behaviors is mandatory as a beginning step.
3. The accessibility to the author makes this group ideal.
4. A "perfect" sample size is represented in this troop. Different age groups, both sexes and a full range of personality types assures a well-rounded ethogram. The size of this group is ideal in that it is large enough to give examples but small enough not to become unruly and difficult to keep track of. (See Table 1)

Preparing the Troop for Study

This captive troop of monkeys has been in the author's care for three years. Because of the familiarity between the keeper and her subjects, only a short period of adjustment was required to prepare the troop for observation. Accustomed to their keeper cleaning, feeding and then leaving, the animals' routine needed to be changed to include being observed. After cleaning and feeding, observations were made from a conspicuous spot no further than five feet away from the enclosure. To further accustom them to change, the observer spoke in a monotone throughout the observation time. This procedure was followed daily for fifteen minute sessions over a two-week period. Once this adjustment was made, two additional fifteen minute sessions were established at a varying morning and afternoon time. An additional week was necessary to accommodate

BLACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

the troops' adjustment to this further break in their routine. Once this was accomplished it became possible to tape record and/or take notes during any part of the day with only a five-minute adjustment period at the beginning of each session.

Note: This conspicuous method of observation was chosen after considerable evaluation of other techniques. This method allows for further observations in the summer when the animals are moved to an "on exhibit" location where inconspicuous observations are impractical.

TABLE 1

Individual I.D. #	Individual Name & Sex	*Estimated Age	Basic individual background information
207	Dad 1.0	10 yrs.	Weight in Spring of '83 = 25 lbs. Sire of only infant born to group.
208	Blue 0.1	10 yrs.	Nov. of '77 = false pregnancy Extremely "people-oriented" Believed to be subspecies <i>belzebuth</i> .
209	Goldie 0.1	14 yrs.	Very few teeth remaining. Limited climbing ability. All locomotion slow and deliberate.
210	Cleo 0.1	12 yrs.	Weight in Spring of '83 = 22 lbs. Has limited use of toes on both feet--permanently crippled.
211	Timid 0.1	12 yrs.	Top section of the left ear is missing due to a bite from another monkey.
212	Mom 0.1	10 yrs.	Fall of '78 tested positive for Avian T.B. Dam of 1.0, Born 2/22/81; sold 2/18/84.

*Animals were received as sexually mature adults with no previous records. Estimates for ages are taken from a combination of sources including date of arrival at the Akron Zoo and dental information.

Method of Study

Longhand notes, supplemented by tape recordings (later transcribed onto the original notes) were the means of data collection. Stick figure drawings were included in the notes to facilitate categorizing behaviors. Due to the nature of the study, the data itself was unstructured and undefined in the beginning, but consisted of phrases describing behaviors, positions and interactions of the animals.

The observer entered the building which houses the monkeys and sat upon a chair placed five feet from the enclosure (see Diagram 1) and in plain view of the study group. Tape recorder, paper and pencil, and binoculars were the only tools used. A five-minute adjustment period was required to give the animals sufficient time to greet the observer, move about the enclosure and finally to return to their daily routines.

BACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

routine session of observation was carried out daily (five days/week) from 10:00 to 10:45 a.m. A morning session and an afternoon session were routinely scheduled to last fifteen minutes. An evening session, again lasting fifteen minutes, was held three times per week. All three of the fifteen-minute sessions were held at random times selected to fit the keeper's daily schedule. This time schedule was maintained for a 11-week period beginning in November 1983 and continuing until April 1984. The total recorded observation hours are 147½.

Maintenance

Resting

Full tuck sitting position-head down (FTHD): Body is completely tucked onto a small ball. The feet are together and the knees are bent. The arms are wrapped around the knees while the tail is wrapped around the ankles. The head or just the chin rests upon the crossed arms. The animal is slightly lying on its side, though not enough to consider this a lying position.

Full tuck sitting position-head up(FTHU): Body is position as above with one exception. The head is held erect.

Straight back sitting position-tail curled (SBTC): With back completely straight almost completely straight, the animal sits with legs bent in a variety of positions. The arms may be in use, tucked around the knees, or in a variety of positions including hanging at the animal's side and resting on a surface. In this position, the tail is always curled around the animal's body. It frequently is lying against the same surface as is the rest of the body, only curled around the legs or feet.

Straight back position-tail being used (SBTU): Body is positioned as above, but the tail is in use. It is either reaching or holding on to some object other than another part of the animal's body.

Straight back sitting position-tail being used-chin on hands (SBTU*): This is only a subset of the (SBTU) position described above. This behavior has been observed only in one of the study subjects, but was so frequently observed that it merits mentioning. The subject uses the (SBTU) position, but places his hands one atop the other, usually resting them on his knee. He then places his chin upon his hands and intently watches whatever has his attention.

Full tuck sleeping position (FTS): Body is positioned as in FTHD, but the animal is completely on one side. There is no mistaking this position from the sitting position. In this position, the tail is always curled around the body, holding closely to a leg or arm.

Outstretched limb sleep position (OS): This position is an "un-tucking" of FTS. The animal will sleep on its side with one or more limbs uncurred from the fetus-style position. The subject will usually remain on its side, but occasionally will roll from one side to another while stretching, and then remain in this position with an outstretched limb.

Fence clinging squat (FCS): In this captive group, it is common to see one or more animals resting in a squat position while hanging from the enclosure front. The tail is extended behind and above the animal, catching the fence above the animal's head. This forms the bulk of the support. The feet grab the fence right at the animals' waist area, leaving the knees bent to the sides. The arms are now left free for grooming, eating or holding on.

Fence clinging squat-stomach press (FCS*): This behavior is only a subset of the FCS and have been observed in only one subject. The frequency that this behavior is observed merits its mention. The position is as above, but an additional thrust of the stomach, forcing it up against the fencing, and a turning of the head accompany vocalizations.

BLACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

This is observed when keepers that the animal is used to have entered the room. This elicits stomach scratching by the keepers. No other animals have perfected this, though others have been observed doing something similar in the same type of circumstances.

Grooming

Positions:

FTHD, FTHU, FTS, SBTU, SBTC are all positions observed in animals that are being groomed by one or more conspecifics. The most common position in which to receive grooming is OS. This position is not only assumed naturally by the recipient, but it is manipulated by the groomer, by means of moving the arm, leg, tail or head of the animal they are grooming. Sometimes the leg (etc.) is held in position by the groomer, other times the leg(etc.) is held in position by the animal being groomed.

SBTC, SBTU are the positions most frequently assumed by the groomer.

FTS, SBTC, SBTU are the positions assumed during self-grooming. The choice of positions appears to vary in direct correlation with the area the animal is trying to reach or groom.

Methods:

One handed search (1h): This is a repetitive movement. The animal uses one hand to make short movements (covering only one square inch of fur per movement) toward him/her self. This may or may not be accompanied by Mouthing (M).

Two handed search (2h): This also is a repetitive movement. The animal alternates hands while searching through a small area (about two square inches) by using short movements towards him/her self. As in 1h, this may or may not be accompanied by Mouthing (M).

Mouthing (M): This movement has only been seen in conjunction with grooming. After a movement with one hand towards the groomer through a small patch of fur (1h) or after a full movement of the (2h) which consists of alternating two hands, the animal will lean forward and mouth the freshly groomed area. The tongue will hit the area very quickly in most cases, occasionally the groomer will bite at the area. This mouthing procedure takes no more than a second or so and very seldom upsets the rhythm set up by the groomer.

Two handed search-random (2hr): This search is identical to the 2h with the exception being the random changing of hands. The animal does not appear to alternate hands or to maintain a rhythm. A slower, less intense method of grooming. Frequently seen in self-grooming.

Feeding

Positions:

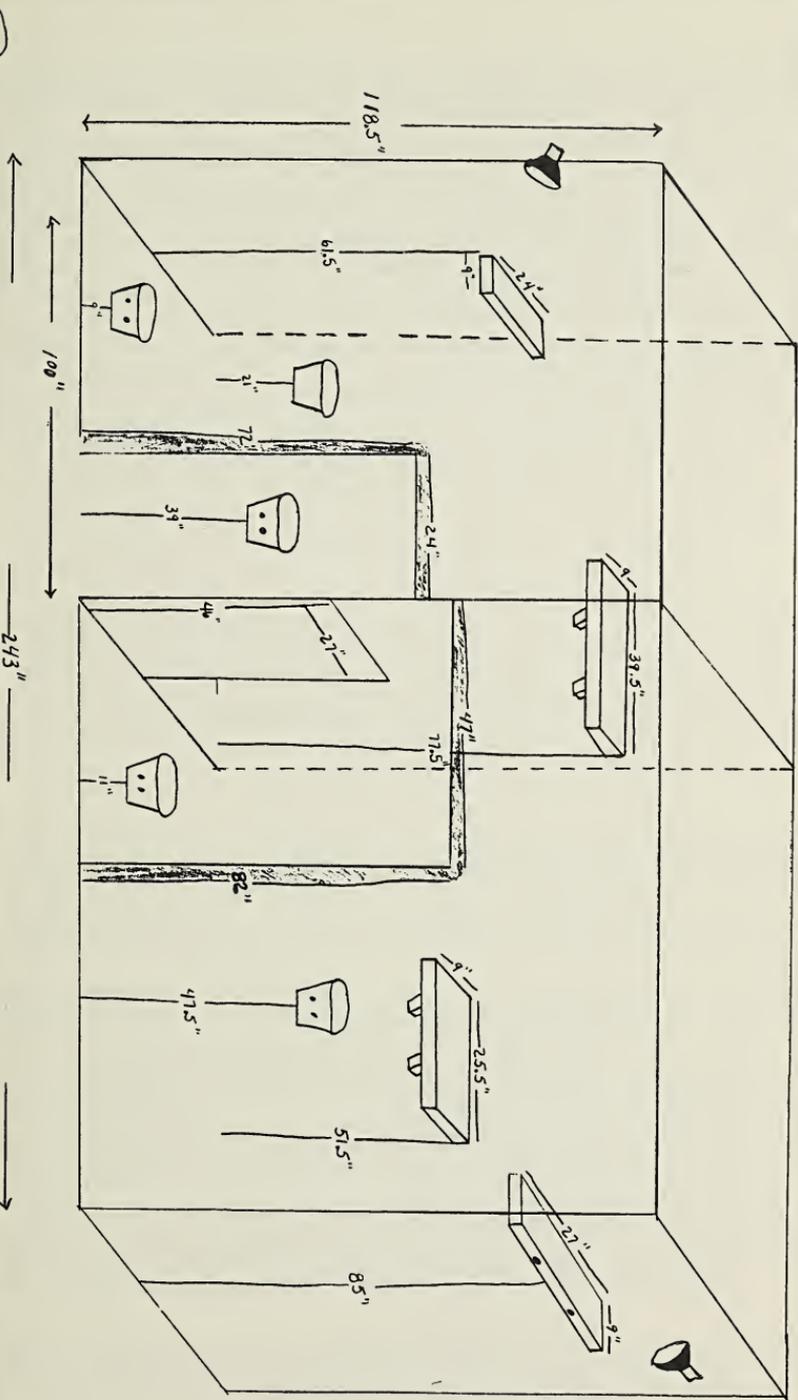
FTHD, FTHU, SBTU, SBTC, FCS, are all used frequently in feeding situations.

All fours (AF): Animal walking on both hands and on both feet. Back is straight, tail always held aloft and curled at the end, or used to grasp any nearby object. Subject will stand in this position and pick up food with tail, hand or mouth.

Bipedal position (B): In this position, the animal stands with legs slightly bent, back straight, but at a 60-degree angle with the substrate. Tail held erect, or holding on to any object. Food is picked up with tail or hands.

BLACK SPIDER MONKEY ETHOGRAM, *Continued*

DIAGRAM 1 - representative sketch of enclosure used during November to April behavioral research. Enclosure is contained within a building. Temperature is maintained at 70°F.



designated feeding stations shaded areas — wooden boards down

designated

BLACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

Locomotion

Methods:

AF, B are two of the most common means of locomotion. They are also the most cumbersome, least coordinated means of movement for these subjects.

Brachiation (Br): The source of their most frequent means of movement. This utilizes the arms and tail in alternating fashion while working their way through branches in a swinging manner. The animal can begin with any of those appendages, swings the entire body weight on that limb, throws out another limb to catch the next branch, and so on. The tail is frequently used for three purposes during this movement. 1 - balance, 2 - part of the actual brachiation process, 3 - a catch net. The tail is the most commonly used part of the body to be used if the animal appears to be falling.

Hand-over-hand (HH): A gibbon-style of brachiation. Just the hands are used for swinging and grasping purposes.

Tail lowering (TL): This constitutes use of the tail to hold the weight of the animal suspended as it drops to another branch or the ground. A variation of this allows the animal to turn upside down while suspended by its tail. This has been observed during possible play periods and in a few feeding episodes.

Tail lowering-two handed (TL*): This is only a subset of the TL. It has only been observed in the oldest group member. While lowering herself with her tail, she will always support herself with both arms until she feels her feet on the desired spot.

Sideways grasp (SG): Due to the captivity of this group, a common feeding position is accomplished by holding to the fence at the front of the enclosure with the tail above the head (therefore holding the bulk of the animal's weight and serving as a pivot point for better maneuvering), the body turned sideways, one arm (the one representing the side of the animal against the fence) holding on and either one or both feet grasping the fence. This allows one arm free to search.

Methods

Backhanded grasp (BG): Because the animal has no thumb, it has learned to use the four fingers with great versatility. This movement places the hand beside the object with the first or index finger hitting the substrate and the other fingers lying tightly above the first. The palm of the hand is facing away from the body. The fingers then wrap around the desired item.

Grasp (G): This movement is just the opposite of BC. In this movement the food is again grasped, but the fingers hit the substrate last or little finger last. The palm of the hand is facing the body.

Finger lift (FL): This movement uses all four finger tips to pick up the desired item. The fingertips are frequently used for picking up very small items, sticky items, or pulling an item off of something else.

Two handed finger lift (2FL): As with the FL, the 2FL uses the fingertips only, but involves both hands. Used frequently when the animal is in a hurry, or has a difficult item to lift.

Tail grab (TG): Using the tail is most often observed only after the food item has already been identified by sight, touch by hands, or smell. To grasp the item the animal just wraps the tail around it. Frequently employed by animals with both hands full of food coming upon another desired food item.

Doggie style (DG): This is the AF position with the exception that the straight back is now at a 45-degree angle with the substrate, allowing for the head to be close to the food. Frequently used when an unknown item is introduced, this method allows the item to be closely inspected, sniffed, and then quickly consumed if it is desirable. The tongue and teeth are both used in this method.

BLACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

Antagonistic behaviors

Pursuance behaviors:

Chase (C): Pursuer actively follows the subject of the aggression. Vocalizations, smacking with the palm of either hand--either directly on or at the subject, and an attack then retreat method of forward movement accompany this behavior. The subject may seem to respond with any of the below listed Reactions to pursuit.

Chase with assistance (C+): This behavior is the same as C but after one aggressor has begun the attack, one or more animals will assist in the pursuit. The assistants will remain behind and/or beside the originator and appear to follow his/her lead. The aggressive act ends when the originator stops pursuing. Assistants have been observed giving a final shove or a slap to the subject before following the original aggressor.

Slaps, nudges and pushes (SNP): Slaps, nudges and pushes are a means of expressing a possible antagonizing situation without a full-fledged chase. These are usually preliminary to a C or C+ aggressive attack. Often times the SNP is all that is needed to avert any further aggression. The slap is administered with a open palm, the nudge is done with a slightly closed fist, and a push is open palm placed against the subject and then pushing away. Any of these can be used in any combination or alone. The most frequently used is the nudge.

Reactions to pursuit

Chase (C*): Subject actively "counter attacks" by using the same chase technique as its opponent.

Submission (S): Subject stands in B position, backs up out of the pursuants' reach, hands raised above the head at least to shoulder level, quiet vocalizations are emitted. In this behavioral reaction, the subject never turns its back to the pursuer until it plans to take full flight (FF) from the situation.

Full Flight (FF): Upon being pursued or sometime during the aggressive act of chasing, the subject turns its back on the pursuer (from whatever position it is in) and runs. This running is either done in B or AF and ends when the animal reaches something to climb. Full flight usually ends with the subject higher than the pursuer and the pursuer giving up the chase.

Side Stepping (SS): Done in the B or AF positions, the subject steps sideways away from the aggressor. Very seldom seen in the C situation, but frequently used to avoid SNP.

Cowering (Co): Occasionally the subject will assume the FTHD position, protecting the head with its hands. This has been observed very seldom and usually by the eldest member of the troop.

Side Stepping Grab (SSG): Observed in a feeding situation by a less dominant animal. The animal will use a side stepping approach to the food and then grab a desired item without breaking stride. The animal then continues forward, side stepping.

Full Flight Grab (FFG): This behavior is used during extremely aggressive feeding situations. Instead of using the SSG approach, the animal will run towards the feeding area, snatch whatever it grabs first and continue running until safely out of reach of any aggressors. No time is taken to select a desired item, instead whatever is touched is selected.

Vocalizations

Whinney (W): The most common sound made by this species. This is a high pitched version of a horse's whinney. Very short and very loud. The vocalization is no longer than 4 seconds in duration. It appears to be used as a greeting, during the embrace (E), and as a means of identification.

BLACK -HANDED SPIDER MONKEY ETHOGRAM, Continued

Bark (BB): This is a lower tone than that of the W. A bark is accomplished with an O shape of the animals' mouth and it is deep and repetitive. It appears to be used during stressful situations as a warning or a means of complaint. An animal in this troop has been recorded to have continued this vocalization for a full 6 hours.

Shriek (Sh): This sound is long in duration, repetitive and high in pitch. It lasts for a 10 second count per repetition and is used when terrified or extremely agitated. Frequently uttered by the male just before attacking of the others.

Whimper (Wh): Resembles a child that is recovering from a bout of crying. The whimper is a collection of squeaks, air intakes, and sobs. Frequently accompanies Responses to pursuits and will last as long as 15 minutes after an aggressive situation. Whimpers have never been recorded coming from the male of this troop of monkeys.

Miscellaneous behaviors

Cricket positions (CP): This position is assumed when the animal is trying to feed in the DG method, or when the male is rubbing his chest in a spot of urine, aromatic foods, or other strong smelling substances already on the substrate. Similar to the Af position, the animal will bend all four appendages to allow for the chest to be close to and possibly touching the ground. A movement from left to right with the chest against the ground accompanies all attempts to rub the chest on a substrate.

Embrace position (E): A very common behavior position for these subjects under a variety of situations. Two animals approach each other bipedally. As they near each other they raise one or both arms over their heads. If subject A bends its head toward subject B's right underarm area then B will bend its head toward A's right underarm area. This is accompanied by the W vocalization and the bringing down of the unraised arm around the back of the other animal. This is maintained from 2 seconds to as long as 30 seconds. It appears to happen most frequently after some type of altercation, and can be initiated by either party.

Tail, Arm Swing (TAS): Observed very seldom, this appears to be done during a stressful situation. The right arm and the tail support the weight of the animal who then raises the head, dangles the other arm and both legs, then begins to swing from right to left. This is a very repetitive behavior and is akin to descriptions of neurotic or cage behavior.

Pacing (P): Another seldom seen behavior akin to neurotic or cage behavior. This consists of many different forms of movement (Br, B and HH being the most frequently used) combined in repetition often in a small area. This behavior is carried out most frequently by a stressed individual.

Playful Behaviors (Pl): A variety of behaviors previously described when taken out of context appear to be play behavior. TL accompanied by much bouncing up and down and W vocalizations appears to be an example. Another example may be the Hit and Skip (HS) behavior observed on several occasions which consists of an active animal running or brachiating over to a resting animal, smacking with an open palm the resting animals' head or back and then quickly moving to another area. This was frequently observed being carried out by a younger animal. Many other behaviors appear to fit this category but require further research.

CONCLUSION

This ethogram, as it is presented, is a representation of the behaviors of a captive troop of 1.5 *Ateles geoffroyi* at the Akron Zoo during the time frame of November 1983 to April of 1984. The author wishes to acknowledge that this data, and therefore the ethogram, does not include

BLACK-HANDED SPIDER MONKEY ETHOGRAM, Continued

behaviors indicative to the environment found only in the outdoor exhibit that this troop occupies May through October. It is felt, however, that the basic underlying behaviors have been observed and recorded and therefore included in this presentation.

The creation of this ethogram gives both the author and the reader a broad working base for further behavioral research. This ethogram will be used by the author as a tool for recording behavior during subsequent research with the hope that a more comprehensive understanding of this species can be obtained.

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Biolog

the supplementary understanding that has been gained in intense watching

BLACK SPIDER MONKEY ETHOGRAM, Continued

of this group of primates has opened many doors to the keeper staff at the Akron Zoo.

- A predictable estrus cycle has been established for three of the five females in this group allowing for a closer prediction of birth in the case of a pregnancy based totally on behavioral aspects.
- A behavioral "watch" set up by the animal department and maintained by the zoo's adult volunteers allowed for detailed notes on the first breeding activities of our pair of four-year-old jaguars.
- The establishment of a program with the nearby University of Akron and their Biology of Behavior classes will supply us with fresh researchers while we suggest the subjects for their projects.
- New projects are being discussed all the time. The possibilities are endless!



Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. There is no charge for such listings. Please include closing dates for positions available.

ELEPHANT HANDLER...to assist trainer and participate in African elephant husbandry program/exotic hoofstock management. Salary - \$1,025-\$1,370 per month, benefits. One year elephant experience is mandatory. Send resume by 15 February 1985 to Mike Blakely, Curator/Mammals, Kansas City Zoo, Swope Park, Kansas City, MO 64132.

KEEPER...responsible for care and feeding of collection of mammals, birds, and reptiles, as well as repair and maintenance of cages and pens. Experience required in zoo situation. Degree in zoology preferred but not required. Willing to be trained in presenting talks to visitors. Must have ability to meet and deal with the public. Salary \$12,000 plus benefits. Send resume to Vince Hall, Claws 'N' Paws Wild Animal Park, RD# 1, Lake Ariel, PA 18436.

ELEPHANT KEEPER...requires high school degree and one year paid experience in care/handling of animals, including pets, or high school degree and six months experience in a zoological institution, or BS in biology, zoology, animal science or veterinary technology and a driver's license. Salary \$13,314-\$14,312. Send resume to Sandra Kempse, Curator of Mammals, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217.

REPTILE/AQUARIUM CURATOR...requires BS in biological sciences and three years' zoo/aquarium experience, including one year in supervisory capacity, with knowledge of reptile/amphibian/fish husbandry and display. Advanced degree preferred. Will be responsible for collection of reptiles, amphibians and fish and supervision of subordinates. Salary \$22,795-\$26,263, plus benefits. Contact Milwaukee County Department of Human Resources, 901 N. 9th St., Milwaukee, WI 53233. EOE.

EDUCATION CURATOR...requires BS in education with biological science background, teaching and communications skills, ability to prepare written a oral programs and ability to recruit and train presenters of such programs. Experience in zoological field desirable. Salary \$13,500-\$19,932, plus benefits. Send resume and references to James Swigert, Jackson Zoologic Park, 2918 W. Capitol, Jackson, MS 39209 (601) 960-1575.

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Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size of no more than 6" x 10" (15 cm x 25½ cm.). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephoned contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

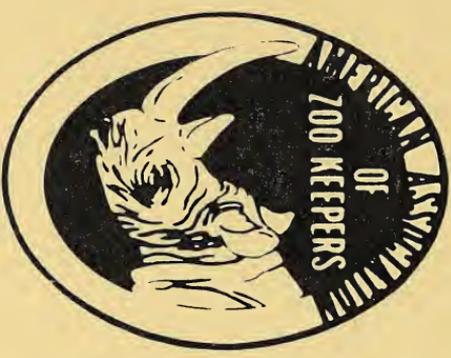
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FEBRUARY 1985
 VOLUME TWELVE
 NUMBER TWO

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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This month's cover drawing of the Bald Eagle is by Godfrey Bourne. He holds a PhD in resource ecology from the School of Natural Resources, University of Michigan and is an authority on the Snail Kite. Thanks, Godfrey!

Scoops and Scuttlebutt

NOTE TO CANADIAN MEMBERS ON MEMBERSHIP RENEWAL

Administrative Secretary Dolly Clark wishes to advise all Canadian AAZK members that they should send ONLY a bank or postal money order in U.S. funds when renewing their memberships. Sending a personal check, even if the sender has written "U.S. funds" on the check, requires that it be processed separately through a separate bank center. This processing also requires payment of a fee from AAZK which is not built into the membership fee. Sending payment in either a bank or postal money order will not only speed up the membership renewal processing, but will also save AAZK money. Thank you for your help.

TELEPHONE TIPS FOR REACHING NATIONAL HEADQUARTERS

Have you ever called AAZK National Headquarters and were unable to find anyone in the office? This may have happened to you and we are sorry for any inconvenience this may have caused. However, what many AAZK members may not know is that the Association's two employees, Administrative Secretary Dolly Clark and AKF Managing Editor Susan Chan are only part-time employees and are not in the office all day, everyday. If you need to reach National by phone, it is best to call between 9:30 a.m. and 2 p.m. (Central Standard Time) on weekdays. One of the employees is usually in the office during these hours. If you are calling about AKF and cannot reach Susan Chan, ask for either Bernie Feldman or Alice Miser. If you call and there is no one available to speak with you, please leave your name, number and a brief description of the purpose of the call with the Zoo's secretary. Oftentimes, messages are left and AAZK employees have no idea of what the caller wanted. Upon returning a long-distance call, they discover that the individual only wanted a membership application or something else that could have more easily and certainly more economically handled by mail. You can help save yourself frustration and the Association money by handling questions etc. by mail rather than long-distance calling. We are, of course, glad to speak with you when the time factor does not allow postal reply.

FROM THE PRESIDENT

As the New Year begins, AAZK is fortunate to have two very active members stepping in to take over projects vacated this past October. Board member Verona Barr at Miller Park Zoo has been appointed the new Book Review Coordinator, replacing Ellen Leach. Ellen deserves thanks from all AAZK members for bringing to our attention the wealth of information available to zookeepers. Ellen's book review column has always been one

of the most popular in AKF and she never ran short of members willing to review the books she had received. It has been a durable column, now in its fourth year in AKF. Verona Barr will, of course, pick up where Ellen left off and I expect we will continue to have books reviewed with regular frequency in AKF. Thanks, Ellen!

Steven Wing at Milwaukee County Zoo is also familiar to AAZK members through his work with the Professional Standards Committee. Steven is the newly appointed coordinator of the Infant Development Notebook. He will be replacing the departing Steve Taylor of Louisville. Steven's job and its going to be a big one, will be to collect from AAZK members information on the mother-rearing of animals for which we care. This will be in notebook format and there will be more information in future AKFs about this project.

Congratulations and thank you to Verona and Steven for accepting these positions.

Kevin Conway

AAZK President

DIET NOTEBOOK

Here is a unique opportunity to share with other keepers the types of diets used to maintain exotics in captivity. This project has the potential to develop an excellent reference on captive diets but only if you participate.

Forms can be obtained from the Collection Centers listed below and when completed they should be sent to the appropriate center. Please type or print information, use metric units whenever possible and refer to the ISIS or IUCN listings for scientific names.

Please become involved.

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AAZPA WESTERN REGIONAL CONFERENCE

March 17-19, 1985 Anchorage, AK

AAZPA SOUTHERN REGIONAL CONFERENCE

March 31-April 2, 1985 Birmingham, AL

SYMPOSIUM ON IMMUNOLOGY OF ZOO AND WILD ANIMALS

April 12-13, 1985 Columbia, SC

Held at the Riverbanks Zoological Park. For information or to submit a paper, contact Dr. Suzanne Kennedy-Stoskopf, Johns Hopkins University, Division of Comparative Medicine, 720 Rutland Ave., G52 Traylor Bldg., Baltimore, MD 21205, (301) 955-3726 or Dr. Barbara Thomas, Riverbanks Zoo, 500 Wildlife Parkway, Columbia, SC 29210 (803) 779-8717.

AAZPA GREAT LAKES REGIONAL CONFERENCE

April 14-16, 1985 Cleveland, OH

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 28-30, 1985 Boston, MA

1985 GREAT LAKES REGIONAL AAZK CONFERENCE

May 5-7, 1985 Detroit, MI

Hosted by the Detroit Zoo Chapter of AAZK. See page 67 of this issue for details on tentative schedule and registration.

SECOND INTERNATIONAL CONFERENCE ON CONSERVATION BIOLOGY

May 5-8, 1985 Ann Arbor, MI

For additional information contact: Conservation Biology, Wildland Management Center, School of Natural Resources, The University of Michigan, Ann Arbor, MI 48109-1115 (313) 763-1312.

1985 NATIONAL AAZK CONFERENCE

October 20-14, 1985 Miami, FL

Hosted by the South Florida AAZK Chapter at Miami Metrozoo, 12400 S.W. 152nd St., Miami, FL 33177. See further information on page 42 of this issue.



Births & Hatchings

DALLAS ZOO.....*Tami Jones*

B&H for December 1984 include: Mammals - 0.1 Suni, 0.1 Addra gazelle, 1.0 East African oryx, 1.0 Orangutan, 1.0 Kirk's dik dik; Birds - 0.0.2 Jan-daya conure, 0.0.2 Society finch and 0.0.1 Yellow-fronted canary.

TAMPA-BUSCH GARDENS.....*Susan Rackley*

December 1984 B&H include: Mammals - 6.4 Defassa waterbuck, 1.0 Dorcas gazelle, 1.0 Cape buffalo, 0.2 Addax, 1.2 Thomson's gazelle, 1.0 Muntjac deer; Birds - 0.0.1 Forsten's lorikeet, 0.0.4 Fischer's lovebird, 0.0.2 Goldies lorikeet, 0.0.4 Black-masked lovebird, 0.0.2 Peach-faced lovebird, 0.0.2 Triangular-spotted pigeon, 0.0.3 White-bellied x Yellow-thighed caique, 0.0.2 Scaly-breasted lorikeet.

WILDLIFE SAFARI.....*John A. Cooper*

B&H from July through December 1984 included 1.0 Dama gazelle (DNS) 1.0 Cape Buffalo and 2.4.1 Cheetah (1.0.1 DNS).

LINCOLN PARK ZOO.....*Susan Moy*

B&H for December 1984 include: Mammals - 0.0.4 Kowari, 0.0.12 Capybara (3 DNS), 0.0.2 Acouchi, 0.0.1 Paca, 0.0.1 Owl monkey (DNS), 0.0.1 Three-banded armadillo; Birds - 0.0.1 Double-striped thick-knee.

JACKSONVILLE ZOO.....*Anne Wiggins*

B&H for August to December 1984 include: Mammals - 0.0.1 Sloth bear, 1.0 Sable antelope, 0.1 Grizzled grey tree kangaroo, 0.0.1 Celebes crested macaque, 1.1 Gemsbok (DNS), 1.0 Sitatunga, 0.5 Capybara, 0.1 Brindled gnu, 0.1 Common waterbuck, 1.0 Cape buffalo, 1.0 Eland, 0.1 Reticulated giraffe; Reptiles - 0.0.5 Cuban boa, 0.0.8 Honduran milksnake, 0.0.3 Western diamondback rattlesnake, 0.0.5 Gopher tortoise, 0.0.8 Black rat snake. Hatched during this time frame was also 0.0.1 Sacred ibis.

PITTSBURGH AVIARY.....*Curtis G. Robbins*

Hatchings for August through December 1984 include: 0.0.9 Elegant crested tinamou (3DNS), 1.0.3 Ringed teal (0.0.3 DNS), 0.0.5 Ruddy duck (5 DNS), 0.0.1 Red-and-white crake (DNS), 0.0.10 Common moorhen (1 DNS), 0.0.1 Sun bittern (DNS), 0.0.1 Double-striped thick-knee (DNS), 0.0.2 Red Lory, 0.0.1 Tawny frogmouth (DNS), 1.1 Levallant's barbet, 0.0.2 Blue-necked tanager (1 DNS), 0.0.2 Troupial, 0.0.3 Zebra waxbill, 0.0.2 Gouldian finch, 0.0.4 Purple glossy starling (3 DNS), 0.0.4 Ruppell's long-tailed starling x Chestnut-bellied starling (sexes of respective parents undetermined), 0.0.1 Wattled starling (DNS) and 0.0.2 Rothchild's mynah.

CENTRAL FLORIDA ZOOLOGICAL PARK.....*Kathy Speckman*

August through November 1984 B&H include: Mammals - 1.1 Ocelot, 1.0 Black-capped capuchin; Birds - 1.1.3 Rothchild's mynah (3 DNS), 0.0.3 Fischer's lovebird (DNS), 0.0.1 African grey (DNS), 0.0.1 Budgerigar (DNS); Reptiles - 0.0.1 Northern earless lizard (DNS), 0.0.2 Common mud turtle, 0.0.2 Eastern hognose and 0.0.3 Dwarf Haitian ground boa.

BIRTHS AND HATCHINGS, *Continued*

BROOKFIELD ZOO.....*John S. Stoddard*

December 1984 births included: 0.0.9 White-toothed shrew, 0.0.4 European harvest mouse, 0.0.3 Chinchilla and 0.0.1 Black-faced kangaroo. The Bird Dept. reports the fledging of 0.0.1 Silver-eared mesia.

SAN ANTONIO ZOO.....*Debi Reed*

B&H for December 1984 include: Mammals - 1 Polar bear (DNS), 3.2 Maned wolf (1.0 DNS), 0.1 Aardvark, 0.1 Chapman's zebra, 1.1 Addax, 0.1 Dama gazelle, 0.1 Arabian sand gazelle, 1.0 Springbok; Birds - 2 Green jungle-fowl, 2 Diamond dove (1 DNS), 2 Duyuenbode's lory, 2 Green-winged macaw, 4 Queen of Bavaria conure, 1 Melba finch, 1 Star finch; Aquarium - Glass shrimp.

ASSINIBOINE PARK ZOO.....*Phil King*

December B&H included: 1 Scarlet ibis (DNS), 2 Gaubian pouched rat (DNS), 0.1 Arabian camel and 2 (at least) Polar bear.

MILWAUKEE COUNTY ZOO.....*Steven M. Wing*

B&H for December 1984 included: 0.0.3 Parrot-billed seedeater, 0.0.2 Diamond dove, 0.0.1 Tree shrew (DNS) and 0.0.1 Vampire bat.

PHILADELPHIA ZOO.....*B. Bahner*

Included in the December 1984 B&H are: 0.1 Reeve's muntjac, 2 Cape Barren goose, 1 Nicobar pigeon, 1 Victoria crowned pigeon (DNS), 1 Brimstone canary and 1 Prehensile-tailed skink (DNS).

METRO TORONTO ZOO.....*Harry Hofauer*

November 1984 B&H include: Mammals - 0.0.1 Brush-tailed bettong, 0.0.6 Bennett's wallaby, 1.1 Egyptian fruit bat, 0.0.1 Douroucouli; Birds - 0.0.2 Zebra dove, 0.0.1 Zebra finch; Invertebrates - 0.0.90 Brazilian giant cockroaches.





WORKSHOP PARTICIPATION ENCOURAGED

By
Pat Sammarco
Keeper Education Committee Coordinator

Spring is on its way, and with it comes opportunities to share our enthusiasm and experience at the various Regional workshops of the American Association of Zoological Parks and Aquariums. The papers at these meetings are always interesting, and the people anxious to make contact with other animal care professionals. This year is a real celebration for Zoo Keepers, since the AAZPA has finally allowed Keepers a membership category of recognition. Check the

list of upcoming events, and register for a Regional. You will find that other conference participants are interested in you, your animals, and in AAZK. If you are planning to attend a workshop, contact your Regional Coordinator (listed in the front cover) for brochures, advice and contacts at the meeting. R.C.s officially represent AAZK at conferences.

The Keeper Education Committee is continuing to identify and develop resources to add to our professional knowledge. The Exhibit Design Form will be ready for distribution soon, with a legal release form taking time to develop. Once this project is fully functional, it will go out of the Keeper Education Committee and become an independent project like the Animal Data Transfer Forms. Diane Forsyth has put a lot of work into this information source and deserves a lot of thanks.

Bibliographies on topics of interest to you are being made available from the Reference Search Project. If you need information about published papers and articles about our animals, please contact Jenny Rentfrow, Liz MacLaughlin or Marilyn Cole. You may also want to send them indexes of specialist journals that you receive to help fill their resource list.

These are only two of our many educational activities. If you have questions or suggestions, please send them to me, or directly to a project head. Sharing knowledge and ideas is what continuing our education is all about.

YOUR INPUT IS NEEDED!!!

If you have not already done so, please take the time to fill out the questionnaire from the Manual Review Project which appeared in this column in last month's AKF. Return the completed form to: Beth Poff at Mill Mountain Zoological Park, P.O. Box 13484, Roanoke, VA 24034.

Also, the Diet Notebook Project is still needing input from the membership. Their specific requests and the names and addresses of collection center coordinators have appeared the past several months in AKF. It was most recently published in the January 1985 issue on page 2.

Our various projects are only as good and useful as the information which members are willing to offer. Your assistance is greatly appreciated.



ANIMAL KEEPERS' FORUM SURVEY RESULTS

(Editor's Note: The following are the statistical results of the AKF survey which was published in the November 1984 edition. Questionnaires were also distributed at the National AAZK Conference in Seattle. A total of 186 surveys were returned. All respondents did not answer all questions and therefore each category may not necessarily add up to the total number of returned surveys. Next month, the editorial staff will publish a second part of this survey, highlighting the comments received on specific topics as well as our responses to these comments. We deeply appreciate those who took the time to complete and return the survey. It is important to remember that AKF belongs to the entire AAZK membership and your comments and suggestions at any time are welcomed.)

1. Are you satisfied with the present front cover drawings of AKF?
 YES 140 NO 46
2. Are you satisfied with the present front inside cover layout of Editors, Board of Directors, Project Heads, Coordinators and Chairmen?
 YES 180 NO 3
3. Are you satisfied with the present inside back cover format for membership application/information?
 YES 173 NO 8
4. Every effort is made to have the AKF in the mails the first Friday of every month. On the average, when during the month do you usually receive your AKF?
 EARLY IN MONTH - 69 MIDDLE OF MONTH - 78 END OF MONTH - 18
5. After you receive AKF, do you: KEEP 173 PASS ON 7 THROW 3
6. Do you read your monthly AKF? YES 180 NO 1
7. Does your Zoo library receive AKF? YES 93 NO 52
8. Have you used husbandry hints or other ideas from AKF in your job?
 YES 81 NO 38
9. Have you ever submitted an article and/or drawing to AKF?
 YES 59 NO 125
10. Have you ever put in a request for "Information Please"?
 Yes 38 NO 142
 If so, did you receive any response? YES 24 NO 18
11. Have you ever responded to a survey request published in AKF?
 YES 68 NO 108
12. Have you ever applied for a job which was listed in "Opportunity Knocks"?
 YES 44 NO 137
 If so, were you successful in obtaining the job? YES 10 NO 34
13. Do you like having the proceedings of various workshops, conferences included in special issues of AKF? YES 182 NO 3
14. Do you like the expanded December issue containing National Conference Proceedings?
 YES 154 NO 23

ANIMAL KEEPERS' FORUM SURVEY RESULTS, Continued

15. How would you rate the job being done by the editors in putting together the AKF and in covering topics of interest to the membership?

Formating of AKF:

Excellent 90 Good 84 Fair 11 Poor 0

Contents of AKF:

Excellent 81 Good 87 Fair 14 Poor 2

16. Of the numerous regular and semi-regular sections of AKF, how do you rate the frequency with which you read the following:

<u>Section</u>	<u>ALWAYS</u>	<u>SOMETIMES</u>	<u>NEVER</u>
Scoops & Scuttlebutt	129	47	1
Births & Hatchings	100	67	14
Coming Events	152	26	2
Continuing Keeper Ed.	124	55	1
Chapter News	86	86	7
Opportunity Knocks	146	33	1
Legislative News	85	86	9
Elephant Set	99	64	17
Bird Calls	87	78	14
Great Ape Pandemonium	111	56	11
Reptile/Amphibian Potpourri	89	72	18
Education Alternatives	107	68	3
Feed Bag	126	55	1
Exhibit Options	125	47	3
Book Reviews	103	71	4
Information Requests	152	29	0
Keeper's Alert	151	27	0
Think Safety!	135	43	3
Struggle for Survival	121	56	2

Statistics compiled by Alice Miser, Executive Editor, AKF.

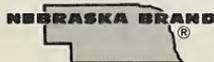
Suggested changes and comments on specific topics of concern will be published in the March issue of Animal Keepers' Forum.





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1985 AAZK NATIONAL CONFERENCE

October 20-24, 1985

Miami, Florida

Conference Committee Chairman: Rachel Rogers
South Florida AAZK
12400 S.W. 152nd Street
Miami, FL 33177

Conference Headquarters: Coconut Grove Hotel
2649 South Bayshore Drive
Miami, FL 33133

TENTATIVE SCHEDULE

Sunday, 20 Oct.

Registration
Board Meetings
Ice Breaker

Tuesday, 22 Oct.

Tour of Miami Metrozoo
Zoo Lunch
Workshops
Zoo Olympics
Dinner provided by Docents

Thursday, 24 Oct.

Paper sessions all day
Lunch on your own
Banquet - Auction

Monday, 21 Oct.

Paper session all day
Lunch at Coconut Grove Hotel
Monty Trainers (local restaurant/
bar)

Wednesday, 23 Oct.

Dreher Park Zoo
Zoo Lunch
Soccer & Volleyball
Dinner on your own

**A trip to the Everglades is being discussed as a optional pre/post (to be decided) conference trip.

FIRST CALL FOR PAPERS

Papers are requested for the 1985 AAZK National Conference. This year's theme - "Husbandry/Maintenance of Traditionally Difficult Animals" - was selected to encourage Conference delegates, whose interests are so diverse, to share their experiences and knowledge with others. It is only by sharing this information that others may learn, and thereby use these ideas to aid them in the future and avoid mistakes that have been made in the past.

Papers will be limited to 20 minutes with a five-minute question/answer period. The registration fee for the conference will be reduced for those people whose papers are accepted. Please notify us of any equipment needed. If you will be using video tapes, only VHS will be accepted. Please submit an outline or abstract by 1 August, 1985. Send papers, information or questions to: *Brett Bannor, AAZK Conference, South Florida Chapter, 12400 S.W. 152nd St., Miami, FL 33177.*

1985 AAZK NATIONAL CONFERENCE REGISTRATION FORM

October 20 - 24, 1985

Please fill in and return this form with your fee to:

Rachél Rogers
Conference Registration
South Florida AAZK
12400 S.W. 152nd. Street
Miami, FL 33177

CONFERENCE REGISTRATION

NAME: _____

ADDRESS: _____ CITY: _____

STATE/COUNTRY: _____ ZIP/POSTAL CODE: _____

ZOO AFFILIATION (if applicable): _____

AREA OF INTEREST _____

VEGETARIAN: _____ YES _____ NO

WILL BE PARTICIPATING IN ZOO OLYMPICS: _____ YES _____ NO

BRINGING AN AUCTION ITEM? IF SO, BRIEFLY DESCRIBE: _____

WILL BE SUBMITTING PAPER: _____ YES _____ NO
(\$15.00 will be refunded on acceptance of paper)

TRANSPORTATION: _____ (car, plane, etc.)

AAZK MEMBERSHIP STATUS & FEE:

Member or Spouse.....\$55.00
Non-member.....\$60.00
Late Registration Fee.....\$15.00

TOTAL FEES ENCLOSED.....\$ _____

ONE DAY RATES FOR INDIVIDUAL CONFERENCE EVENTS ARE AVAILABLE. Please contact Rachél Rogers for Information.

Please make this check payable to: "SOUTH FLORIDA AAZK". The deadline for Registration is Thursday, 15 August, 1985. Hotel information will be available in the March 1985 Animal Keepers' Forum.

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

ENVIRONMENT

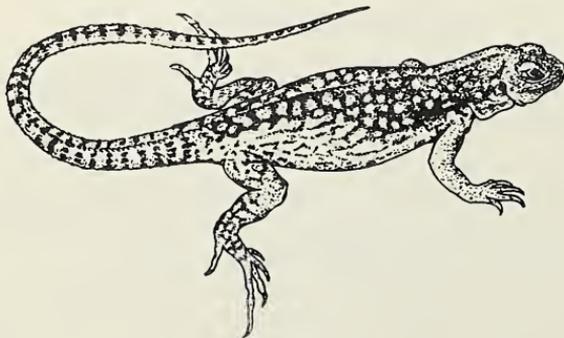
(Humidity and Water Requirements)

Generally, reptiles need relative humidities between 30-70%.

Water and humidity maintenance problems are major contributors to ill-health in captive reptiles. For example, air conditioning causes many skin problems which can be remedied by supplementing humidity with larger water bowls, misting daily, or by placing damp substrate material in one corner of the animal's cage. But, care should be taken when using damp substrates such as moss and other absorbent material: excessive humidity can promote blisters and other skin problems.

Desert dwellers derive most of their water from the food they eat, and they require lower relative humidity than those living in rain forests. However, most reptiles drink directly from standing water, and many snakes preparing to shed will often soak in their water bowls. For different reasons box turtles and some tortoises also soak in water; therefore, they should be supplied with water receptacles (at least twice the turtle's body size) that are shallow enough to provide easy access and prevent drowning. Animals who lick water from morning dew or raindrops are unfamiliar with deep water; therefore, a piece of slate or some pea-gravel can be placed within the bowl to prevent their drowning. Larger lizards and snakes tend to tip their water bowls; bowls should be heavy enough to prevent this problem.

Regardless of an animal's mode of acquiring its water, a water bowl should always be supplied.



INSECT DISPLAYS AND REARING
AT THE CINCINNATI ZOO

By
Milan K. Busching
Curator of Invertebrates
Cincinnati Zoo, Cincinnati, OH

Live insects on display is one of many unique features at the Cincinnati Zoo. The Insect World exhibit opened to the public in 1978 and was the first exhibit of its scope and magnitude in North America to be specifically designed and built "from the ground up" to display living arthropods. It won the National Exhibit Award for the year 1979 by being judged the best display to open at any zoological park or aquarium in the United States and Canada. It was designed to be an educational exhibit that would appeal to a diverse audience of all ages and educational backgrounds. The display introduces people to the world of insects and is seen by about one million visitors each year. This includes about 130,000 students from grade schools, high schools, and colleges who come with their instructors on organized tours to learn about insects.

In addition to the people who have seen the exhibit in person, millions of others are reached through the media systems. The Insect World has contributed dozens of newspaper articles, radio, and television segments both locally and nationally.

The visitors are directed through the exhibit along a sequential path dealing with such topics as insect morphology, evolution, numbers and mass, relations with plants and other animals (including humans), defense and escape, senses, locomotion, reproduction, and social behavior. The theme of the Insect World is diversity with the living displays extensively supplemented with graphics, photographs, models, and preserved specimens which ensures the representation of most of the major groups of insects. The combination of both museum and zoological garden techniques results in a unique and attractive presentation.

Insect identification railings or "pinning rails" are located in front of the display walls and contain appropriate pinned specimens, text, paintings, and line drawings. The specimens and labels can be easily changed thus insuring flexibility and interchangeability between the displays. This format makes it possible to immediately place on display newly acquired species.

In designing the Insect World it was felt that captive insects would be best displayed in a naturalistic context, with the primary focus placed on how they live in their world. The introduction of living plants and other animals into the display serves to underscore the enormous importance of insects in nature.

Among the most popular displays are those in which visitors can actively participate: pulling out drawers to find answers to quiz questions; stepping onto a scale to see how many insects equal their weight; or sliding moveable magnifying glasses over specimens to have a closer look. Visitors especially enjoy insect demonstrations conducted by Insect World employees and zoo volunteers where selected arthropods can be picked up and held for an even closer examination.

One of the highlights of the Insect World is the butterfly "aviary" where

INSECT DISPLAYS AND REARING AT THE CINCINNATI ZOO, Continued

visitors actually enter the enclosure which houses the insects. Represented here is a jungle clearing in which Heliconiid butterflies and humming-birds can be seen surrounded by lush tropical vegetation including orchids, bromeliads, trees, and flowering vines.

Live specimens displayed in the Insect World are obtained by several methods. Commercial suppliers supply certain moths, butterflies, and stick insects. Numerous exchanges of specimens have been made between the Cincinnati Zoo and several museums, universities, and other zoos. In addition, insects are acquired by donations and collecting trips, both local and tropical. These sources provide important fresh material for display and for the development of new rearing techniques and life history investigations.

Many factors enter into insect colonization, display design, and display maintenance. Most of the 63 live displays are serviced daily from the public side by sliding them forward out of their wall mount locations. Cage construction consists of a plywood bottom with a wood moulding around the front and sides, a molded fiberglass back, a glass front, and a hinged plexiglass lid with one or two screen ventilation panels depending on cage size.

Certain species can be reared in continuous cultures in the display cages (milkweed bugs (Oncopeltus); flour beetles (Tribolium); Collembola; chafer beetles (Pachnoda); various cockroaches; etc.) But most of the approximately 100 species of Arthropods at the Insect World are kept in breeding cages in the service area and transferred to display cages at the appropriate stage of development. A greenhouse is used to raise Heliconiid butterflies and to grow foodplants for phytophagous insects during winter.

A discussion of rearing techniques for a few particular insect species may serve to illustrate a number of key considerations for insect propagation under display conditions. The arthropods displayed at the Insect World fall into three general rearing categories: 1. continuous culture (with overlapping generations), 2. seasonal rearing (or non-overlapping generations), and 3. maintaining individuals (not reproducing in captivity.)

Among the insects which are raised in continuous culture, the Heliconiid (passion-flower) butterflies from the New World tropics are good examples for many considerations which must be accommodated when rearing and displaying insects. The adult butterflies are provided with flowers which provide a sufficient amount of nectar (e.g. Lantana) and pollen (e.g. Anguria and Gurania -- both tropical Cucurbits) from which the butterflies extract amino acids. Sugar-water feeding stations can be provided in emergencies. Larval foodplants (passion-flower vines) are placed in oviposition cages. Passiflora caerulea and P. biflora have been the two most useful and versatile species of Heliconiid foodplants at the Insect World. Several predators species which have depressed butterfly populations at the Insect World include: Pharaoh ants, Carpenter ants, and Pillbugs which prey upon eggs, larvae, and pupae; jumping spiders and wolf spiders which attack larvae; and various web-spinning spiders which prey upon adult butterflies. Since the use of insecticides in an insect exhibit poses obvious hazards, cultural and biological controls are used whenever possible.

Another of the permanent displays is the honeybee colony. The bees are allowed to forage outside, however, since it is a small colony (five frames) supplemental feeding (sugar syrup and pollen substitute) is usually necessary during late winter and early spring.

One of the highest maintenance of the continuous culture species is the Leaf-cutting ant colony (*Atta columbica*) -- one of the fungus culturing species of ants. The display colony at the Insect World requires literally an armload of leafy branches every day throughout the year. Fresh branches are used during warm months. Frozen leaves, greenhouse plants, and evergreen shrubs are used during the winter. Plant preferences of the ants change from day to day so leaf species must be provided on a rotating basis. Also, moisture and temperature levels in the fungus garden must be closely watched and adjusted appropriately.

Several species of stick insects are reared and displayed in continuous, overlapping generations. Among these are the Javanese leaf insect (*Phyllium*) and the Giant Asian walking stick (*Eurycnema*) both of which have year-long life cycles. Since the eggs incubate for six months, overlapping generations are essential to keep this species on display. Another more extreme example of long development time is the Malayan leaf insect (*Heteropteryx*) which has a two-year generation (eggs incubate for nine months).

Among the predatory species displayed, one of the more unusual is the hematophagous bug (*Dipetelogaster maxima*) from Baja California which is believed to be the largest blood-sucking bug in the world. This species requires a blood meal at each nymphal instar and at monthly intervals during the adult stage.

The Hickory-horned devil or Royal walnut moth (*Citheronia regalis*) is one of the local species in the Cincinnati area which is displayed on a seasonal basis limited mainly by foodplant availability.

Another seasonal species is the Owl butterfly (*Caligo*) of the New World tropics. Adults have been reared at the Insect World from eggs laid by wild-caught females but so far no matings have been observed and no fertile second-generation eggs have been produced.

Some encouraging results were obtained with the Royal goliath beetle (*Goliathus regius*) of West Africa which arrived at the Insect World in 1980. Wild-caught females oviposited in captivity and larvae were reared on decayed *Albezia* wood and fruit (mainly cantelope rind). For undetermined reasons about 90% of the original 55 larvae died during the pre-pupal and pupal stages. Only two survived to the adult stage--both males. Both specimens lived out their lifespans at Cincinnati and while it is hoped to exhibit and breed this species in the future, none are currently housed at the Insect World.

The Hercules beetle (*Dynastes hercules*) from the New World tropics showed good reproductive success in 1981 when eighteen larvae from eggs laid by wild-caught females were reared. The largest of these larvae weighed just over 102 grams. These larvae matured to the adult stage, mated in captivity and the Insect World staff is currently rearing a totally captive-bred second generation of this species.

Species which have not reproduced in captivity at the Insect World are numerous and include the Rainbow grasshopper (*Dactylotum*) from the southwest United States. Mating was observed in this species, but no oviposition took place. This species is not currently housed at the Insect World.

The Harlequin beetle (*Acrocinus*) is another large, attractive beetle from the American tropics which makes an interesting display with the males being quite territorial. Encouraging results have occurred from specimens collected on a recent trip to Trinidad. In 1984 eggs were laid and the larvae are now being raised and are reaching maturity. Currently, the larvae are about half way through their life-cycle. This species is collected and displayed every year.

The brilliantly-iridescent green *Plusiotis* (a scarab-type of beetle from the southwest United States) was collected during a field expedition this past summer and preliminary reproductive efforts are encouraging. Eggs were laid by the wild-caught females and larvae are currently being reared.

In conclusion, the Cincinnati Zoo's Insect World was designed to be an attractive and entertaining educational exhibit which would introduce visitors to insects. The Insect World is well suited for use as a teaching aid for Entomology or Animal Behavior classes. We have learned much about insect display and rearing and continue to learn while at the same time the displays allow visitors to have a close look at living insects and to learn what insects are, how they have adapted to survive, and how they interact with plants and other animals in nature.



THINK Safety!

*Submitted by Jill Grade
Safety Column Coordinator*

Good news! Denise Robinson writes that the Philadelphia Chapter might be interested in producing safety buttons and bumper stickers. She also has a terrific idea for safety warning stickers to be used in keeper work areas. At this point we are simply exchanging thoughts on design--any more ideas out there?

During a recent visit to the Lincoln Park Zoo, I noticed several articles on animal-related accidents pinned to a keeper message board. This is an excellent idea. Such articles, large or small, could even be zeroxed and distributed throughout your zoo. The accidents reported need not relate to your specific work area - such reports serve as reminders to everyone to THINK SAFETY. And how about sending some of those articles to me for an even wider distribution? My current mailing address is: 1437 N. Wicker Park Ave., Chicago, IL 60622. Articles may also be sent directly to the AKF. Be sure to include source information.

Even more valuable than outside articles, are recollections of personal experiences involving safety. Have you ever been involved in or witnessed an accident? Have you ever discovered and eliminated a safety hazard before someone was injured? Seen any safety comics lately, or know of someone able to draw one up for you? Anecdotes? Stories? A new safety campaign at your zoo? Just think, a contribution to this column could save a life--THINK SAFETY!



Publications Available

NEW TRADE LAW REPORT AVAILABLE FROM WORLD WILDLIFE FUND-U.S.

Latin American Wildlife Trade Laws by Kathryn S. Fuller and Byron Swift is a country by country analysis of the laws that govern wildlife trade in Central and South America and also provides current information about domestic wildlife restrictions in the entire region. A list of protected and regulated species is included for each country.

This publication has received enthusiastic support from World Wildlife Fund-U.S., the CITES Secretariat, the IUCN's Environmental Law Centre, and the natural resources agencies of the Latin American countries. U.S. government agencies, such as the Departments of Interior and State, have offered both financial and technical assistance. Other non-governmental groups, including the International Association of Fish and Wildlife Agencies, have also been generous supporters.

Plans are already underway to expand the report's scope to include other regions of the world, notably Asia, Africa, Oceania and the Caribbean. Regular updates of the report will include new developments in Latin American wildlife trade laws and expanded coverage of plant trade laws and regulations.

The 354-page report has been published in both English and Spanish and is available for U.S. \$11.50 each. Make your check payable to World Wildlife Fund-Trade Law and mail it to TRAFFIC (U.S.A.), 1601 Connecticut Ave., N.W., Washington, D.C. 20009.

ZOOLOGICAL PARKS OF U.S. AND CANADA GUIDE PUBLISHED

Lions, Tigers and Bears by freelance travel writer Jefferson G. Ulmer, is billed as the most comprehensive guide to live animal exhibits in the United States and Canada. All institutions with permanent onsite animal collections open to the public --over 700 in all-- are included: zoos, aquariums, reptile displays, nature centers, fish hatcheries, visitor farms, and children's museums. Entries are listed alphabetically within sections devoted to states or provinces. Each entry gives address, telephone number, hours, fees, highlights of the collections, and educational programs and facilities. An index of park names completes the volume. The 256-page, illustrated volume is available through Garland Publishing Inc., 136 Madison Ave., New York, NY 10016 (212) 686-7492). Prepaid and credit card orders include postage and handling fees. Price per book is \$20. Credit card orders should include type of card, account number, expiration date and authorized signature.

WHITE-TAILED DEER: ECOLOGY AND MANAGEMENT

Published by the Wildlife Management Institute, this exhaustive volume represents the product of 9 years of effort by 72 authors, and details virtually all aspects of white-tail history, behavior, habitat and management.

While written primarily for use by professionals in the wildlife field, the book was also carefully prepared to be of use to sportsmen and others interested in wildlife conservation. Its pages contain more than 450 photos, original artwork and approximately 2,400 references.

Copies are available from Stackpole Books, Cameron and Keller Streets, Harrisburg, PA 17105.



THE STRUGGLE FOR SURVIVAL

VIRUS BLAMED FOR WHOOPING CRANE DEATHS

An extensive investigation into the recent deaths of seven whooping cranes (*Grus americana*) at the Patuxent Wildlife Research Center in Laurel, MD, has revealed that the birds fell victim to a virus, eastern equine encephalitis. The virus was transmitted to the birds by *Culiseta melanura*, a mosquito that is not known to bite humans. Biologists do not know what brought this mosquito into contact with the whooping cranes, which are kept outdoors, but the onset of cold weather will kill any remaining mosquitos this season. By late November, all of the remaining whoopers appeared to be well. As a precaution, biologists are experimenting with a vaccine on similar, but non-endangered birds.

The seven birds (five females and two males) that died were part of a captive flock maintained at the research center for breeding. Offspring from the Patuxent flock, which now numbers 32 birds, have been "cross-fostered" with sandhill cranes (*Grus canadensis*) in an attempt to establish a second wild whooping crane flock migrating between Bosque del Apache (New Mexico) and Grays Lake (Idaho) National Wildlife Refuge. Only one of the seven Patuxent birds had produced offspring.

The virus was identified jointly by Patuxent, the NWS's National Health Laboratory in Madison, WI, the Center for Disease Control in Atlanta, the U.S. Army's Fort Detrick in Maryland, the Maryland Department of Agriculture, the University of Maryland, and the Department of Agriculture's National Veterinary Services Laboratory in Ames, Iowa.

The recent deaths are the first time that encephalitis virus has been documented among whooping cranes. Although Eastern encephalitis typically attacks the brain and central nervous system in mammals, birds exhibit few symptoms and investigators in the Patuxent outbreak noted liver damage as the most common effect in many of the dead cranes.

The low point for the whooping cranes in the U.S. was reached in 1941, when just 15 were left in the wild. The U.S. and Canada have worked jointly to build up whooping crane numbers through research, captive breeding, habitat protection, and strict law enforcement. Today, in addition to the 32 captive whoopers at Patuxent, there are approximately 90 whooping cranes in the wild flock that migrates from Canada's Wood Buffalo Park to Aransas National Wildlife Refuge in Texas and 35-38 in a second, experimental wild flock which migrates between New Mexico and Idaho.

Endangered Species Technical Bulletin
Vol. 1X, No. 11 (1984)

YOU CAN'T TELL THIS BIRD BY ITS COVER

By
Debbie Hewitt, Hospital Keeper
San Diego Zoo, San Diego, CA

What sex are the condor chicks? Curiosity surrounding this question is certainly strong, fueled by an intense worldwide interest in the fate of the critically endangered California Condor (*Gymnogyps californianus*). With less than three dozen of these magnificent birds left alive in the world today, the curiosity at the Center for Reproduction of Endangered Species (CRES) is far from idle.

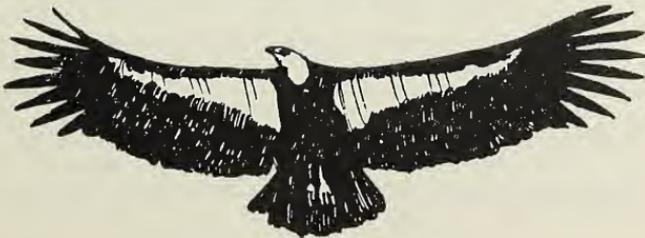
CRES researchers have worked to develop and test a reliable method of determining the sex of newly hatched chicks. Their efforts will contribute significantly to the California Condor Recovery Program, under which it is proposed to release juvenile condors hatched in captivity back into the wild as early as next year. For this plan to succeed, the sex ratio of the chicks from each season must be known.

A major difficulty in doing research with endangered species is that there are simply too few of the animals available to test or observe. In sexing California Condors, the basic problem was compounded by another: the birds are apparently not externally sexually distinct at any age. Male and females look identical. Still another challenge faced by the CRES researchers was to devise a sexing method that is totally safe for the young birds, that can be done without touching them and that is potentially applicable to the rarest of species.

The egg waste estrogen (EWE) analysis developed by CRES under the direction of Arden Bercovitz, an avian reproductive physiologist, appears to overcome all of these problems. The test is passing rigorous evaluation of its reliability with flying colors. Results of EWE analysis on the six chicks hatched in 1984 indicated that all are female. Chromosomal evaluation from blood samples taken later confirmed the EWE analysis results.

As a condor embryo grows during the last half of incubation, the gonads (testes in males and ovaries in females) begin to function. Estrogens and androgens are produced. As this happens, the metabolic waste products of these hormones accumulate inside the egg. They then are readily and easily measurable if fecal material is collected from the shell remains when the chick hatches.

An ovary produces more estrogen than does a testis, and one major estrogen, estradiol (E2), is greatly concentrated in the feces of female chicks. Now, several collaborative projects are extending test of the EWE sexing method to other species of vultures and birds of prey. The American Federation of Aviculture has funded a pilot study of the EWE technique in parrot chicks; this work focuses on the Puerto Rican parrot, which, like the California Condor, has a total world population of less than three dozen.



Chapter

South Florida Chapter

Brett Bannor has been selected to head the Diet Notebook Project. If anyone has questions or information regarding the Diet Notebook write: South Florida Chapter AAZK, c/o Brett Bannor, 9751 Wayne Ave., Miami, FL 33157.

Columbus Chapter AAZK

The last meeting of the year was held at the Bogey Inn for the AAZK Christmas party. For those who weren't able to attend, you missed out on a delicious buffet dinner, an outrageous slideshow of events that were held throughout the year, door prizes, a speech from Jack, and the Ghost Buster Band. We had a wonderful turnout of 65 members.

The Columbus AAZK chapter ended 1984 with many goals and accomplishments made to bring in the New Year. The first goal AAZK met was bringing together all sectors of the Zoo for an educational experience. This was accomplished through the Keeper Workshop held in October and trips to nearby zoos. The second goal was the fun aspect. No one will ever forget the First Annual Zoo Olympics!

Even though this was a trial year after being stagnant for awhile, I believe that 97 paid members shows what incredible enthusiasm and pride we take in our Zoo. Our president, Andy Lodge, estimates that we are one of, if not the largest AAZK chapter in North America. Way to go Columbus Zoo!

We are greatly looking forward to the AAZPA National Conference which will be held in Columbus, as well as even bigger and better events in 1985.

---submitted by Stacy Katz

News

Please send Chapter News to Lee Payne, Chapter Affairs Coordinator at the Detroit Zoo. Also send a copy of news to: AKF Editorial Offices, 635 Gage Blvd., Topeka, KS 66606.



IBA CONFERENCE SCHEDULED FOR 1986/CALL FOR PAPERS ISSUED

The International Association of Bear Research and Management (IBA) is sponsoring its seventh International Conference 21-26 February 1986 in Williamsburg, VA. The purpose of this conference is to provide a forum in which researchers, biologists, and managers from throughout the world can exchange information and ideas. The IBA publishes a proceedings consisting of papers presented at the conference. To promote the timely publication of these proceedings, the first call for papers is in order.

Abstracts of papers to be presented at the conference are due to the editor on 1 May 1985. Abstracts will be evaluated by a panel of reviewers and authors will be notified of tentative selection by 15 June 1985. Draft manuscript will be due before the conference, 1 October 1985. Manuscripts will receive peer review and be returned to authors with notification of selection by 1 December 1985. Revised manuscripts (3 copies plus camera-ready figures) will be due at the Williamsburg meetings.



Legislative News

LEATHERBACK TURTLE NESTING BEACH BECOMES WILDLIFE REFUGE

A beach area of about 327 acres at Sandy Point on the island of St. Croix, U.S. Virgin Islands, has been purchased by the USFWS for protection as a national wildlife refuge. This site is one of the most important nesting beaches known within the U.S. territory for the leatherback turtle (*Derموochelys coriacea*), an endangered species. During the 1984 season, 28 leatherbacks nested at Sandy Point a total of 141 times. The area is also used for nesting by two other listed sea turtles, the threatened green (*Chelonia mydas*) and the endangered hawksbill (*Eretmochelys imbricata*).

Both Sandy Point, which is on the southwestern tip of St. Croix, and the adjacent waters are designated as Critical Habitat for the leatherback. Until recently, Sandy Point was zoned for various kinds of development. If hotels, houses, and shops had been constructed at the site, sea turtle nesting would have been disrupted by lights, structures, and vehicles on the beach and by people and pets. As a result, the leatherback population using the nesting beach could have been extirpated. Destruction of turtle nests and killing of adult turtles has also been a problem in the past. As part of the new Sandy Point National Wildlife Refuge, the beach can be better protected during the vital nesting season. For the past three years, volunteers from the organization Earthwatch have been active in sea turtle research and in patrolling the beaches.

The commercially valuable Sandy Point property was purchased from a willing seller for \$2.5 million, which was appropriated by Congress from the Land and Water Conservation Fund. Acquisition of the area for conservation purposes was supported by the Virgin Islands Department of Conservation and Public Affairs.

The only other known site of concentrated leatherback turtle nesting within U.S. territory is at a beach on Culebra, a small island near Puerto Rico. In 1984, 25 leatherbacks nested a total of 155 times at this site. Earthwatch also has a major project on Culebra. The Culebra nesting beach is on property owned by the Commonwealth of Puerto Rico and is managed in cooperation with the USFWS.

---Endangered Species Technical Bulletin
Vol. IX, No. 11 (1984)

TWO NATIVE FISH LISTED AS ENDANGERED

The USFWS recently added two native fish to the list of species protected by the Endangered Species Act. The Smoky madtom (*Noturus baileyi*) is a small species of catfish restricted to a seven-mile stretch of Whitico Creek in the Cherokee National Forest region of Tennessee. This fish was thought to be extinct until its rediscovery in 1981. It is now listed as Endangered.

The other fish of interest is the Osark cavefish (*Amblyopsis rosea*), a true cave-dwelling species which is now limited to only fourteen caves in Arkansas. It has experienced population declines because of habitat change and over-collecting by fish hobbyists and is now listed as Threatened.

--K. Vehrs in AAZPA Newsletter
January 1985

USFWS TO REVIEW STATUS OF EIGHT FOREIGN TURTLES

The Service has begun reviewing the status of eight species of foreign turtles to determine if they should be proposed for listing under the Endangered Species Act. Among the threats to these species are habitat alteration, exploitation for food, and collection for the pet trade.

Species proposed for review include: 1) Painted batagur (Callagur borneonensis); 2) Celebes tortoise (Geochelone forsteri); Kavalai forest or cane turtle (Heosemys silvatica); Brazilian sideneck turtle (Phrynops hogei); Chaco sideneck turtle (Platemys pallidipectoris); South American red-lined turtle (Pseudemys scripta callirostris); Iguana Island turtle (Pseudemys malonei); and the Cat Island turtle (Pseudemys felis).

---Endangered Species Technical Bulletin
Vol. 1X, No. 11, (1984)

1984 ADDITIONS BRING U.S. ENDANGERED SPECIES LIST TO 828

Forty-six more native and foreign animals and plants, ranging from China's giant panda to the diminutive bumblebee bat, thought to be the world's smallest bat, were added to the U.S. List of Endangered and Threatened Species during 1984. Among U.S. species, the Wyoming toad, the woodstork, and the woodland caribou are all now protected by the Endangered Species Act.

With these additions, the number of endangered and threatened species on the list now stands at 828, of which 331 species are found in the U.S. and 497 are found solely in other countries. The grand total includes 297 mammals, 220 birds, 99 reptiles, 85 plants, 62 fishes, 24 clams, 16 amphibians, 12 insects, nine snails and four crustaceans.

In addition to the new listings, 54 other species were proposed in 1984 for listing as endangered or threatened. Among these are the wide-ranging interior least tern and piping plover, plants as exotic-sounding as the Last Chance townsendia and the Large-flowered fiddleneck, and the Perdido Key beach mouse, believed to be the Nation's most critically endangered small mammal.

This year provided good news for several species that appear headed toward eventual recovery. The Arctic peregrine falcon and the Utah prairie dog were moved from "endangered" to "threatened" listings--reflecting an improvement in their status. The tiny snail darter--a southern Appalachian member of the perch family that sparked the most celebrated court test of the Endangered Species Act--was likewise reclassified as "threatened," due to discovery of small numbers of the fish in additional locations. Other species on their way to a more certain future include the southeastern population of the brown pelican, and the Florida population of the American alligator.

---Dept. of Interior News Release
January 1985



THE "UNDERGROUND ZOO"

THE PROBLEM OF EXOTIC VENOMOUS SNAKES IN PRIVATE POSSESSION IN THE UNITED STATES

By

John H. Trestail, III, RPh
Western Michigan Poison Center
Grand Rapids, MI

*Said I to the Keeper at the zoo
It's a good thing that pet snakes are so few.
He said: the zoo you see here,
Is not the one you should fear.
There's also one "underground" too.*

Most poison control centers in the United States routinely handle calls involving treatment of those snake species native to North America. There exists, however, a number of exotic venomous snakes in the United States, either in zoos, research facilities, or often secretly held in private collections of amateur herpetologists forming an "underground zoo." Does the presence of these exotic species constitute a problem for medical personnel in their rapid and effective management of the envenomated patient? To what extent do bites by these exotic species occur, and under what circumstances? In an attempt to answer some of these questions, a survey was undertaken of the 25 regional poison centers recognized by the American Association of Poison Control Centers (AAPCC) in 1981 in order to determine their experiences with exotic snake bites from 1975-80 and the awareness of poison center personnel as to the presence of any exotic snake specimens in their areas.

Nationally prominent medical consultants on snake bite poisoning were also surveyed to determine their involvement in exotic envenomations during the same five-year period. There apparently exists in the amateur herpetological communities a certain amount of skepticism of the ability of their local poison centers and emergency department personnel to handle their case of envenomation by exotic species, should it happen. To more effectively provide care to the patient of the exotic envenomation, the medical professionals and the amateur herpetologist must be brought to a better understanding of each others problems and needs. It is as an attempt to inform the poison centers on how to prepare for the exotic snake bite, that this paper is dedicated.

THE EPIDEMIOLOGICAL PROBLEM

Survey of AAPCC Regional Poison Centers

A questionnaire was sent in 1981 to the 25 AAPCC approved regional poison centers. These 25 centers represented 25/271 (9.1%) of all centers responding to the 1980 National Survey conducted by the National Clearinghouse for Poison Control Centers (NCPCC), and the same 25 centers reported a total of 646,036 (40%) of the 1,317,705 calls reported taken in 1979 by all responding centers. Each center was asked in the "Exotic Snakebite Questionnaire" to search their records for the five-year period 1976-80 and to indicate how many confirmed venomous snakebite related incidents they handled. Of these total incidents they were asked how many were from domestic and how many were from exotic snake species. For each exotic snake species, the poison center was asked to give background on the bite

THE UNDERGROUND ZOO, Continued

victim and whether the person was a professional or amateur herpetologist, herpetological supplier, or innocent bystander. Each exotic snake was to be identified by scientific name where possible. Additional information was sought on the medical treatment the victim received and the outcome of the incident. Each poison center was also asked to list any exotic snake species they were aware of in private collections within the geography covered by their poison center.

Of the 25 questionnaires sent out, 24 (96%) were returned. However, only 18 (72%) of the 25 centers were able to supply data for the full time period or a portion of it. The two major reasons why most centers were unable to provide the requested data were that either they did not break down envenomation calls to that degree, or they lacked sufficient funds and manpower to abstract the requested data from their records. The results of this survey are given in Tables 1 and 2.

Table 1 ranks the poison centers by total calls taken in 1979 as they indicated in the NCPCC National Survey (Column B), and also for perspective is given the 1959 "bite rate" (the recorded treated snake bites per million people per year) taken from the 1959 national epidemiological survey by H.M. Parrish, MD, for the state in which the regional center is located (Column C). As can be seen, there were a total of 774 cases of authenticated snake envenomations which included 7 (0.9%) caused by exotic species (Column E). The percentage of the five year reporting period of which the poison centers' data represents is found in Column F.

Table 2 provides a breakdown of the seven cases of exotic snake bites encountered as to species, victim's herpetological background, cause of the incident, treatment received, and case outcome. It is interesting to note that 5 (71.4%) of the cases involved amateur collectors and that in 4 (57%) of the cases, the victim was either inebriated or in a self-destructive frame of mind when the incident occurred. In only one (14.3%) of the cases was there a fatality. The most common snakes listed in 5 (71.4%) of the cases were various subspecies of the "Cobra" (*Naja naja*). Only 4 (17.4%) of the responding poison centers were able to list any exotic venomous snakes in their area in private collections. Among the species identified to be in private hands were: Cobras (*Naja naja*), Phillipine mangrove snake (*Boiga dendrophila*), Gaboon viper (*Bitis gabonica*), African puffadder (*Bitis arietans*), Kraits (*Bungarus sp.*), Green mamba (*Dendroaspis angusticeps*), European viper (*Vipera berus*), and European asp (*Vipera aspis*).

It appears that although exotic venomous snakes do exist in communities served by poison centers, there are very few bite incidents that are captured by the poison center information system. Either the amateur collectors are very careful in their handling of their collections, or the bite is not reported when it occurs. Another possibility might be that the poison center was bypassed in the seeking of information of toxicity and treatment.

Survey of National Snakebite Consultants

In order to determine if additional exotic snake bites had occurred in the United States during the same five-year period, a questionnaire was sent to several nationally recognized medical consultants which were listed in the POISINDEX microfiche system. Of the eight consultants surveyed, 5 (62.5%) supplied data on their consultations regarding exotic snake bites during 1976-1980. Those consultants responding were: Sherman A. Minton, MD, Indianapolis, IN; David L. Hardy, MD, Tucson, AZ; Findlay E. Russell, MD, Tucson, AZ; Jack Wainschel, MD, Arcadia, CA; and Willis A. Wingert, MD, Los Angeles, CA.

THE UNDERGROUND ZOO, Continued

20. Omaha, NE	14,203	32.6	15	0	100%	
21. San Francisco	12,133	14.1	36	2	55%	Calls from 2/79-11/81
22. Rochester, NY	11,240	2.2	78	0	100%	
23. Kansas City, MO	8,137	54.2	4	0	20%	Calls in 1980 only
24. Iowa City, IA	3261	3.3	4	0	100%	
25. Washington, DC	(None)	6.5	7	1	5%	No calls prior to 1/80
TOTALS	646,036	AV.29.3	744	7	79.6%	

TABLE 2 - Reported Cases of Exotic Snakebites, 1976-1980

CASE NUMBER	LOCATION	EXOTIC SPECIES	VICTIM	REMARKS
1	San Diego, CA	<u>Naja naja</u> (Cobra)	Amateur Collector	suicide attempt resulted in fatality
2	Long Island, NY	<u>Atheris</u> sp. (African Bush Viper)	Professional Zoo Herpetologist	accident, hospitalized no exotic antivenin used, recovered
3	Grand Rapids, MI	<u>Naja naja kaouthia</u> (Monocellate Cobra)	Amateur Collector	suicide attempt hospitalized, exotic antivenin used/ recovered
4	San Francisco, CA	<u>Naja naja melanoleuca</u> (Forest Cobra)	Amateur Collector	suicide attempt hospitalized, exotic antivenin used/recovered
5	San Francisco, CA	<u>Baia dendrophila</u> (Phyllipine Mangrove Snake)	Amateur Collector	accident (inebriated owner), hospitalized, no exotic antivenin used, recovered
6	Washington, DC	<u>Naja naja</u> (Cobra)	Amateur Collector	accident, hospitalized, recovered

Table 1 - 1981 AAPCC Recognized Regional Poison Centers, Venomous Snake Data 1976-1980

A	B	C	D	E	F	G
Center Location	1979 Total Calls	1959 Bite Rate	Total Venomous Snake Cases	Total Exotic Snake Cases	% of 5 Year Reporting Period	Comments
1. New York, NY	57,285	2.2	133	0	20%	Calls in 1980 only
2. Boston, MA	55,000	0.4	10	0	60%	Calls from 1978-80
3. Denver, Co	45,279	23.4	?	?	--	No response to survey
4. San Diego, CA	40,080	14.1	104	1	100%	
5. Seattle, WA	40,000	8.8	15	--	100%	No data (not broken down)
6. Atlanta, Ga	39,666	134.4	--	--	100%	No data (not categorized)
7. Baltimore, MD	39,000	13.5	--	--	100%	No data
8. Detroit, MI	36,020	7.4	--	--	100%	No data
9. Minneapolis, MN	35,652	0.8	--	--	100%	No data
10. Salt Lake City, UT	32,230	23.5	18	0	100%	
11. Inadrianapolis, IN	26,000	9.7	--	--	100%	No data
12. Long Island, NY	25,415	2.2	2	1	100%	
13. Grand Rapids, MI	20,594	7.4	11	1	100%	
14. Tucson, AZ	20,574	78.3	60	0	20%	No data available prior to 1980
15. Galveston, TX	20,222	147.0	145	0	60%	
16. Sacramento, CA	19,144	14.1	--	1	100%	No data (not broken down)
17. St. Louis, MO	16,000	54.2	12	0	100%	
18. Springfield, IL	14,590	3.5	3	0	100%	
19. Albuquerque, NM	14,311	74.7	87	0	70%	Calls from 7/1/77-12/31/80

THE UNDERGROUND ZOO, Continued

The results of this survey are listed in Table 3. In this data it can be seen that three of the consultants broke down their consultations, the others providing more generalized discussions. Of the data supplied, there were a total of at least 168 consultations, of which 17 (10.1%) involved exotic species of snakes. Of the 17 cases at least 6 (35.5%) were involving amateur collectors. Many of these cases, of course, might include duplicated information with the data from the poison center survey, or as consultants confer with each other, but it does present a picture of the type of incidents that are recorded. Many of the snake species involved were not recorded by any of the poison centers which would seem to indicate a direct call to the consultant bypassing the poison center's information system.

Literature Review

In order to determine if any previous work had been done on the subject of envenomation by exotic snake species, a review of the international literature was conducted. Some of the prior experiences that were revealed were as follows: H.M. Parrish, MD, stated that of approximately 6,680 people bitten annually in the United States, the estimate was that 8 (0.1%) were due to foreign venomous snakes. Also during the period 1950-1959, there were 138 snake bite fatalities, 3 (2.2%) of which were due to foreign venomous species. His estimate was that about 8 people are bitten by foreign venomous snakes in the U.S. annually. (1.) F.E. Russell, MD, stated that by the year 1975, in 650 cases of snake bite he attended to, 85 (12.9%) were due to exotic species. Also during the period 1955-1957, the Los Angeles County-University of California Medical Center had logged a total of 373 telephone calls and 121 letters relating to bites by exotic snakes. Dr. Russell also noted that a mail survey of ten Southern California snake collectors, handlers, or herpetologists, indicated that they kept 667 exotic venomous snakes, and the respondents suggested there may be as many as 2,000 exotic snakes in the area (2). H.A. Reid, MD, studied the problem of foreign venomous snakes in Great Britain and found that from 1970-1977, there were 32 bites from foreign venomous snakes. Three bites were to zoo personnel, 5 bites were to workers in research facilities utilizing venomous snakes, and 24 (75.0%) were to private individuals in their homes. A questionnaire survey of 500 members of herpetological societies showed that of the 310 respondents (62%), 26 (8.4%) said they kept foreign venomous snakes including representatives of 50 different species. The more common species were: Western Diamondback (Crotalus atrox), Puff Adder (Bitis arietans), Gaboon Viper (Bitis gabonica), and Cobras (Naja naja). Of course many of the species foreign to Great Britain are native to the United States, but many of the exotics are the same in the collections found in each country.

Survey of Herpetological Societies

To determine the extent of exotic venomous species in possession by amateur herpetologists, a letter survey was carried out involving several large herpetological groups around the U.S., as to what "HOT" (venomous) exotic species their membership might possess. There was no response to the letters; the societies and their membership remained disturbingly silent.

Survey of National Antivenin Resource Center

To determine if any calls for exotic antivenin had bypassed both the poison centers and the medical consultants, a letter was written to the

			(3) Honocellate Cobra <i>(Naja naja haouthla)</i>	-----
			(4) Indian Spectacled Cobra <i>(Naja naja naja)</i>	-----
			(5) Fer de Lance <i>(Bothrops atrox)</i>	-----
3. Wingert	--	2	(1) Cobra <i>(Naja naja sp.)</i>	Amateur Collector
			(2) South American Coral Snake <i>(Micruurus frontalis)</i>	No Exotic Antivenin Used Due to Extreme Hypersensitivity
TOTALS	168	17		

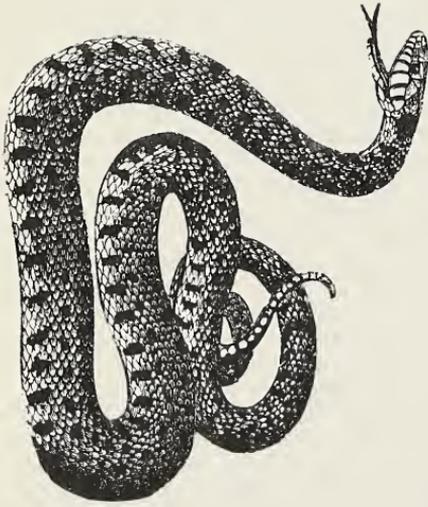


Table 3 - Survey of Snakebite Medical Consultants

Medical Consultant	1975-1980 Total Consults	Total Exotics	Species Involved	Comments
1. Minton	45	10	(1) Tropical Rattlesnake <i>(Crotalus durissus terrificus)</i>	Amateur Collector Hospitalized No Antivenin Used
			(2) Cantil <i>(Agkistrodon bilineatus)</i>	Amateur Collector Hospitalized No Antivenin Used
			(3) Green Asian Pit Viper <i>(Trimeresurus sp.)</i>	Research Scientist No Antivenin Used
			(4) Tropical Rattlesnake <i>(Crotalus durissus sp.)</i>	Amateur Collector Bitten by Zoo Specimen
			(5) Saharan Horned Viper <i>(Cerastes cerastes)</i>	Professional Herpetologist
			(6) Honocellate Cobra <i>(Naja naja kaouthia)</i>	Amateur Collector Exotic Antivenin Used
			(7) Oxus Cobra <i>(Naja naja oxina)</i>	Zookeeper Exotic Antivenin Used
			(8) Siamese Cobra <i>(Naja naja kaouthia)</i>	Amateur Collector Exotic Antivenin Used
			(9) Russell's Viper <i>(Vipera russelii)</i>	Serparitarium Worker Exotic Antivenin Used
			(10) Honocellate Cobra <i>(Naja naja kaouthia)</i>	Serparitarium Owner No Symptoms Developed
2. Wainshel	121	5	(1) Fer de Lance <i>(Bothrops atrox)</i>	-----
			(2) Philippine Mangrove Snake <i>(Boiga dendrophila)</i>	-----

THE UNDERGROUND ZOO, Continued

Oklahoma Poison Control Center, producers of the "Antivenin Index". In this letter the staff was asked to abstract their data for the period 1976-1980, for the number of times and for what species they were asked to assist in locating exotic antivenin stocks in the U.S. Their response was that they only showed one instance in 1979 (Monocellate Cobra, Naja naja kaouthia), and three instances in 1980 (Puff Adder, Bitis Arietans; Black Mamba, Dendroaspis polylepis; and Krait, Bungarus sp.). For the prior years, there were no records still on file. These results seem to indicate that although exotic antivenins were used often in cases of exotic snake envenomations as indicated by the medical consultant, and poison center questionnaire responses, this valuable resource center for poison centers and medical personnel was not utilized in the location of antivenin as much as one would have expected.

("The Underground Zoo" is reprinted from Veterinary and Human Toxicology, Vol. 24, Supplement 1982 with the permission of the author. Part 2 to be published in the March 1984 AKF will deal with the education problem and possible solutions.)



A HAVEN FOR INJURED BIRDS AT THE AUDUBON ZOO



By
Carol L. Lentz
Public Information Officer
Audubon Park & Zoological Garden
New Orleans, LA

The elements for survival for an injured bird are care, observation, nutrition and exercise through flight. All of these elements are now available for birds in Audubon Zoo's new flight enclosure located in the Wild Bird Rehabilitation Center.

The Flight Rehabilitation Exercise Enclosure is 60' x 50', has four chambers made of wooden slats and houses up to a dozen birds at a time. According to Krista Morgan, Director of the Wild Bird Rehabilitation Center, "The slats are used instead of wire because birds have such strong eyesight that they see past their wire enclosure and tend to fly into it repeatedly."

The enclosure was designed in 1982 by Morgan and Ann Orlowski-Tappan, the founder and first coordinator of the Rehabilitation Center.

Two of the chambers are designed for large birds such as eagles, hawks, owls and herons. Within these areas the large birds can fly back and forth rebuilding muscles needed for strong flight in the wild. In the two smaller chambers, the wooden slats are lined with fine wire to prevent small birds such as wrens and screech owls from escaping.

Another important function of the enclosure is to reintroduce birds of prey to the act of catching their food. The bottom of the chambers are covered with sheet metal which prevents rodents and other small prey from getting away. While this prepares the bird for their release into the wild, it also enables the zoo staff to evaluate the birds with eye injuries and inner ear problems.

"The enclosure has become an important tool in our work because we now can rehabilitate the birds much more quickly and we're more certain that they'll survive in the wild," said Morgan.



Viewpoint

HE WANTED TO BE A KEEPER

By
A. Dale Belcher
Curator of Herpetology
Rio Grande Zoo, Albuquerque, NM

oy, I sure wish I had your job," he told me. About ten, maybe eleven. I had that kid-next-door look and eyes so blue they were bottomless.

Really? What would you like about my job?"

Well, you know, you take care of the animals." Oh. Not really. Not hardly at all, in fact.

Suppose there should be a certain sense of comfort in knowing your job is secure, even if only because no one wants it. He wanted to be a Keeper.

52. Highway 63 passes two lanes wide through twenty small towns in the 150 miles from Columbia to St. Louis, MO. We leave early, before sunrise; I will take nearly four hours in a 1946 Plymouth coupe to make the trip. It would be dark, too, when we got home again; but in between, all day, I would be at the Zoo.

I remember the Reptile House and a crowd of people around a large cage. I crept through unnoticed, the way a child can, and heard an old black man saying, "You see, he's got feet all underneath," as he pointed to the belly of a large python trying to climb the glass. I knew even then that those were scales, belly and ventral scales, open along the rear edge, lifting outward and forward to try to gain, perchance, a scalehold on some roughness of the smooth glass. I didn't tell him, maybe couldn't was a better word; I was shy, and older people seldom listen to kids. Someday, I decided I would work in that building, and then I could tell him. I wanted to be a Keeper.

Keeper. A Taker-care-of. A Carer. In many ways keepers are the most important people working at the zoo. To be sure the veterinarian should be a specialist, and at the same time the ultimate general practitioner. To be sure, the director and the curators should be multitalented. To be sure, the business manager should possess superlative business acumen, to account for the thousands of dollars to the penny. To be sure. But without a well-cared-for animal collection, without caring keepers, we might all be selling shoes.

The keepers are the backbone of the zoo operation. What do they do? Well, a little raking, a little shoveling, a little hosing, a little scrubbing, a little watering, a little feeding, attend the births and note the breeding. They know their animals not as numbers, but as individuals. They know which animals have trouble at birth and which make the best mothers. The keepers know all the little details about the animals that are not written anywhere. Ask which snakes have problems shedding--they know. Ask the last time it was too hot, too cold, too rainy, or too windy to clean and feed - that, they don't know.

HE WANTED TO BE A KEEPER, Continued

I remember January 1977. It was cold, below zero, and the waterfowl lakes were frozen over. Without open water, the birds would be at the mercy of predators at night. Every zoo has some: feral dogs and cats, raccoons, foxes. We broke ice for most of four hours. The ice was nearly 18" thick and had to be netted out of the water and dragged off. We were bird keepers, reptile keepers, primate keepers, hoofed stock keepers. Our gloves were frozen; several boots were filled with icy water; and our jeans were frozen stiff below the knees. No one complained - we were keepers; and there were animals' lives at stake.

I remember another time in late winter 1979. The Banteng bull was sick and being medicated around the clock. I arrived a few minutes late; it was midnight, after all. The keepers were there. So was the veterinarian and we did the work. Two of the keepers had forgotten to punch the time clock; the animal, not the overtime was on their minds.

You can teach anyone to rake and shovel feces. Almost anyone can hose a floor and scrub it down. Who can endure the tedium of such work day in and day out and remain aware of the interactions of the animals in the enclosures and their reactions to the keeper? Only a craftsman can.

For some, no doubt, it's a job. Eight to five, and it pays the bills. For the best, it approaches an art form. For most, it is a way of life. Ask them, and they can all tell you about sleepless nights spent worrying about a sick animal. They seldom have a Saturday or Sunday off to spend with family and friends. Christmas morning? "I was off on Christmas two years ago. It was nice to be with my family, but you know, it felt kind of funny too, like I should be here." New Year's morning? All sober. A hangover or two perhaps, but they are there taking care of their charges.

When I finally went to work in that Reptile building in the St. Louis Zoo, nearly twenty years later, I was proud. When I left to become a curator, I was proud, too. But every once in awhile, just occasionally, I'm sorry. I wanted to be a Keeper. Keepers are special people.

(Editor's note: The above essay was the first place winner in an essay contest sponsored by the Rio Grande Chapter of AAZK and first appeared in their newsletter Good Gnus, Vol. V, Issue 2, August 1982. We think it says it all.)



Camy Steeds
©

In Encouraging Word.....

On 26 October, 1984, the President signed a bill extending for two years the Wetlands Loan Act, which provides a means of accelerating habitat preservation for migratory waterfowl. First enacted in 1961, the Act authorized up to \$200 million annually for use by the USFWS to acquire habitat for the National Wildlife Refuge System.

The status of the bald eagle (*Haliaeetus leucocephalus*) in California appears to be improving. There were 68 occupied nesting territories in 1984 that fledged 69 young for an average of 1.04 young per occupied site. Twenty-one sites (31%) failed to fledge young. There has been a small decline in average production of this population, but it still is slightly above the national average of 1.0 young per occupied site. There is good evidence that the population is increasing since 19 of the 68 sites were previously unrecorded.

The American Association of Zoological Parks and Aquariums (AAZPA) recently accepted the red wolf (*Canis rufus*) for development of a Species Survival Plan (SSP). This action will allow for coordinated management of the captive populations in the participating institutions, which include the Wild Canid Survival and Research Center (St. Louis, MO), the Point Defiance Zoo (Tacoma, WA), and the Texas Zoo (Beaumont, TX). The entire captive population will be treated as one genetic population, and procedures will be developed to reduce inbreeding and to increase genetic diversity. It is hoped that implementation of the SSP will ensure the species survival. The USFWS has requested the acceptance of the Mexican wolf (*Canis lupus baileyi*) by the AAZPA for an SSP, however, the association is in the process of reviewing internal policy regarding the treatment of subspecies and will make a final decision based on this review at a later date.

Reports from the whooping crane (*Grus americana*) summer grounds at Wood Buffalo National Park (Canada) and Gray's Lake National Wildlife Refuge (Idaho) are encouraging. Twenty-two Wood Buffalo eggs and ten from the Patuxent Wildlife Research Center were transported to Gray's Lake this year. Four of the Patuxent eggs proved to be infertile, but two Patuxent birds and 11 Wood Buffalo Park birds were reared to fledging by Sandhill cranes (*Grus canadensis*) foster parents. (One of the young birds died of congenital heart failure.) Along with the adult whoopers, the Gray's Lake flock may total 35-38 birds migrating to the New Mexico wintering grounds. The Wood Buffalo flock set a new record for recent history this year when 28 nesting pairs fledged an estimated 15-17 young. Seventy-five adult whoopers left Aransas NWR in Texas last spring; consequently, 10-90 whoopers should be returning this fall--a new high for this population.

Preliminary findings from an early summer survey of the Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*) habitat in Key Largo, FL, indicate that the butterfly population appears to be stable. These butterflies were also found at two sites not previously recorded.



AAZK KEEPER TRAINING VIDEO TAPE PROJECT

The goal of the AAZK Keeper Training Video Tape Project is to produce quality video tape training programs suitable to supplement existing in-house training of entry level keepers. These tapes are not intended to be a complete training program in themselves. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes. Two tapes are currently available.

Zoo Keeper Safety; An Attitude Adjustment - This 18-minute program does not attempt to address the numerous variable specifics of this subject. It presents a safety approach to the job of zoo keeping, and promotes constant awareness and personal responsibility for safety.

A Zoo Keeper's Introduction to Feeds and Feeding - A half hour introduction to the complex subject of feeds and feeding of zoo animals. Topics covered include what, when, and where to feed.

AAZK KEEPER TRAINING VIDEO TAPE PURCHASE AGREEMENT RESPONSIBILITIES AND RESTRICTIONS OF THE BUYER

- 1) The tape may not be duplicated or made available to any person or institution for the purpose of duplication.
- 2) The tape may not be utilized for any commercial purpose.
- 3) Should the buyer decide the tape will not be useful to their training program, the undamaged tape may be returned within 14 days of receipt for a partial refund - \$10 for BETA and VHS, \$18 for 3/4 inch.

I, the undersigned, accept the responsibility for the restrictions listed above.

NAME _____ (Type or Print)

SIGNATURE _____ DATE _____

ORGANIZATION/INSTITUTION _____

SHIPPING ADDRESS _____

_____ ZIP _____

TELEPHONE () _____

TAPE TITLE _____

FORMAT: BETA _____ VHS _____ 3/4 INCH _____
 \$25 \$25 \$35

Make checks payable to AAZK KEEPER TRAINING VIDEO TAPE PROJECT.

Mail to: B. Wayne Buchanan
 Woodland Park Zoological Gardens
 5500 Phinney Avenue North
 Seattle, WA 98103

Keeper's Alert

1985 Great Lakes Regional AAZK Conference

The Detroit Great Lakes Regional AAZK Conference will be held May 5-7, 1985 at the Detroit Zoological Park, Royal Oak, MI.

Papers are requested for this regional conference. Each paper will be limited to 20 minutes with a 5-minute question and answer period. Topics should pertain to zoos and zookeeping. Outlines should be submitted by 31 March, 1985. Please indicate if you would be willing to lead a discussion group on your subject on Tuesday afternoon. There will be a reduction in the conference registration for those presenting papers.

Tentative Conference Schedule

<u>Sunday, 5 May</u>	<u>Monday, 6 May</u>	<u>Tuesday, 7 May</u>
Registration	Welcome	Presentation of papers
Ice Breaker at Belle Isle Zoo & Aquarium	Presentation of papers Lunch (provided) Tour of Detroit Zoo Volleyball game/Bar-B-Q	Lunch (provided) Discussion groups Closing dinner & auction

Please make checks payable to: "Detroit Chapter AAZK". Send papers, completed registration forms with registration fee to: *Anne Payne, Detroit Chapter AAZK, Detroit Zoo, Box 39, Royal Oak, MI 48068.*

Registration Form

Name: _____

Address: _____ City _____
State/Province _____ ZIP _____

Phone No: () _____ Name of Zoo: _____

Area(s) of interest: _____

Fees: Member or Spouse - \$30.00 Non-Member - \$35.00
Late registration fee after 7 April, 1985 - \$5.00 additional
Total fees enclosed: \$ _____

(If you cannot attend the entire conference but wish to attend a portion of it, please contact us and we can make arrangements for you to do so.)

Motel Registration Form: Detroit Great Lakes Regional AAZK Conference

Name: _____

Address: _____ City: _____
State/Province _____ ZIP _____

Phone No: () _____ Dates staying at Motel: _____

___ 1 person/double bed - \$35.00 per day ___ 2 people/double bed - \$37.00 per day
___ 2-4 people/2 double beds - \$41.00 per day

___ Do you wish to share a room with another person (to be matched by Motel?)

Reservation deadline 14 April, 1985 - to be assured a reservation.

Heritage Inn Motel, 14700 E. 8 Mile, Detroit, MI 48025. (313) 527-1070.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings of positions which become available close to deadline are accepted.

WARDEN...Six Flags Great Adventure Drive-Thru Safari, located in Jackson, NJ currently has a position available. Requires one year prior experience handling exotic animals. Excellent compensation and comprehensive benefit package. Send resume no later than 20 February 1985 to: Six Flags Great Adventure, P.O. Box 120, Jackson, NJ 08527, Attn: Personnel.

ZOOKEEPER II (Elephant Handler)...requires a college degree in Animal Husbandry or a related field or a high school diploma and three years of zoo experience. A basic understanding of elephant husbandry and handling is necessary. Salary - \$11,508 to \$17,676. Send resume by 28 February, 1985 to: James L. Swigert, Jackson Zoological Park, 2918 W. Capitol St., Jackson, MS 39209.

ZOOKEEPER III...requires Biological Science degree from four-year college/university plus four years experience in a recognized zoo in the care, feeding and handling of exotic animals; or a high school diploma with seven years experience, three of which must have been in a recognized zoo; or any equivalent combination of training and experience. In all cases, one years experience in supervising zookeepers at a recognized zoo is required. Desire experience with African mammals and birds. Will be responsible to the General Curator for direct supervision of one of three zookeeper sections. Basic hiring rate is \$15,780, plus benefits. Send North Carolina application, resume and references to arrive by 28 February, 1985 to: Human Resources Manager, North Carolina Zoological Park, Rt. 4, Box 83, Asheboro, NC 27207. Phone: (919) 879-5606, Ex. 224.

MAMMAL KEEPER...requires a college degree in the biological or animal sciences field, knowledge of animal husbandry and experience in the care and breeding of wild and domestic animals. Send resume to: Angelo Monaco, New York Zoological Society, Bronx Zoo, Bronx, NY 10460.

ANIMAL KEEPER/MAMMAL DEPT...requires high school diploma and one years paid experience in the care/handling of animals, excluding pets; or high school degree and six months experience in the care/handling of animals in a zoological institution; or BS from an accredited college or university in biology, zoology, animal science or veterinary technology and eligibility for a driver's license. Salary \$13,314-\$14,312. Send resume to: Sandra Kempske, Curator of Mammals, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217.

BIRD KEEPER...requires Associate Degree in biology, zoology or related field and two years avicultural experience or an equivalent combination of training and experience. Salary \$720 per hour plus benefits. Send resume to: Diane Omandsen, Supervisor of Birds, Tulsa Zoological Park, 5701 E. 36th St. North, Tulsa, OK 74112. Closing date 1 March 1985.

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AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

- \$20.00 Professional Full-time Keepers
 - \$25.00 International All members outside the U.S. and Canada
 - \$10.00 Associate Individuals not connected with an animal care facility
 - \$15.00 Affiliate Other staff and volunteers
 - \$50.00 Contributing Organizations and Individuals
- U.S. CURRENCY ONLY PLEASE

Directory Information

Zoo	Work Area	Special Interests
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Mail this application and check or money order, payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to the *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size of no more than 6" x 10" (15 cm x 25½ cm.). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephoned contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or of the American Association of Zoo Keepers.

Items in the publication may be reprinted. Credit to this publication is requested. Order reprints from the Editor.

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of Zoo Keepers
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MARCH 1985

Animal Keepers' Forum

Published by the American Association of Zookeepers



Cathy A. Tauler 1983

Dedicated to Professional Animal Care



Executive Editor: Alice Miser
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MARCH 1985
 VOLUME TWELVE
 NUMBER THREE

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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is month's cover art is by Cathy Taibbi, a keeper at the Atlanta Zoo. Cathy's pen and ink drawing features an Agamid lizard with hatchling. His drawings and other works by Cathy are available in larger print size. For details see page 307 of the October 1984 AKF. Ten per cent of proceeds generated from the sale of these prints is donated to the Atlanta Zoo AAZK chapter. Thanks, Cathy!

Scoops and Scuttlebutt

NEW FEE FOR ASSOCIATE CATEGORY ESTABLISHED

All AAZK members are advised that the Associate category for membership in the Association now has an annual fee of \$15.00. The costs of processing memberships, correspondence and publishing 12 issues of AKF now runs approximately \$8.00 per year per member. Therefore the \$10.00 membership category is no longer financially feasible. Upon renewal, all Associate members will pay the \$15.00 fee. All other membership categories remain as printed on the back inside cover renewal form.

OPPORTUNITY KNOCKS TO HOPEFULLY SOON EXPAND

The AKF staff is currently in the process of compiling a list of personnel directors and others in charge of hiring and placing advertisements for job openings. These individuals will be advised of the opportunity available to advertise such job listings free of charge in AKF. This will hopefully result in more job listings being published each month. We ask members to encourage their institutions to send job listings to AKF for inclusion each month. Listings should be received no later than the 15th of the month prior to the month of publication (i.e. 15 March for April listing). Closing dates should allow a minimum of three weeks following the mailing of the AKF which is the first Friday of each month.

NEW AAZK ACCESSORIES AVAILABLE FROM ATLANTA AND SAN DIEGO CHAPTERS

Baseball caps, black with a white front and featuring the official AAZK logo are now available from the Atlanta AAZK Chapter. The price per cap is \$6.75, which includes postage. Make checks payable to "Atlanta AAZK" and send along with your name and complete mailing address to:

AAZK Baseball Caps
Atlanta AAZK Chapter
800 Cherokee Avenue S.E.
Atlanta, GA 30315

Solid brass belt buckles with the AAZK rhino logo are now available through the San Diego Chapter. These high quality belt buckles are guaranteed for life by the manufacturer. Cost, including postage is \$15.00 each, prepaid. Make checks payable to "San Diego AAZK", and send to Debbie Hewitt, 3059 Bonita Mesa Rd., Bonita, CA 92002. Please include complete mailing address.



Births & Hatchings

HONOLULU ZOO.....*Margo Lengen & Pete McLane*

B&H for 1 July, 1984 through 15 January, 1985 include: Mammals - 2.3 Hawaiian sheep (DNS), 3.0 Nilgai, 0.1 Springbok (DNS), 0.0.1 Spider monkey, 0.0.2 Golden lion tamarin, 0.1 Malayan sun bear, 1.0 Celebes crested macaque; Birds - 0.0.3 Green-winged king parrot (2 DNS), 0.0.3 Hawaiian gallinule, 0.0.2 Jackass penguin (DNS), 0.0.6 Greater rhea, 1.1 Grand eclectus parrot, 0.0.1 Turkey vulture (DNS), 0.0.3 Glossy starling (DNS), and 0.3 Red-billed hornbill.

METRO TORONTO ZOO.....*Harry Haufer*

November 1984 B&H include: Mammals - 0.1 Bush-tailed bettong, 0.0.1 Sugar glider, 2.0 Egyptian fruit bat, 1.1 Mara, 3.0 Grizzly bear, 1.1 Mouflon; Fish - 0.0.30 Australian rainbowfish and 0.0.170 Lake Tanganyika cichlid.

COLUMBUS ZOO.....*Andy Lodge*

B&H for October 1984 through January 1985 include: Mammals - 2.2 Cheetah, 1.0 Capybara, 2.0 Blackbuck (DNS), 1.0 Pigmy hippo, 1.0.1 Polar bear (DNS), 3.0 Nilgai and 1.0 Lowland gorilla.

UTICA ZOO.....*Heidi Wester*

December 1984 through January 1985 include: Mammals - 1.2 Reeves muntjac, (0.1 DNS), 1.0 Llama, 0.2 Mouflon, 2.0 Yak, 1.0 Grant's zebra (DNS), 2.1 Fallow deer, 2.0 Sardinian donkey, 1.0 Himalayan tahr, 1.0 Porcupine, 1.0 California sealion, 3.2.1 Cotton-top marmoset (1.1 DNS), 2.3 Ring-tailed lemur, 1.0 White-handed gibbon, 0.0.3 Red-bellied tamarin, (0.1.1 DNS); Birds - 0.0.3 Black swan (0.0.2 DNS), 0.0.5 Wood duck, 0.0.5 Red heads, 0.0.11 Peafowl; Reptiles - 0.0.4 Mangrove snake (0.0.1 DNS).

BENSON'S ANIMAL PARK.....*Mika Nurmikko*

B&H for 1 February 1984 through 30 January 1985 include: Mammals - 1.0 Dromedary camel, 1.1 Llama, 0.1 Addax, 2.0 Beisa oryx, 1.1 Nilgai, 0.2 Blackbuck, 0.1 Grevy's zebra, 1.0 Siberian tiger, 1.2 Serval, 0.2 Patas monkey, 1.0 White-handed gibbon, 1.0 Black-capped capuchin monkey, 0.1 Walleroo, 0.1 Collared peccary; Birds - 0.0.2 Blueneck ostrich, 0.0.5 Slenderbill conure, 0.1 American eider, 2.4 Ruddy shelduck, 0.0.1 Scarlet macaw; Reptiles - 0.0.7 Copperhead snake.

DALLAS ZOO.....*Tami Jones*

January 1985 B&H include: Mammals - 1.2 Nile lechwe, 1.0 Addax, 1.0 Suni, 1.0.3 Serval, 0.1 Addra gazelle; Birds - 0.0.3 Cape Barren goose, 0.0.2 Alexandrine parakeet, 0.0.1 Double-striped thick-knee, 0.0.2 Yellow-fronted canary; Reptiles - 0.0.4 Phillipine sail-fin lizard.

PHILADELPHIA ZOO.....*B. Bahner*

January 1985 B&H include: 0.1 Reticulated giraffe, 1 Victoria crowned pigeon (DNS), 2 Brimstone canary, 8 Gouldian finch (3 DNS), 4 Leopard gecko and 2 Prehensile-tailed skink (DNS).

BIRTHS AND HATCHINGS, Continued

SAN DIEGO ZOO AND WILD ANIMAL PARK.....Jody Courtney

B&H for October, November and December 1984 include: Mammals - 0.1 Trans-caspian kulan, 0.3 Hartmann's mountain zebra, 0.1 Barasingha deer, 1.0 Formosan sika deer, 1.0 Addax, 0.1 Indian guar, 2.3 Addra gazelle, 1.1 Mhorr gazelle, 1.1 Scimitar-horned oryx, 1.0 Beisa oryx, 0.1 Pigmy marmoset, 0.1 White-faced saki, 1.0 Lion-tailed macaque, 0.0.1 Kikuyu colobus, 1.0 Hamlyn's guenon, 1.1 Bornean orangutan, 0.0.5 African hunting dog, 1.1 North China tiger, 0.1 Baird's tapir, 1.1 Pigmy hippopotamus, 2.2 Zulu suni, 1.0 Cotton-top tamarin, 1.0 Northern langur, 1.1 Francois' langur, 0.1 Okapi, 1.0 Baringo giraffe; Birds - 0.0.1 Tahiti blue lory, 0.0.3 Scarlet-chested grass parakeet, 0.0.1 Bali mynah; Reptiles - 0.0.1 Gopher tortoise.

Also recorded was the birth of 1.1 Southern white rhinoceros. These two births are the 56th and 57th calves sired by "Mandhla" before his death in 1984.

SEDGWICK COUNTY ZOO.....Scott Carter

B&H for December 1984 and January 1985 include: Mammals - 0.1 Damara zebra, 0.1 Alpaca, 0.1 Axis deer, 0.0.2 Cape hunting dog (DNS), 2.0 Cotton-top marmoset, 0.0.1 Giant fruit bat, 0.0.1 Wallaroo, 0.0.1 Scrub wallaby, 1.1 Cameroon goat (DNS); Birds - 0.0.3 Cereopsis goose, 0.0.2 Black swan and 0.0.4 Elegant crested tinamou.

MIAMI METROZOO.....Lori Bruckheim

The following are the B&H for December 1984 and January 1985: Mammals - 3.0 Scimitar-horned oryx (1.0 stillborn), 0.1 Grant's zebra, 0.1 Dama gazelle, 1.0 Addax, 1.3 European brown bear, 2.1 Chimpanzee (0.1 still-born), 0.0.4 Sugar glider; Birds - 0.0.13 Green junglefowl (0.0.4 DNS), 0.0.1 Wattled crane and 2.3 Egyptian goose.

PITTSBURGH AVIARY.....Curtis G. Robbins

Hatchings for January 1985 are: 0.0.1 Red-and-white crake (DNS), 0.0.1 Double-striped thick-knee, 0.0.1 White-cheeked touraco, 0.0.1 Greater roadrunner, 0.0.1 Speckled mousebird, 0.0.2 Blue-grey tanager, 0.0.5 Gouldian finch and 0.0.1 Society finch.

CORRECTION: In last month's B&H section an error occurred in the listings from the Pittsburgh Aviary. We printed that 0.0.4 Ruppell's long-tailed starling x Chestnut-bellied starling (sexes of both parents undetermined) had been hatched. In fact, it was 0.0.1 hybrid Superb starling x Chestnut-bellied starling, sexes of respective parents undetermined. Our apologies.

TAMPA/BUSCH GARDENS.....Susan Rackley

B&H for January 1985 include: Mammals - 1.3 Addax, 2.5 Thomson's gazelle, 2.1 Grant's gazelle, 1.1 Soemmering gazelle, 4.5 Nyala, 0.0.1 American otter, 0.1 Defassa waterbuck, 0.1 Scimitar-horned oryx, 1.2 Grevy's zebra, 0.1 Grant's zebra, 2.0 Muntjac deer; Birds - 0.0.1 Jandaya conure, 0.0.14 Sun conure, 0.0.1 Palawan peacock pheasant, 0.0.1 Scaly-breasted lorikeet, 0.0.1 Golden (Queen of Bavaria) conure, 0.0.2 Forsten's lorikeet, 0.0.3 Cockatiel, 0.0.3 Black-necked stilt and 0.0.4 Black swan.



Coming Events

NATIONAL WILDLIFE REHABILITATORS ASSOCIATION

March 21-24, 1985

St. Paul, MN

For information contact: Carpenter-St. Croix Valley Nature Center, c/o Jim Fitzpatrick, 12805 St. Croix Trail, Hastings, MN 55033 (612) 437-4359.

AAZPA SOUTHERN REGIONAL CONFERENCE

March 31-April 2, 1985

Birmingham, AL

SYMPOSIUM ON IMMUNOLOGY OF ZOO AND WILD ANIMALS

April 12-13, 1985

Columbia, SC

AAZPA GREAT LAKES REGIONAL CONFERENCE

April 14-16, 1985

Cleveland, OH

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 28-30, 1985

Boston, MA

1985 GREAT LAKES REGIONAL AAZK CONFERENCE

May 5-8, 1985

Detroit, MI

Hosted by the Detroit Zoo Chapter of AAZK. For further information, see page 67 of February AKF or contact Anne Payne, Detroit Zoo AAZK, Detroit Zoo, Box 39, Royal Oak, MI 48068.

SECOND INTERNATIONAL CONFERENCE ON CONSERVATION BIOLOGY

May 5-8, 1985

Ann Arbor, MI

For additional information contact: Conservation Biology, Wildlife Management Center, School of Natural Resources, The University of Michigan, Ann Arbor, MI 48109-1115 (313) 763-1312.

THE FOURTH INTERNATIONAL OTTER SYMPOSIUM

August 6-10, 1985

Santa Cruz, CA

For more information, contact Judy Mitchell, Center for Marine Studies, University of California, Santa Cruz, CA 95064.

1985 NATIONAL AAZK CONFERENCE

October 20-24, 1985

Miami, FL



REQUEST FOR NOMINEES FOR AAZK AWARDS

Nominations are being sought for awards for 1985. These awards will be presented at the 1985 AAZK Conference in Miami, FL. If you work with or know someone who is performing in an exceptional manner and meets the qualifications listed herein, please consider nominating them for the appropriate award.

These awards are the EXCELLENCE IN ZOOKEEPING award, the CERTIFICATE OF MERIT FOR ZOOKEEPER EDUCATION, and the MERITORIOUS ACHIEVEMENT AWARD.

The deadline for acceptance of nominations is 1 June 1985. Each month the AKF will discuss one of these different awards.

The first award, EXCELLENCE IN ZOOKEEPING, is given to recognize outstanding people in the zookeeping field. Any keeper is eligible for the award and more than one award may be given each year. If five excellent keepers are nominated, five awards will be given. If none of the nominees qualify, no award will be given.

Excellence in zookeeping cannot be determined on the basis of an isolated breeding success or upon one spectacular instance, but rather, upon examination of the keeper's total performance. Each keeper has a slightly different idea of what his or her job entails. There are, though, basic themes which can be used in judging a keeper's performance.

Perhaps the most essential characteristic is commitment to the animals and to the profession. Commitment is defined as, "the state of being bound emotionally or intellectually to some course of action". This commitment is necessary because the needs of the animals often exceed the demands of an eight to five workday. Without this basic foundation of commitment, it is impossible to realize one's full potential as an animal keeper.

The next important quality is the ability to empathize. You must understand your animals' needs, both physiologically and psychologically and fulfill them the best you can.

In fulfilling the animals' needs, a keeper must have a knowledge of the animal's behavior, physiology, and natural history. This knowledge is essential to maintain the animals efficiently and effectively. Furthermore, a keeper should actively pursue greater knowledge of his or her animals through observation or private study. In addition, a keeper should be able to communicate this knowledge effectively to other keepers and to the public. At the same time, keepers should be receptive to the knowledge and experience of others. The task that keepers face is too difficult to be stingy with our own knowledge or disdainful of another's opinion. We must share our knowledge with other keepers and make the public aware of the intrinsic value of the animal we care for.

Finally, the keeper must function as the animal's representative in policy decisions and planning. A keeper may not be an expert on an entire order or even a particular family, but he or she should be an expert on the animals in his or her care. Therefore, since the animals can't tell us themselves whether a new cage is inadequate or a new situation too stressful, it is up to the keeper to represent their interests in zoo decisions.

These, then are the basic criteria for examining the performance of a zookeeper. Any single area, isolated, is of little value. The ability

REQUEST FOR NOMINEES FOR AAZK AWARDS, Continued

to empathize with the animals is useless if you lack the knowledge and skill to improve their care. Similarly, knowledge and skill without commitment leads to a keeper who, "keeps his or her animals alive and nothing more". Each area must be evident in the good zookeeper. The excellent zookeeper will excell in one or more of these areas, but cannot lack any of them. If you feel that a keeper you know meets these criteria, submit his or her name, along with a brief letter describing why you feel they deserve the EXCELLENCE IN ZOOKEEPING award.

QUALIFICATIONS

1. The nominees must be a full-time animal keeper, employed in any North American zoological institution or aquarium.
2. The nominee must have been employed at least two years on a permanent basis at a zoo or aquarium.
3. The nominee must be nominated by his or her peers who have also been employed at that same zoo or aquarium.

NOMINATION PROCEDURE

1. List name, position, institution, years of service in the field and the recommendations of peer or colleague.
2. List outstanding achievements: exhibits, breeding, education, etc.
3. List any extra activities outside of zoo or aquarium work; working with conservation groups, youth, wildlife officials, etc.

SELECTION PROCEDURE

The Awards Committee, consisting of five people, will independently review each nominee.

Send Nominations to:

Mike Crocker
AAZK Awards Committee
Dickerson Park Zoo
3043 North Fort
Springfield, MO 65803



ELECTION '85

NOMINATIONS FOR AAZK BOARD OF DIRECTORS

Here is the nomination information for the Board of Directors election. Two seats are up for re-election - those held by Kevin Conway and Pat Sammarco, whose terms expire in December of this year. Nominations must be postmarked no later than 30 April. The committee will then verify each nomination received and a short biographical sketch on each nominee will be prepared. During the first week in July, ballots and the biographical sketches will be sent to each Professional member, in order to elect the two new members.

Please send the completed nomination information to:

Lynne Villers, NEC Chairperson
Indianapolis Zoo
3120 E. 30th St.
Indianapolis, IN 46218

DUTIES OF THE BOARD OF DIRECTORS

For a more detailed explanation of the expanded duties of the Board, refer to the Papers of Incorporation--available upon request from the National Office.

- 1) Select, appoint or remove officers, committees, agents and employees of the Association, including prescribing powers and duties.
- 2) To control and manage the Association and its property, passing upon acquisition and disbursements with approval of a majority of the Board.
- 3) To formulate policies, rules and regulations in accord with the Constitution and By-laws.
- 4) To uphold the Constitution of AAZK and the policies of the Association.
- 5) To appear at Board meetings, to accept Board assignments and to devote time to communications pertinent to all Board Business, including answering correspondence promptly and efficiently.

QUALIFICATIONS FOR NOMINATION

- 1) Nominee must be a Professional Member of AAZK and must have been a member of the Association for at least a year.
- 2) Nominee must be presently employed as an animal keeper/attendant by a recognized zoo or aquarium in the U.S. or Canada and must have been in the zoological field for at least two years.

NOMINATION PROCEDURE

- 1) List name of nominee, address, phone and institution.
- 2) A brief statement by the nominator as to why the nominee warrants election to the Board.
- 3) A biographical sketch by the nominee with the following data:
 - (a) Professional background, places of employment, titles, length of service.
 - (b) Educational background
 - (c) Membership in AAZK: National and local chapters, number of years, offices held, involvement in activities, AKF contributions, etc.
 - (d) Membership in affiliate organizations: AAZPA, NWF, Audubon, etc.
 - (e) Other information that nominee feels to be pertinent.

This information should be signed by both the nominator and the nominee. It should be understood that false or lacking information requested will void the nomination.

---Lynne Villers, NEC Chairperson



Great Ape *and* demonium

METRO TORONTO ZOO EXPERIENCES GORILLA DEATH; ORANGUTAN BIRTH

Ron D. Barbaro, Chairman of the Metro Toronto Zoo's Board of Management and Interim Director, recently announced the death of Natasha, a lowland gorilla at the Calgary Zoo. Natasha was born at the Metro Toronto Zoo on 4 November, 1980 and was sent to Calgary in August 1984 with her half-sister, Tabitha, on a breeding loan.

Natasha became ill on 27 December and on 31 December 31, Calgary Zoo veterinarians assisted by a surgical team from the Calgary General Hospital, performed a successful appendectomy. Her recovery from surgery seemed to be normal and by 19 January, plans were made to reintroduce her to the other gorillas. On 21 January she started passing blood and a 22 January examination revealed a bleeding ulcer. On 24 January, surgery was again performed to remove the ulcerous portion of the large intestine. Despite the 24-hour intensive care given Natasha, she died at 4:00 a.m. on 26 January.

Mr. Barbaro, who had been in daily contact with Calgary Zoo officials, said, "It comes as a real shock personally and to all the Metro Toronto Zoo staff who had hand-raised Natasha virtually from birth." However, he stated, "I have complete confidence that the Calgary Zoo staff and the medical team had done everything humanly possible and I wish to thank them for their efforts."

A complete necropsy was performed at Calgary and final results are still pending.

On a much happier note, Puppi and Dinding, Metro Toronto Zoo's adult pair of orangutans, produced a male offspring on 13 January, 1985. The infant tipped the scales at 1½ kg. Both mother and son are doing well as of this writing.

It is the second birth for Puppi. She produced another male, Santan, in 1977 at the Zoo. There are now seven members in the Zoo's orangutan collection including Abigail, Chantek and Mias II. The latter two were also born at Metro Toronto.



T.V. WORTH WATCHING

World Wildlife Fund International Trustee David Attenborough whose fine series "Life On Earth" gained international recognition and praise, returns this season on PBS with "The Living Planet: A Portrait of the Earth". If you have not already begun watching this series (which premiered 3 Feb), be sure to try and catch the remaining episodes: Air dates may vary by region so check your local PBS listings. The remaining episodes are:

March 10	The Baking Desert
March 17	The Sky Above
March 24	Sweet Fresh Water
March 31	The Margins of the Land
April 7	Worlds Apart
April 14	The Open Ocean
April 21	New Worlds



The "Underground Zoo"

The Problem Of Exotic Venomous Snakes In Private Possession In The United States

Part II

By
John H. Trestrail, III, RPh
Western Michigan Poison Center
Grand Rapids, MI

The Education Problem and Possible Solutions

From information gathered by the author in conversations with candid but wary amateur herpetologists, it seems as though the medical professionals and the exotic snake keepers are caught in a circular information gap problem. On the one hand, the amateur collector would often rather ride out his exotic snake bite encounter at home because he believes that his local emergency room personnel knows little about how to treat the domestic envenomation let alone exotic ones. In addition, the amateur collector knows that access to exotic antivenins which would be needed for proper treatment are limited. Lastly, the victim is probably afraid of being reported to some enforcement agency which might result in the confiscation of his prized herpetological specimens.

The emergency room personnel, on the other hand, are totally unaware of the "underground zoo" in their area and the types of species they might be involved in treating. How does the medical personnel learn more about the locally kept exotic species, and in turn, how does the amateur collector begin to gain more confidence in the medical community's ability to handle his problem? The poison center can serve as a bridge to aid in closing the information gap between these groups by providing specialized education programs for the two diverse groups.

Some of the programs and education tools which have been prepared by the Western Michigan Poison Center (WMPC) include: a slide talk directed to the medical personnel in emergency treatment facilities on the current management of snake bite envenomations; a slide talk directed to amateur herpetological groups on the natural history and behavior of venomous snake species, including prevention tips on avoiding bites from all specimens domestic and exotic and a discussion of the readiness of the poison center to handle their problems; the development of poison center protocols for handling the bite of the exotic snake species by rapidly obtaining aid from medical consultants and the location of exotic antivenins with arrangement for their transportation to the treating facility if needed (see Appendix A); and the development of protocols working with the local zoo herpetology section on the initial first aid for snake bite and tips on prevention within the facility, as modified from work by Rappolt et al (4) (See Appendices B,C,D, and E).

APPENDIX A: WMPC Exotic-Snakebite Protocol

1. Call received from hospital, zoo or amateur collection that snake bite has occurred.
2. Gather standard WMPC information:
 - A. On the patient (in addition to regular information) obtain: patient's allergy history; prior history of snake bites, and species involved in prior bites; present health status of patient and prior medical status.

"THE UNDERGROUND ZOO", Continued

- B. On the snake involved, obtain: species identification; age and size of snake; circumstances of the bite (How did it happen?).
3. Contact John T. immediately and brief him on the situation.
(616) (Pager) (616) 676-9945 (Home)
 4. For initial treatment follow protocols listed in Poisindex[®], and guidelines in the "biotoxin handouts" by John T.
 5. Medical Consultants:
Walter D. Meester, MD, Grand Rapids, MI, (616) (Pager), (616) (Home).
Sherman A. Minton, MD, Indianapolis, IN, (317) 264-7842 (Office),
(317) 849-2596 (Home)
Findlay E. Russell, MD, Tucson, AZ, (602) 626-4558 (Office)
(602) 626-6016 (Via Arizona Poison Center).
 6. If exotic antivenin is needed, contact the antivenin index center for availability and location of appropriate antivenin: Oklahoma Poison Information Center, (405) 271-5454; Oklahoma City Zoo (405) 424-3344.
 7. Brief treatment facility and inform them that WMPC has located antivenin and will arrange for quickest transport, if treating physician deems it needed.
 8. If antivenin is needed: arrange for the quickest air and/or ground transportation from the nearest storage depot to treating facility (i.e. Law enforcement agencies, military, commercial, or private carriers).

APPENDIX B: Zoo Protocol--Immediate First Aid for Poisonous Snakebite

The snakebite victim should sound alarm; attempt to remain calm; secure and identify the snake (if this can be done quickly and without further personal risk); remove any rings, bracelets, or other jewelry; sit or lie down as soon as possible.

The person assisting the snakebite victim should: check to see snake has been secured and identified properly; reassure the victim; immobilize the involved extremity or area; watch for any untoward reactions (i.e. absence of breathing - needing CPR); see that appropriate transportation is arranged for and agencies notified: call for transportation to emergency treatment facility, call 9-911 and asked for advanced life support (ALS) transportation, ask 911 dispatcher to patch to Western Michigan Poison Center, and notify them of the incident, and details (identification of victim and health history, pull victim's personnel card; present physical condition of the victim; identification of the snake by species and the details of the bite, pull ID card from snake's cage; name of emergency facility to which victim is being transported); obtain appropriate antivenin from zoo supply; do not delay in transporting the victim (with supply of appropriate antivenin) to emergency treatment facility.

APPENDIX C: Zoo Procedures for Venomous Reptiles

1. Have the appropriate antivenin on hand in the refrigerator.
2. Arrange for transportation system in the event of a bite incident (E-Unit).
3. Make sure the reptile holding facility is safeguarded against vandalism and animal escape. In the case of an emergency have a policy developed for the evacuation of the building.
4. Have all entrances from the rear areas to the public areas "snake-proof".

"THE UNDERGROUND ZOO", Continued

5. No venomous reptiles are to be directly handled by anyone except designated personnel, and only during working hours when at least two qualified reptile keepers are in the building.
6. Have available a bell alarm signal system to notify others that a handler has been bitten.
7. Cages containing reptiles considered extremely dangerous are not to be opened unless reptiles are in shift cages, except by designated personnel.
8. All venomous animal cages and containers are to have cards on them with the following data which is kept up-to-date at all times: reptile identification (common and scientific names); number of specimens in container (spelled out); what antivenin to use.
9. All venomous reptile cages and containers are marked with "venomous" tags. These tags are to be removed from vacant cages. All other cages are to be marked with "harmless" tags when in use. Vacant cages, therefore, will have no tags, but will be latched at all times.
10. Designated personnel will check the antivenin supply for anticipated needed replacements as part of the semi-annual maintenance checklist. Needed replacements will be ordered at that time.
11. Conduct semi-annual "dry run" through the emergency snakebite procedure.
12. Except for authorized personnel, no one is permitted in the service areas unless accompanied by designated zoo personnel.
13. No venomous reptile is to be removed from the premises, without proper authorization of designated zoo personnel.
14. Do not handle venomous reptiles if feeling unwell in any way.
15. Always expect the unexpected (untypical behavior). There is no such thing as a typical individual for any species.

APPENDIX D: Zoo Protocol--Venomous Reptile Checklist

Monthly check list--litter and blanket; check for availability; antivenins: check inventory against stock; antivenin index: check location in reptile building; snakebite procedures: check locations; animal enclosure ID cards: check against ID and quantity of animals.

Semi-annual checklist--poison control center test check: call for anti-venin and current information regarding treatment of test case; personnel medical information records: check for currentness of information.

Annual checklist--review all procedures for modifications and updating.

APPENDIX E: Zoo Snake-Handler Information

1. Name
2. Home Address
3. Home Telephone
4. Nearest relative
5. Birth date
6. Medical History -- Chronic medical problems, Chronic medications, Allergies (Medications, Horse serum, other).
7. Prior history of snakebites: Species involved; Date occurred
8. Personal physician
Name
Telephone Number

"THE UNDERGROUND ZOO", Continued

Other ways to aid in education is for orientation of poison center staffs on exotic snakes by having them read from recommended texts. The following basic library can be constructed by a poison center for approximately \$83.00:

- Minton, Sherman A., Venom Diseases, Charles C. Thomas, Pub., Springfield, IL, 1974, \$11.75.
- Parrish, Henry M., Poisonous Snakes of the United States, Vantage Press, New York, NY, 1980, \$15.00.
- Poisonous Snakes of the World, U.S. Government Printing Office, Washington, D.C., 1965, \$6.25.
- Russell, Findaly E., Snake Venom Poisoning, J.B. Lippincott Company, Philadelphia, PA, 1980, \$35.00.
- Visser, John and Chapman, David S., Snakes and Snakebite - Venomous Snakes and Management of Snakebite in Southern Africa, Purnell and Sons. Ltd., Cape Town, South Africa, 1978, \$15.00.

The above mentioned texts will give an operational poison center a good working knowledge of both domestic and exotic species and the management of their envenomations. It will prove most useful when the time arises.

It is also helpful to make contact with the Oklahoma Poison Control Center, Oklahoma Children's Memorial Hospital, P.O. Box 26307, Oklahoma City, OK 73126 (405) 271-5454, producers of the "Antivenin Index" and obtain a copy for the poison center to aid in more speedy location of exotic antivenins within the U.S. Also make contact with local herpetological groups and local zoos to determine their needs and to offer assistance of the poison center's information facilities. Through the utilization of some of these techniques and the development of new ones, the emergency treatment facility personnel and amateur herpetologist will feel they are not so isolated and alone in dealing with snake envenomations, as there is a facility which is prepared and ready to assist them.

CONCLUSION

It is evident that even through the problem of a bite by an exotic venomous snake in the U.S. is a rare one, the existence of these species by amateur herpetologists in secluded "underground zoo" collections cannot be denied. This problem will not go away as there are no apparent federal laws regulating the possession of these snakes and a quite active but secretive marketing and exchange mechanism exists in the collector communities. In order to better prepare for the exotic snake envenomation, poison centers and others involved in clinical toxicology should prepare themselves for this isolated incident so that the bite victim will receive fast and effective management of his clinical problem, where time is of the utmost importance.

Acknowledgements

The author would like to thank all those individuals (poison center personnel, medical consultants, and herpetological organizations) for their time and efforts in abstracting and sharing their data and ideas, making this paper a reality.

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2. Russell, Findaly E.: Exotic Species in the United States, Snake Venom Poisoning, J.B. Lippincott, 345-349, 1980.
3. Reid, H.A.: Bites by Foreign Venomous Snakes in Britain, Brit. Med. J., 1:1598-1600, 1978.
4. Rappolt, Richard T., et al: Medical Toxicologist's Notebook: Snakebite Treatment and International Antivenin Index, Clinical Toxicology 13: 409-438, 1978.

(Editor's Note: "The Underground Zoo" is reprinted from the proceedings of the 1982 International Congress of Clinical Toxicology and the Second World Meeting of Clinical Toxicology/Veterinary and Human Toxicology, Vol. 24, Supplement 1982, pp. 144-149, with permission of the author. Part 1 appeared in the February 1985 issue of AKF.)



Chapter

ATLANTA ZOO AAZK CHAPTER

During the summer of 1984, the Chapter benefitted from an arrangement between zoo director Terry Maple and the Atlanta Zoological Society to pay for memberships in AAZK for staff members. As a result, the Chapter has grown from six professional and one affiliate members to seventeen professional and four affiliate members.

Chapter members attended the Southeastern Regional AAZK Conference at Riverbanks Zoo, Columbia, SC, and the National AAZK Conference at Woodland Park Zoo in Seattle, WA.

A slide show of the National Conference was presented by Alan Sharples and Cathy Taibbi at the November Chapter meeting and new officers for 1985 were elected at the December Chapter meeting.

The new officers are:

President.....Alan Sharples
Vice Pres.....Julia Lofton
Secretary.....Greg George
Treasurer.....Susan Barnard

Also at this meeting several proposals for Chapter projects for 1985 were made. These proposals include exhibit renovation or enhancement, establishing a zoo library, and creating a new Chapter T-shirt. The Atlanta AAZK Chapter is now offering for sale baseball caps featuring the AAZK logo.

Honolulu Zoo Chapter AAZK

Our chapter re-elected all of our 1984 officers at our January meeting. We usually meet the first Wednesday of the month: Re-elected were:

President.....Dan Vitiello
Vice Pres.....Peter McLane
Sec/Treas.....Steve Robinson
Sgt-at-arms...Larry Zolton

News

Sedgwick County AAZK Chapter

Newly elected officers of the Sedgwick County Chapter in Wichita, KS are:

President.....Amy Shelton
Vice Pres.....Laura Meyers
Sec/Treas.....Mary Nonnweiler



Research.....

From The Research/Grants Committee of AAZK

Submitted by Frank B. Kohn, Chairman
AAZK Research/Grants Committee

The Research/Grants Committee continues its work on A Keepers Guide to Research in Zoos in conjunction with the Zoological Husbandry Fundamentals (ZHF) Book. The Guide will be written as an independent sourcebook for keepers with little or no training in research, but who are interested in conducting a project at their zoo. It will also be condensed for incorporation into the ZHF.

A few keepers have expressed interest in contributing to the Guide. Any keeper desiring to work on the book is welcome regardless of your experience with research methods. As a keeper you are a trained observer specializing in observing particular species. This knowledge is necessary to design practical studies.

If you would like further information about the Guide, please contact me. I will send you a preliminary outline describing the various aspects of work available for the Guide.

Research Grants Available

AAZK offers research grants to keepers interested in studying some aspect of zoo biology at their respective facilities. Grants are limited to \$250.00 but may involve more than one investigator. For more information and a copy of the proposal guidelines write to: Frank Kohn, Hospital/Research Bldg., Dept. of Zoological Research, National Zoo, Washington, DC 20008.

Upcoming Research Meetings

- 16-20 June 1985--American Society of Mammalogists - University of Maine at Orono, Orono, MA 04469.
- 24-28 June 1985--Primates - The Road to Self-Sustaining Populations, Zoological Society of San Diego, San Diego, CA 92112.
- 24-28 June 1985--Animal Behavior Society, North Carolina State University, Raleigh, NC 27695.



RIVER OTTER SYMPOSIUM SCHEDULED

The Zoological Society of New Jersey announces a one-day Symposium on Captive Breeding of North American River Otters, to be held on 3 April, 1985 from 1:00 to 5:00 p.m. at Turtle Back Zoo's Education Center. Speakers will include: Joe Davis of Brookfield Zoo, Chicago; Joan Ryskamp of John Ball Zoo, Grand Rapids; Pat Foster-Turley of the University of Florida; and Richard Ryan of Turtle Back Zoo.

Registration/Admission is free. For further information contact Turtle Back Zoo, 560 Northfield Ave., West Orange, NJ 07052, (201) 731-5800.





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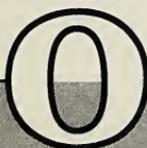


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PLANTING INDOOR EXHIBITS

By
Elizabeth Worden, Gardener Aide
Woodland Park Zoological Gardens
Seattle, WA

Why plant existing interior exhibits?

- Naturalizing an existing exhibit breaks up the squareness and adds visual interest to the exhibit.
- Naturalizing gives the public an opportunity to experience an animal in a simulated native habitat.
- Creating a more natural physical space for an animal can be beneficial to the animal's physical and psychological well-being.

Want to plant an exhibit? Some questions to ask:

- Which plants best simulate the animal's habitat and suit the size of the exhibit?
- Of these, which ones are best suited to survive and grow in the light, heat, and humidity provided in the exhibit?
- Who will care for the exhibit once it is established? Care includes watering, pruning, fertilizing (we use fish fertilizer, which is organic), checking for bugs and disease, and general damage from the animal or staff. Care also includes replacing dead plants and seeing to the appropriate soil mixture for various plants.

Where to go for information on plants, their origins, and their needs:

- Exotica or Tropica, A.B. Graf - lists virtually all tropical plants and their places or origin.
- How to Grow House Plants, a Sunset publication and How to Grow Healthy House Plants, HP Books - two of a large number of books which contain good photographs of house plants; information on their care - light, soil, water, humidity requirements; also, good disease and insect descriptions.
- The Woodland Park Zoo Plant Care Manual, by Sue Maloney - contains specific information on planted exhibit requirements plus plant lists for the existing exhibits at WPZ.

People:

- Your horticultural staff or gardeners
- Your county extension service
- Local university botany or horticulture staffs
- Local garden clubs
- Local nurseries
- Association of Zoological Horticulture

Interior plant companies who specialize in maintaining office plantings may be willing to give you plants they can no longer use in their displays. A majority of WPZ's tropical plants are donated by a local firm, *Interiors in Green*.

References on Poisonous Plants

- Connor, H.E., The Poisonous Plants in New Zealand, E.C. Keating, Government Printer, Wellington, New Zealand.
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- Muenschles, Walter Conrad, Poisonous Plants of the United States, Collier Books, 1975.

Association of Zoological Horticulture

The Association of Zoological Horticulture is a non-profit organization of zoo horticulturists dedicated to the advancement of zoo horticulture through professional exchanges, horticultural education and research and conservation programs.

The AZH encourages the practice of horticulture in zoos and the improvement of the zoo horticultural profession by providing a network for the sharing of professional ideas and to solving problems related to zoo horticulture as well as plant/animal relationships. It also serves to aid in the exchange of seeds and plant material for exhibition, conservation, scientific and educational purposes.

The increase of scientific research and education in the field of horticulture as well as plant conservation are objectives of the organization. Professionalism is encouraged by the AZH along with the acquisition of increased expertise by the members. The AZH publishes a newsletter to inform its members of the activities of the organization as well as its members. Membership is open to individuals, organizations or companies who work in or are interested in the practice of horticulture in zoos and aquariums.

Recommended Membership Categories:

- Regular Membership - open to persons who are interested in the objectives of the Association, have an interest in the Association programs and wish to support them. Regular members have the right to vote and hold office.
Dues - \$10.00
- Supporting Organization Membership - open to any zoological park, aquarium, botanical garden, arboretum or institution having an interest in supporting the Association. Supporting organizations do not have voting rights.
Dues - \$50.00

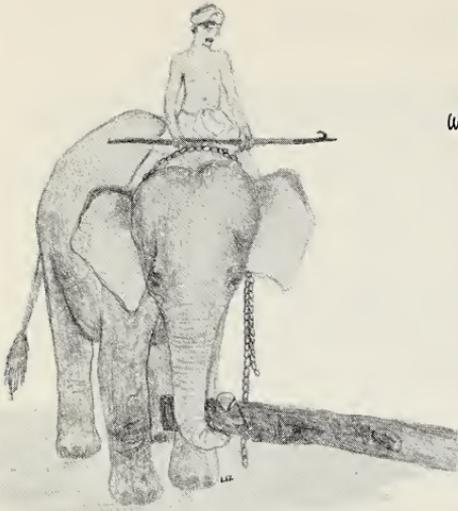
(Editor's note: If interested in obtaining a membership application for AZH, contact Steve Beard, Treasurer AZH, Columbus Zoological Gardens, 9990 Riverside Drive, Box 400, Powell, OH 43065.)



ELEPHANT ROUND-UP AT SURIN

By

Charlie Rutowski, Keeper
Washington Park Zoo, Portland, OR



*"Elephant and Mahout"
By Elizabeth Pine
Lafayette Zoo*

Elephants, elephants, elephants. Big ones, small ones, short ones, tall ones, young and old. One hundred and twenty-eight in all, parade past you as you sit in the grand stands at the elephant round-up festival in Surin, Thailand. The excitement as they pass is electrifying. You continue to point out to a companion next to you a particular animal which catches your eye. "Look at that one, she looks just like Pet back home" or "See that bull off to the side; he must be pretty hard to handle as they keep him away from the others". "Look at all the chain draped over his neck; he must run off quite often and isn't that calf about two weeks old?" As an elephant person you feel as though you've died and gone to heaven!

The elephant round-up at Surin is a yearly festival that is co-sponsored by the Tourist Authority of Thailand and the Forest Industry Organization. The festival has been going on for the last 16 years and is held each year at the start of the dry season around the third week in November. The festival of old, normally preceded a villagers' trip to the jungle to capture wild elephants. It has now grown to become a celebration of man's relationship with the elephant.

The round-up begins with a procession of elephants. These animals, along with their mahouts, are all lined up facing the grand stand. The cows which gave birth that year are singled out and given special attention for their efforts. They receive a piece of sugarcane and the mahout a small stipend. Then all participants go to the far end of the Surin airfield where they prepare for the day's proceedings.

In the early years of the elephant capturing, a village would prepare for the round-up with a ceremony to appease the spirits. They would spend several days feasting and then gather all the equipment needed for the three-month sojourn into the jungle. The wives of the mahouts would do nothing for that period of time so as not to offend any spirits. They wouldn't bathe or comb their hair and they would move about the house very carefully.

Two different methods were employed in capturing the elephants. The first was to build a large corral or Kraal and drive an unsuspecting herd into it. Once enclosed the mahouts would ride in on their Konkis (large males that were already trained) and single out an individual. They would then

ELEPHANT ROUND-UP AT SURIN, Continued

lie in between two tame elephants and escort them out of the kraal. The wild elephants pay little attention to the mahouts on the backs of the strange elephants. The new captives are then taken to a crush where their initial training takes place. The second method used is lassoing the elephant with a woven rope.

Picture yourself on the back of an elephant moving silently through the jungle. A scout comes back and says a herd is located 2km to the west. You move off in that direction. The wind is in your face and insures that the wild herd doesn't catch your scent. As you move nearer all verbal communications cease and the lead mahout signals you to the west. You see a dark grey form ahead of you. Your lasso (a long pole to which a loop of rope is attached) is readied. You check the other end of the rope to see that it is secured to the harness of your elephant. You see that the wild elephant ahead of you is getting restless. It directs its trunk towards you but is unable to pick up your scent.

Suddenly the wind shifts and brings your scent to the elephant. It wheels around and heads off in the opposite direction trumpeting an alarm. The other elephants follow suit and the chase is on. The mahout urges your elephant forward closing the gap between you and your quarry. As you get closer to the selected animal you lower the lasso, slipping the loop around the hind leg. The loop is pulled taut. Before another loop can be slipped around its leg, another mahout throws a thorny rope around the captive's neck. That way, if it should escape, the thorns will dig into the flesh causing an infection. The animal then weakened from fever from the infection can be easily captured several days later. You are able to secure your elephant though, and he's tied to a tree where later he will be escorted back to the village and trained. A demonstration of all this is given at Surin.

The activities continue and highlight the elephant's abilities. There are several types of races. The most exciting is the all-out speed race. Also there is a race where the elephant has to pick up an object from the ground and give it to the mahout. Interestingly enough, in this race no bunch of bananas ever made it to the hands of the mahout. A log rolling contest follows, and a tug-of-war between members of the Thai Army and one mature bull. The elephant won. There was also an elephant soccer game.

The climax to the proceedings was a demonstration of the use of elephants in warfare. Through history there have been many conflicts between the Burmese King and the King of Siam. Troops from the opposing forces would amass along a common front. A general or the King of Siam would be seated on a large howda on the back of one of the elephants. He would direct his troops with the use of wands made of peacock feathers.

Initially, scouts would be sent out to determine troop strength and positions. The foot soldiers would advance next followed by the war elephants. The war elephants each had a mahout that would guide it and a war howda with a spearman in it. He had a large arsenal of weapons from which to choose. Each elephant was also accompanied by four foot soldiers, one by each leg. They were to protect the elephant, for once injured and maddened with pain, the elephant could not discern friend from foe as it rampaged about.

On the field the two armies marched towards each other growing ever closer. Artillery is fired and finally the archers are in range to shoot. The two armies clash. At this point all the elephants stampede towards the grandstands and loom over the top of the bystanders offering them rides. Once one regains his composure, the offer of a ride is gladly accepted. So ends the elephant round-up festival at Surin, Thailand for another year.





1985 AAZK NATIONAL CONFERENCE

October 20-24, 1985

Miami, Florida

TENTATIVE SCHEDULE

Sunday, 20 Oct.

Registration
Board Meetings
Ice Breaker

Tuesday, 22 Oct.

Tour of Miami Metrozoo
Zoo Lunch
Workshops
Zoo Olympics
Dinner provided by Docents

Thursday, 24 Oct.

Paper sessions all day
Lunch on your own
Banquet - Auction

Monday, 21 Oct.

Paper session all day
Lunch on your own
Monty Trainers (local restaurant/
bar)

Wednesday, 23 Oct.

Dreher Park Zoo
Zoo Lunch
Soccer & Volleyball
Dinner on your own

**A trip to the Everglades is being
discussed as an optional pre-post
(to be decided) conference trip.

SEE FIRST CALL FOR PAPERS PAGE 42 IN FEBRUARY AKF. NOTE CHANGE: Papers will be limited to 10-15 minutes with an optional five-minute question/answer period.

ZOO OLYMPICS

The Zoo Olympics is a Miami Metrozoo tradition that involves a triathlon of events that allow zoo personnel to show their agility, speed, and strength in events that are designed to simulate day-to-day activities. The great athletes who participate in these games may utter various sounds as they put forth tremendous effort to do their very best. There will be two-person teams made up of one female and one male zoophilic keeper. One must compete in the triathlon in order to have a chance to win, place or show. Points will be awarded for first through fifteenth place in each olympic event.

The first event is the heaving of elephant dung for distance. The teams may unleash their biotic missiles down the ranges with considerable velocity. However, it should be mentioned that dung should not be directed towards the judges who are measuring the stupendous throws.

The second event requires the amazing dexterity of our Olympic zootechnicians. The unlocking and locking of locks, as all zoo personnel know, demands the utmost skill in performing this olympic task. Zooking may be heard far and near as our Olympians use all of their agility to bring this event to its final conclusion.

MIAMI '85, Continued

The third and final event exhibits the swiftness of our competing zoophilic keepers. This Olympic event of the triathlon begins with the removal of a bale of hay by the first Olympian from mother earth to a wheelbarrow or wheelchariot, as it is called at Metrozoo. The wheelchariot is then wheeled with increasing speed to a point in the distance where the bale is disposed of on the ground again. The wheelchariot is then returned to its original place and transferred to the other Olympian, who takes it back to the offending bale, deposits the bale into the wheelchariot and returns once more to the starting point.

We encourage all of you tremendous athletes and dedicated zoo personnel to join in our games, to please the zoo gods and to become enshrined with other zoomorphic heroes of the past.

DISCOUNT TRAVEL INFORMATION

Convention Planners International through its retail travel agency offers all attendees of the American Association of Zoo Keepers Conference airfare discounts. Convention Planners International will offer the lowest possible airfare, then discount those rates even further. Discounted pre- or post-convention tours will also be offered.

If you are interested in the lowest airfare rates available*, please call our 800 number today or fill in the form below and return to:

Convention Planners International
9131 Fletcher Parkway, Suite 124
La Mesa, California 92041

(Inside California) 800-223-8021
(Outside California) 900-431-2472

*South Florida AAZK Chapter recommends that you first look into airfares on your own before you use this service. We cannot guarantee that the airfare rates they offer are the lowest available to everyone.

AAZK TRAVEL FORM

NAME: _____ Spouse/Guest: _____

Number of Children & Ages in Party: _____

Address: _____ City: _____

State: _____ Zip: _____ Phone: () _____

Departure City: _____ Departure Date: _____ am pm

Return Date: _____ am pm Credit Card #: _____

Expiration Date: _____ Signature: _____

Please send additional information:

___ Pre- or Post-Convention Tours

___ Car Rental for ___ Days



IN GREATER MIAMI

and architecture of each display also portray that geographic area.

Metrozoo's unique design, from overall concept of moated exhibits to the detailed sculptural work on each exhibit sign, gracefully combines education and entertainment. Among the zoo's many special features are: Sulawesi, a colorful replica of a Malayan village where children and adults alike can come into contact with some of the zoo's tame animals; a replica of a mysterious 13th-century Cambodian temple where the zoo's white tigers live; exciting bird shows in the zoo's amphitheatre; informal zoo-keeper presentations and elephant shows; a lakefront restaurant and observation deck overlooking the African lobe; and a 2.2-mile guided monorail tour throughout the 225-acre park, where one can see from the air all of the behind-the-scenes activities.

Metrozoo's newest exhibit is Wings of Asia: Garden of Tropical Birds which opened to the public on December 28, 1984 and folks are flocking to see it. 'Wings...', informally referred to as the aviary, is a 1½-acre tropical environment contained under pole-supported, heavy-duty metal netting. In some places the structure is 65-feet tall.

Rare Southeast Asian birds inhabit the free-flight aviary, and new species are being added over the next several months. Approximately 300 exotic birds now make up the 'Wings of Asia' population, living amid tropical trees, shrubs and ground cover that recreate the forests and marshes of Asia. It is this duplication of natural conditions and environments that induces the birds to behave as they would in the wild. The 70 or so species in the aviary include such exotics as birds of paradise, sacred ibis, orange bellied leaf birds, rhinoceros hornbill, fairy bluebirds, and hanging parrots. The unusual plants in the aviary are as valuable as the birds, with over 100 species making up the landscaping.

A winding pedestrian walkway throughout the aviary takes the public over a hanging bridge, up to an observation deck, past rushing waterfalls and over a canopy of trees. 'Wings of Asia' can also be viewed from the Zoofari monorail, which goes through the center of the exhibit.

Metrozoo is well on its way to becoming an invaluable and enduring addition to the zoological community worldwide and to the residents and visitors to South Florida. We are proud of our Metrozoo and would love to show it to you at the AAZK National Conference in October. See you then? Good!

**MIAMI
METROZOO**

NEW
Wings
of Asia
Garden of Tropical Birds



2649 South Bayshore Drive
 Miami, Florida 33133
 (305) 858-2500

For Revisions or Cancellations, please call us Direct on our Toll Free Numbers: Oustide Florida - 800-327-8771, Within Florida - 800-432-6155.

NAME: _____

COMPANY NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE: () _____

ARRIVAL DATE: _____ TIME: _____ DEPARTURE DATE: _____

To receive Special Rate, Reservations must be received by 20 Sept., 1985.

Check in Time is 3 P.M. and Check Out Time is 1 P.M. Reservations will require:

One night's room and tax deposit or assured by a credit card.

Please hold my reservations for (check one)

Guaranteed for Late Arrival (with deposit enclosed)

Assured with Credit Card (Am. Express, Diners, Carte Blanche, Visa, Master Charge)

Credit card No: _____ Expiration date: _____

For guaranteed reservations only: I understand I am responsible for one night's room and tax charge which will be deducted from any deposit or charged to my credit card if I fail to cancel my reservation.

Signature _____

-Please Indicate Accommodations Desired-

No. Rooms	Accommodations	Rate
	SINGLE 1 Person	\$75.00
	DOUBLE - 2 Persons 1 Bed	\$75.00
	JR. SUITES 1-2 Persons	\$150.00
	ONE BEDROOM SUITES 1-2 Persons	\$225.00

*Extra Person (Rollaway) Charge is \$10.00.

ANY SPECIAL REQUESTS: _____

1985 AAZK NATIONAL CONFERENCE REGISTRATION FORM

October 20 - 24, 1985



Please fill in and return this form with your fee to:

Rachel Rogers
Conference Registration
South Florida AAZK
12400 S.W. 152nd Street
Miami, FL 33177

CONFERENCE REGISTRATION

NAME: _____

ADDRESS: _____ CITY: _____

STATE/COUNTRY: _____ ZIP/POSTAL CODE: _____

ZOO AFFILIATION (if applicable): _____

AREA OF INTEREST: _____

VEGETARIAN: _____ YES _____ NO

WILL BE PARTICIPATING IN ZOO OLYMPICS: _____ YES _____ NO

BRINGING AN AUCTION ITEM? IF SO, BRIEFLY DESCRIBE: _____

WILL BE SUBMITTING PAPER: _____ YES _____ NO
(\$15.00 will be refunded on acceptance of paper)

TRANSPORTATION: _____ (car, plane, etc.)

AAZK MEMBERSHIP STATUS & FEE:

Member or Spouse.....\$55.00
Non-member.....\$60.00
Late Registration Fee.....\$15.00
TOTAL FEES ENCLOSED.....\$_____

SINGLE EVENT RATES: Ice Breaker \$10.00 Paper Session I \$10.00
Sun. 20 Oct. Mon. 21 Oct.
Miami Metrozoo \$15.00 Dreher Pk Zoo \$20.00
Tues. 22 Oct. Wed. 23 Oct.
Paper Session II & Banquet \$30.00
Thurs. 24 Oct.

Please make this check payable to: "SOUTH FLORIDA AAZK". The deadline for registration is Thursday, 15 August, 1985.

AKF SURVEY RESULTS - A Commentary From The Editors

From the statistical results of the survey on Animal Keepers' Forum (see page 39, February issue), the majority of those responding to the survey seemed to express the opinion that they were basically satisfied with the job AKF has been doing. However, there were a number of specific concerns and suggestions submitted by respondents and it is those which the editorial staff would like to address here.

Prior to getting down to specifics, we feel it is important for the membership to understand what the editorial philosophy behind AKF is and how the staff sees its job of implementing that philosophy. The idea for AKF began at a time when there was very limited communication between zoos and keepers in particular. It was hoped that the establishment of a communications vehicle such as the Forum would stimulate interaction between members of the zookeeping profession and serve as a common meeting ground for information exchange.

The primary philosophy of AKF is to serve as an open forum to those in the zookeeping profession. Its goal is to get out as much useful information as possible to the membership by providing such a forum to all members, allowing them to contribute material ranging from research-oriented papers to zoo and animal news; from artwork and anecdotal articles and safety tips to essays dealing with personal experiences. The Forum is aimed toward the 'whole keeper', not just the serious researcher or the individual who wishes to express his or her feelings about the profession via art or poetry.

We do not claim nor do we feel it is advantageous to become a journal on the level of Zoo Biology or IZN. The more rigid constraints on material and format required by these publications would tend to exclude (i.e. "shut out") a good portion of the AAZK membership. We feel it is important for AKF to remain open to all the many levels of professional animal keepers. Every Zoo/Aquarium has evolved a certain level of professionalism for its keepers depending on the demands of each facility. AKF remains 'open' to all these levels and exclusive to none.

In implementing this philosophy, the staff makes every effort to review the wide variety of material submitted by members. It is important to remember that AKF is primarily dependent on the membership to fill its pages. It is beyond the scope of time available to the staff to generate articles on more than a few specific topics (example: Endangered Species Update). Therefore, the majority of what appears in AKF comes from the membership directly. Each month the staff attempts to put together a well-rounded collection of material - working towards a diversity of topics as well as editorial styles. What hopefully results is a publication in which each AAZK member can find something of interest or assistance to him/her. We do not expect every article in every issue to appeal to every member. That would be unrealistic. What we hope to achieve is a balance.

We are committed to the philosophy of a truly 'open forum' for all those involved in the zookeeping profession.

Now to specifics. The following are changes and suggestions submitted by survey respondents and our reply to them.

1. Typing and proofreading should be better - *We are aware of the errors which sometimes appear in AKF. We are not any happier with them than you. We make every effort to send the Forum to the printers as mistake-proof as we can make it. The human factor of making errors enters the picture despite the fact that each issue is proofread a minimum of three times before publication. We are working on improving this problem as best we can.*

AKF SURVEY - A Commentary From The Editors, Continued

2. Too much on front inside cover/don't like membership application on back inside cover - In order to qualify for our Second Class postal permit a certain amount of information is required to appear on the front inside cover. These are statics which we cannot change. We are, however, working at reformating the section on Committee Chairmen, Project Heads and Regional Coordinators so that it will be easier to read and more useful to the membership when they need to contact one of these people. As for the Membership Application--it is placed on the back inside cover so as not to have to use up space on the inside of the AKF for its duplication. The staff is, however, giving consideration to printing the application on the last page of each issue thus giving the applicant more room to fill in necessary information and eliminating the need to cut it out of the cover to send it in. If this is done, it would be printed back-to-back with that current month's Opportunity Knocks page so that in tearing out the application, you would not lose any part of an article.
3. Have more articles on hoofed stock, carnivores, behavior research and things for aquarium keepers - As stated earlier, we can only print what the membership is willing to share via AKF. We too would like to see a greater diversity of articles, particularly from the areas mentioned, but do not have the resources to generate them internally. We would hope that those respondents who requested these specific areas would take it upon themselves to write an article on their speciality and to encourage other like-interested colleagues to do the same. We cannot stress too emphatically that AKF can only fulfill its role of disseminating information on all topics related to zookeeping if the membership is willing to support that goal by becoming active contributors.
4. Cut out all poems and other "cutesy" stuff - This type of comment came from several specific geographical pockets around the U.S. and apparently keepers in these areas feel that poetry, travelogue-type articles, cartoons and the like are not professional enough to be included in AKF. We feel that a world without humor is a pretty dull world indeed and we also see no lack of professionalism in a keeper relating his/her feelings and commitment to his/her profession through art, poetry or cartoons. While we never intend to fill AKF's pages with such material exclusively, we feel the occasional inclusion of less serious subject matter may serve to help us all achieve a better prospective on ourselves as people and as professionals and keeps us from taking ourselves too seriously.
5. List more job opportunities available - We list every job opening we have available every month. However, we feel that many zoos and personnel directors may not be aware of this free service from AKF. We are therefore currently compiling a list of such institutions/individuals and will be sending them information on this service. With a good response, we can hopefully soon have more job listings to print. We encourage members to let their administrations know that they can list job openings in AKF gratis.
6. Delete cover art and use Zebra logo only/quality of cover art variable - We feel that going back to the exclusive use of the Zebra logo on the front cover is not only monotonous but really detracts from the uniqueness of the AKF. We receive vast amounts of cover art from keepers all across the country. Subject matter and quality vary considerably. We attempt to use the best of what we have available while varying the subject each month and tying in covers with inside articles whenever possible. Another suggestion we received was to print a small piece on the animal featured on each month's cover. We feel this is an excellent suggestion and we will attempt to begin doing this as soon as possible.

F SURVEY - A Commentary From The Editors, Continued

Use more photographs - We are pleased to include suitable photographs whenever they are sent with an article. Photographs must be in black and white and preferably on glossy stock. Cost restraints would prevent us from running lots of photographs each issue, but we would be pleased to include them when appropriate.

Revamp Births and Hatchings Section - This suggestion has been under consideration for some time and the staff anticipates formatting changes in this section soon. Because this section of AKF has continued to grow and grow, some stricter guidelines for what is to be included are going to be established. We are currently working with several keepers across the country in establishing such guidelines. While the AKF survey statistics showed that B&H is read by a majority of the respondents, we hope to make it a more significant and informative part of the overall AKF contents.

Verify accuracy of material submitted - We, unfortunately, have no control other than an individual's word that material submitted is original in nature. We could not possibly read every journal and scientific publication and be familiar with everything published on animals and animal husbandry. Occasionally we have, say, a news release, sent in by a member about something happening at his/her institution. This is listed in the AKF submitted by NOT written by whomever. We rely on individual member's integrity when they submit material that it is original and not an outright out plagiarism of another's work.

Better standardization of quality of articles published/better referencing of articles/stricter criteria for papers submitted - This is a rough concern to answer as it gets back to the philosophy of AKF being an 'open forum' for keepers at all levels of the profession. We realize that there is a discrepancy in the 'level of writing' between various articles. Not everyone is a writer, not everyone is a researcher. For articles which are research-oriented, we expect more strict adherence to style and standard guidelines. Those articles which are more subjective and relate more to an individual's personal experience in his profession are not expected to meet the same criteria as the former. We feel, however, that there is a need for better standardization in some instances and we plan to work closely with both the Research and Education Committees on setting criteria for those types of articles. We do not feel obligated to publish everything we receive and make an honest effort to edit and correct material whenever possible. That doesn't mean we don't make mistakes in our content and judgement on occasion. We hope in the coming months to publish an article(s) on "How To Write An Article for AKF" which may help us bring greater standardization and continuity to our editorial content.

Legislative News is beyond the scope of AKF/institute a "Action Alert" on upcoming legislation/have monthly update on the SSP - We feel it is important to keep members aware of what's going on with wildlife legislation. We realize that we cannot cover it all in depth, but we hope to spark interest in the membership to become involved outside of their zoetting. An "Action Alert" is a good suggestion but without having someone in Washington to keep a daily eye on what's happening with wildlife legislation, it is difficult to be current in this area. If anyone has any suggestions on how this could be achieved, please let us know. We all have a vital interest in the SSP program but this we feel, beyond a general article on occasion, is beyond the present scope of AKF. Without direct contact with and cooperation from the various SSP Coordinators, it would be difficult for us to do this subject any justice. We feel since AAZPA is involved directly in SSP and has access to information on it, they are still the best source for information on this topic. But we are open to suggestions again on how to cover this complex subject.

AKF SURVEY RESULTS - A Commentary From the Editors, Continued

12. More reports on AAZK Committees, goals, progress/how to become involved actively in AAZK projects/info on AAZK officers/ AAZK award winners - Each Committee/Project Chairperson has been asked to submit an article to AKF on their goals and/or progress. To date we have received very few. But we feel it is important for the membership to be aware of what these groups are doing and so will continue to pursue such reports. We frequently include requests from Committees/Projects asking members to provide assistance. This is how you can become involved. If you have an interest in a specific area, contact the chairperson of that committee and offer your help. You can only become as involved as you want to be! We hope in the near future to run some profiles on the AAZK Board of Directors and Officers to better acquaint the general membership with these people who give so much of their time and effort to making AAZK work. We will be contact Mike Crocker, Awards Committee Chairman to solicit some follow-up information on 1985 AAZK Award winners for publication. This will include: who are they and why were they selected for recognition.
13. Make AKF bigger/Less advertising/Add a table of contents to each issue- Cost limitations determine the size of the AKF. An average of 36 pages per issue is about all the budget can take. We have very little advertising although we have been pursuing more potential patrons. These ads help to pay the costs of publication and help in keeping membership costs down. We have no plans to decrease the editorial content in favor of ads but will expand the space available for articles as advertising allows us to expand issue size. The idea of using a table of contents in each issue is under consideration at this time.
14. More articles on equipment evaluation/opportunities available in travel and research/international articles/helpful husbandry hints/other animal organizations/more listings of publication and proceedings available - This is a very broad category and again is one in which we really need the input of the membership in order to make these suggestions a reality. We publish international articles whenever they are available. The same goes for opportunities in research/travel (i.e. Earthwatch etc.) We have tried several times to solicit members to send in helpful husbandry hints for a short column but received dismal response. We publish listings of publication and proceedings available whenever we know of them. If you know of some, why not pass it on?! The same goes for other animal-related organizations which might interest the membership--if you belong to one or know of one send us the information. GET INVOLVED!!!
15. Have a Letters to the Editor section/Expand the Book Reviews--Whenever we have received a letter to the editor, we have published it and would continue to do so except that we do not hear from people very often. We don't know if they have nothing to complain/compliment about or what. The Book Review project has been inactive for some months and we have missed being able to publish reviews on a regular basis. Verona Barr has taken over the project and hopefully we can begin printing reviews again soon.

We realize that we have not been able to cover all of the comments and suggestions sent in by members on the AKF survey. We attempted to respond to those in which a number of individuals expressed an interest. If you have concerns, comments or suggestions, please write to us. Animal Keepers' Forum is the journal of your Association and we sincerely hope that you will take an active interest in helping it develop, grow and improve. Your involvement is vital. Again, many thanks to those who took the time to respond to the survey. We appreciate your interest.

---The AKF Editorial Staff



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

NUTRITION

(Introduction and Feeding Carnivores)

Though feeding activity is reduced during the breeding season and during hibernation, it is most pronounced in winter. For this reason, more inquiries from the novice reptile owner will be directed to zoo keepers during the winter months than any other time of year.

Young reptiles require proportionately more food than adults, and food should only be offered at the individual reptile's preferred temperature (Part 5).

Stressful conditions may cause a reptile to become a reluctant feeder: these include improper photoperiod, the lack of hide areas, and such stressful conditions as excessive noise, vibrations, and handling.

Most all carnivorous reptiles (including the venomous ones) will readily accept dead prey. Dead food prevents potential injuries to the feeding reptile. Even food animals that are considered innocuous, such as mealworms and crickets, may kill timid or sick animals. Limiting the numbers of these insects before introducing them to the feeding reptile may reduce the risk of food animal injuries. Chitinous insects have been known to cause intestinal impaction; therefore, frequent substitutions of corn grubs or wax worms is advisable.

Only whole-body animals should be fed to carnivorous reptiles. Commercially prepared diets or animal parts such as chicken necks, wings and legs, ground beef or animal livers are usually lacking in a balance of nutrients; and, even with the supplementation of vitamins and minerals, essential nutritional requirements may not be satisfied. Table 1 lists some food preferences of some captive carnivorous reptiles.

Feeding frequencies for reptiles are variable, depending upon an animal's age, size, and species. Most snakes should be offered food every one to three weeks; however, low activity or very old snakes should receive less food over a longer span of time. Lizards, turtles, and crocodilians should be fed one to three times a week. Those keeping reptiles must continually evaluate an animal's diet, and feeding frequencies must be monitored and adjusted accordingly.

Table 10 will be concerned with feeding herbivorous reptiles.

TABLE 1 - Key

X = usual food, 0 = occasional food
* Also eats fruit
* Ants, termites, small crickets

REPTILE CARE: RELATING TO THE INQUIRING NOVICE, PART 9, *Continued*

	Reptiles									
	Small Mammals	Birds	Snakes	Lizards	Amphibians	Fish	Insects	Worms or Slugs	Mollusks	Eggs
Indigo	X	X	X	X	X	X				0
Kingsnake	X	X	X	X	X					0
Krait	X		X	X	0					
Mangrove	X	X		0						
Marine or Sea						X				
Night			X	X						
Racer	X	X	X	X	0		0	0		0
Rainbow					Salamanders					
Rat	X	X		0						X
Rattlesnake	X	X	0	0	0		0			
Ribbon					X	X				
Ring-necked			0	0	Salamanders			X		

Table 1. Food Preferences of Some Carnivorous Captive Reptiles*

Reptiles	Small	Birds	Snakes	Lizards	Amphib-	Fish	Insects	Worms or	Mollusks	Eggs
	Mammals				ians			Slugs		
Adult Snakes										
Anaconda	X	X	0	X		X				
Boa, Python	X	X		0	0					
Coachwhip	X	X	X	X	0		X			
Cobra (except King Cobra)	X	X	X	X						
Coral	0		X	X						
Copperhead	X	0		0	X	0	0			
Dekay's							0	X		
Egg-eating										X
Garter	0	0	0	0	X	X	0			
Gopher, Bull, Pine	X	X		0						0
Green				0			X			

REPTILE CARE: RELATING TO THE INQUIRING NOVICE, PART 9, *Continued*

	Reptiles									
	Small Mammals	Birds	Snakes	Lizards	Amphibians	Fish	Insects	Worms or Slugs	Mollusks	Eggs
Collard	X						X			
Gecko (misc.)	X						X			
Glass	X	X		X			X			X
Horned							X***			
<u>Lacerta</u> (misc.)	X	0		0			X	0		
Monitor	X	X					X			X
Night							Termites Grubs			
Skink**	X	X		0			X			0
Swift							X			
Tegu**	X	0					X			X
Whiptail (Racerunners)	0						X			
Worm	0						Termites			

Table 1 (cont'd).

Reptiles	Small	Birds	Snakes	Lizards	Amphib-	Fish	Insects	Worms or	Mollusks	Eggs
	Mammals				fans			Slugs		
Vine		0		X						
Viper (misc.)	X	X	0	0						
Water Moccasin	X	X	X	X	X	X				
Water Snake	0		0	0	X	X		0		
Worm Snake (<u>Typhlops</u> , <u>Leptotyphlops</u>)							X	X		
Lizards										
Alligator	X	X					X			
American Anole							X			
Basilisk**	X	X					X			
Beaded and Gila	X	X								X
Bearded**	X	X		0			X			
Chameleon	0	0					X			

Reptiles	Small Mammals	Birds	Snakes	Lizards	Amphibians	Fish	Insects	Worms or Slugs	Mollusks	Eggs
	Crocodylians Alligator, Caiman, Crocodile	X	X				X	X		
Gavial	0	0				X				
Chelonians (Of the following, most all eat some plant matter) Alligator snapping, Blandings, Bog, Chicken, Diamondback terrapin, Map, Mud, Painted, Pond (misc.), Red-eared slider, Side-necked, Snapping (misc.), Softshelled, Wood**	X	X			X	X	X	X	X	



Keeper's Alert

1985 Great Lakes Regional AAZK Conference

The Detroit Great Lakes Regional AAZK Conference will be held May 5-7, 1985 at the Detroit Zoological Park, Royal Oak, MI.

Papers are requested for this regional conference. Each paper will be limited to 20 minutes with a 5-minute question and answer period. Topics should pertain to zoos and zookeeping. Outlines should be submitted by 1 March, 1985. Please indicate if you would be willing to lead a discussion group on your subject on Tuesday afternoon. There will be a reduction in the conference registration for those presenting papers.

tentative Conference Schedule

<u>Sunday, 5 May</u>	<u>Monday, 6 May</u>	<u>Tuesday, 7 May</u>
Registration	Welcome	Presentation of papers
Ice Breaker at Belle Isle Zoo & Aquarium	Presentation of papers Lunch (provided) Tour of Detroit Zoo Volleyball game/Bar-B-Q	Lunch (provided) Discussion groups Closing dinner & auction

Please make checks payable to: "Detroit Chapter AAZK". Send papers, completed registration forms with registration fee to: *Anne Payne, Detroit Chapter AAZK, Detroit Zoo, Box 39, Royal Oak, MI 48068.*

Registration Form

Name: _____
Address: _____ City _____
State/Province _____ ZIP _____
Phone No: () _____ Name of Zoo: _____
Area(s) of interest: _____
Fees: Member or Spouse - \$30.00 Non-Member - \$35.00
Late registration fee after 7 April, 1985 - \$5.00 additional
Total fees enclosed: \$ _____

(If you cannot attend the entire conference but wish to attend a portion of it, please contact us and we can make arrangements for you to do so.)

Motel Registration Form: Detroit Great Lakes Regional AAZK Conference

Name: _____
Address: _____ City: _____
State/Province _____ ZIP _____
Phone No: () _____ Dates staying at Motel: _____
_____ 1 person/double bed - \$35.00 per day _____ 2 people/double bed - \$37.00 per day
_____ 2-4 people/2 double beds - \$41.00 per day
_____ Do you wish to share a room with another person (to be matched by Motel)?

Reservation deadline 14 April, 1985 - to be assured a reservation.

Heritage Inn Motel, 14700 E. 8 Mile, Detroit, MI 48025. (313) 527-1070.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings of positions which become available close to deadline are accepted.

AVIARY KEEPER...\$9.1055 per hr., requires at least two-years experience as a bird keeper at a zoo or an aviary or an equivalent combination of training and experience. Cares for birds at indoor and outdoor exhibits at aviary by preparing or directing preparation of food, ministering to injured birds and performing other tasks; may give lectures and tours. Written examination required. Request application by writing to: The Department of Personnel and Civil Service Commission, Fourth Floor, City-County Building, Pittsburgh, PA 15219. Filing deadline is 29 March, 1985.

MAMMAL KEEPER...prefer previous experience with large carnivores. Starting salary \$9289 based on previous experience. Send resume by 25 March, 1985 to: Mark D. Pyritz, Curator of Mammals, Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210.

WARDEN...Six Flags Great Adventure Drive-Thru Safari, located in Jackson, NJ currently has a position available. Elephant, big cat experience preferred. Salary \$7.81 per hour plus full benefit package. Send resume no later than 1 April, 1985 to: Six Flags Great Adventure, P.O. Box 129, Jackson, NJ 08527, Attn: Personnel.

ZOO DIRECTOR...required degree or suitable experience compatible with Zoo Administration. Will manage and direct full operations of progressive zoo exhibiting native Texas fauna. Responsibilities include directing curatorial, administrative, development, marketing, and educational departments. Send resume to: Texas Zoo: The National Zoo of Texas, P.O. Box 69, Victoria, TX 77902, c/o Dennis Williams, President, South Texas Zoological Society. Salary negotiable with benefits depending upon work experience and education. The Texas Zoo is an equal opportunity employer.

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Information Please

Information is needed to locate a Jack Lynch who used to have a group of Plain Wolves [*Canis lupus nubilus* (?)]. Anyone who has information on the group of wolves or Mr. Lynch, please contact:

Harry Teyn
c/o Howletts
Bekesbourne near
Canterbury
Kent CT4 5EL
England

or

Harry Teyn
c/o Diana Guerrero
P.O. Box 154
Laytonville, CA
95454
U.S.A.

SHIPPING AN ANIMAL? Remember to include an Animal Data Transfer Form. These forms are available FREE - a professional courtesy of AAZK. Contact: Bernie Feldman, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

- \$20.00 Professional
 Full-time Keepers
- \$25.00 International
 All members outside the
 U.S. and Canada
- \$50.00 Contributing
 Organizations and Individuals
- \$15.00 Affiliate
 Other staff and volunteers
- \$15.00 Associate
 Individuals not connected
 with an animal care facility
- U.S. CURRENCY ONLY PLEASE

Directory Information

Room	Work Area	Special Interests
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Mail this application and check or money order, payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 335 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to the *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size of no more than 6" x 10" (15 cm x 25½ cm.). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephoned contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or of the American Association of Zoo Keepers.

Items in the publication may be reprinted. Credit to this publication is requested. Order reprints from the Editor.

Postage Paid At Topeka

of Zoo Keepers
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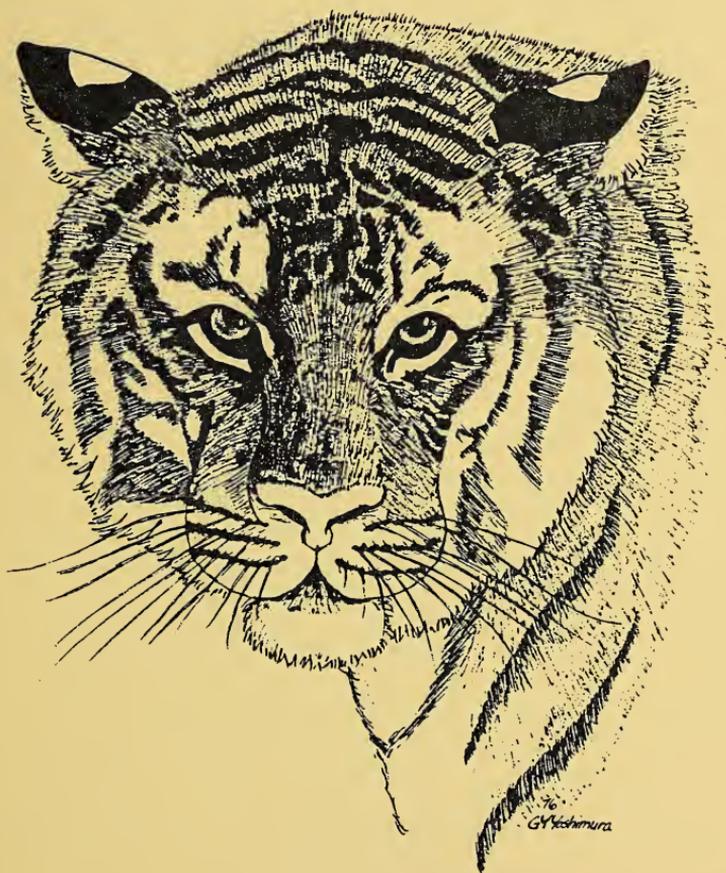


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APRIL 1985

Animal Keepers' Forum

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Dedicated to Professional Animal Care



Executive Editor: Alice Miser
 Managing Editor: Susan Chan
 Associate Editor: Bernie Feldman

APRIL 1985
 VOLUME TWELVE
 NUMBER FOUR

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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<u>Exhibit Design</u> Diane Forsyth, Akron Zoo	<u>Diet Notebook</u> Brett Bannor, South Florida Chapter
<u>Keeper Accomodations List</u> Oliver Claffey, Metro Toronto	<u>Biological Values/Gestation</u> Larry Brainard, San Francisco Zoo
<u>Keeper Training Videotapes</u> Wayne Buchanan, Woodland Park	<u>Keeper Data Survey</u> Mary Slaybaugh, San Antonio Zoo

Reference Search

Liz McLaughlin, Roger Williams Park Zoo/Jenny Rentfrow, Mason, Michigan

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Lawrence Gledhill	Woodland Park Zoo	WA, OR, ID, MT, WY, AK
Joanie Stinson	Phoenix Zoo	CA, NV, AZ, UT, HI
Vacancy		Canada

is month's Keeper/ Artist is Gwen Yoshimura of the Honolulu Zoo in waii. Her drawing is of a Bengal Tiger. Thanks, Gwen!

Scoops

and Scuttlebutt

NEW REGIONAL COORDINATOR NAMED

Ian Sharples of the Atlanta Zoo has been named as Regional Coordinator for the states of Mississippi, Louisiana and Arkansas. Alan, who is resident of the Atlanta AAZK Chapter, also serves as RC for the states of Florida, Alabama and Georgia.

FLY HIGH AT THE DETROIT REGIONAL!

Janini Sutherland, a Detroit Zoo Docent and licensed pilot, will be offering free plane rides over the Detroit Zoo and the Belle Isle Zoo during the 1985 Great Lakes Regional AAZK Conference. Plane rides will be available for those participants arriving on Sunday, 5 May in the morning and afternoon.

It should also be noted that the Detroit Conference Committee has announced that those keepers presenting papers at the regional will receive a \$15.00 education in their registration fee. A registration form for the conference, scheduled May 5-7, can be found on page 139 of this issue of AKF.

CATCH THE MAILS FOR YOUR 1985 SAFARI BROCHURE

The flyers for the Fourth Annual Off-the-Job Training Safari to East Africa have been mailed to the membership. This Safari, arranged especially for AAZK by Park East Tours, Inc., will be led this year by Gary Clarke, Director of the World Famous Topeka Zoo and promises to be one of the best trips ever. Departure date is 23 November 1985 with U.S. return date of 6 December 1985. Total cost from New York is \$2285.00. If you do not receive a brochure in the next couple of weeks, contact National Headquarters.

FROM THE ELECTION COMMITTEE

Members are reminded that nominations for the two AAZK Board of Directors positions open in this year's election are due by 30 April 1985. Check the March issue of AKF (page 75) for further details. Nominations are to be sent to NEC Chairperson Lynne Villers at the Indianapolis Zoo.

AKF ANNIVERSARY T-SHIRTS NO LONGER AVAILABLE

Members are advised that the special edition AKF 10th anniversary T-shirts are no longer available from the Woodland Park Chapter in Seattle. This was a special project in conjunction with the 1984 Conference and orders were only accepted through the closing date of the Conference.



FROM THE PRESIDENT

Dear Fellow Members:

In the February and March issues of Animal Keepers' Forum, we have run notices for the Great Lakes Regional AAZK Conference which is being hosted by the Detroit Zoo AAZK Chapter. I would like to strongly urge our members in the Midwest, and Great Lakes region to take advantage of this opportunity, and attend the conference. You say you can't attend all three days? Then go for one or two! Even if you're only able to attend the icebreaker at Belle Isle Zoo and Aquarium, the chance to rub elbows with your fellow zoo professionals will pay you back in the future.

Last year the Riverbanks Zoo Chapter of AAZK hosted the Southeast Regional conference and, in my judgement, it was one of the best organized conferences ever to have occurred in a three-day span. Knowing the dedication of the Detroit Zoo Chapter of AAZK, and the support they receive from their zoo administration, there is no doubt in my mind that Detroit will be able to duplicate the success the Riverbanks Chapter had last year.

For those members who have never attended a regional or national AAZK conference, I would like to point out the many opportunities available at these conferences to increase your knowledge of professional animal care. At least a portion of two days will be devoted to paper presentation, with the opportunity for delegates to ask questions after each paper. Although specific workshops are not listed now, by the time the conference begins they will be included, providing another forum for information and idea exchanges. Workshops at previous conferences have covered such topics as: Primates in Captivity, the SSP program of AAZPA, Keeper Research, Zoo Horticulture, Continuing Keeper Education, Small Felids in Captivity, Elephant Management, and the Zookeeper as a Video Producer.

Tours of hosting facilities is yet another opportunity to share, and compare work routine, and techniques with fellow keepers. It also provides you with a glimpse of how other people view caring for and exhibiting the same animals you work with.

Finally this conference will provide you with the opportunity to meet keepers from other facilities on a one-to-one basis. Over the years this has proven to be the best method for distributing the information we gain each day, working with and caring for captive exotic wildlife. Also keep in mind that when you attend an AAZK conference, regional or national, you are guaranteed that you will be hearing about animal techniques.

If there is any doubt in your mind about attending an AAZK conference, I suggest you ask your fellow keepers or zoo employees if they have attended one. I'm sure that when you find one who has experienced an AAZK conference, they will be able to infuse you with the enthusiasm they brought back from it.

Remember to mark your calendar, and sign up for your annual leave for May 5-7. The Great Lakes Regional AAZK Conference is the spring tonic you're looking for!

Sincerely,

Kewin Conway

President AAZK



Births & Hatchings

SAN ANTONIO ZOO.....*Debi Reed*

February 1985 B&H include: Mammals - 0.0.1 Dama wallaby, 1.0 Potto (DNS), 1.1 Prevost's squirrel (0.1 DNS), 0.1 Dama gazelle, 1.0 Grant's gazelle, 1.0 Speke's gazelle, 3.1 Aoudad (0.1 DNS), 0.2 Mouflon; Birds 0.0.2 Diamond dove, 0.0.2 Galah (1 DNS), 0.0.2 Sun conure, 0.0.2 Diamond firetail finch, 0.0.3 Zebra finch and 0.0.1 Society finch.

In other news, two sea lions have arrived for our new sea mammal exhibit. We expect more sea lions and some seals later in the month. We're glad to have them!

TAMPA/BUSCH GARDENS.....*Susan Rackley*

B&H for February 1985 include: Mammals - 1.1 Grant's gazelle, 0.2 Thomson's gazelle, 1.0 Addax; Birds - 0.0.3 Senegal parrot, 0.0.6 Sun conure, 0.0.2 Black-masked lovebird, 0.0.2 Golden-capped conure, 0.0.3 Alexandrine Ring-necked parakeet, 0.0.2 Egyptian goose and 0.0.3 Cereopsis goose.

ROGER WILLIAMS PARK ZOO.....*Adrienne Miller*

B&H for September 1985 through February 1985 include: 0.0.1 Saddle-back tamarin, 0.1.1 Roosevelt elk, 1.0 Llama, 0.0.6 Capybara, 0.0.1 Parma wallaby, 2.0.1 Barbados sheep, 0.0.1 Eland, 0.1.2 Ferret and 0.0.1 Cocktiel.

METRO TORONTO ZOO.....*Harry Hofauer*

December 1984 B&H include: Mammals - 0.0.1 Sugar glider, 0.0.2 Indian fruit bat, 3.0 Hamadryas baboon, 1.0 Sumatran orangutan, 0.0.4 Kowari, 1.0 Reeves' muntjac, 1.0 Barbary sheep; Birds - 0.0.1 Zebra finch; Fish - 0.0.60 Brichardi cichlid; Invertebrates - 0.0.37 Brazilian giant cockroach, 0.0.2 African giant land snail.

JACKSONVILLE ZOO.....*Anne Wiggins*

B&H for January and February 1985 include: 3.1 Egyptian goose, 0.0.2 Honduran wood turtle, 0.2 Sitatunga (1 DNS), 1.0 Guanaco and 0.1 Southern white rhinoceros.

LINCOLN PARK.....*Susan Moy*

January 1985 B&H include: Mammals - 0.0.3 Sugar glider, 0.0.1 Agouti, 0.0.1 Colobus monkey, 1.1 Cotton-top tamarin, 0.0.1 Senegal galago (DNS), 0.0.1 Lowland gorilla, 0.0.1 Tree shrew (DNS); Birds - 0.0.1 Yellow-fronted canary.

BRONX ZOO.....*Margaret Price*

B&H for December 1984 and January 1985 include: Mammals - 0.1 Wisent, 2.1 Axis deer, 5 African zebra mouse, 4.0 Pen-tailed bettong, 0.1 Blackbuck, 2.0 Egyptian fruit bat, 1.1 Sambar deer, 1.1 Maxwell duiker, 1.0 Greater Artibeus bat, 1.0 White-handed gibbon, 1.0 Pudu, 1.0 Red brocket deer, 2.0 Collard peccary, 1.0 Degu, 1.0 Minnie Down's mouse, 1.0 Reeve's muntjac, 1.0 Blesbok, 1.0 Lesser galago, 1.0 Large Malayan mouse deer, 1.0 Lowland gorilla, 1.0 Leopard cat; Birds - 1.0 Tahitian blue lory; Reptiles - 4 Asiatic cobra, 8 Timber rattlesnake, 4 Southern copperhead and 1 Travancore tortoise.

BIRTHS AND HATCHINGS, *Continued*

PITTSBURGH AVIARY.....*Curtis G. Robbins*

Hatchings for February 1985 were: 0.0.1 Emu (DNS), 0.0.2 Red lory, 0.0.3 Greater roadrunner and 0.0.1 Blue-gray tanager.

HONOLULU ZOO.....*Margo Legen & Pete McLane*

B&H for 15 January through 15 March, 1985 include: Mammals - 0.2 Toggenburg (1 DNS), 0.0.4 Axis deer (1 DNS), 1.0 Grey kangaroo (DNS), 1.0 Water buffalo (DNS); Birds - 0.0.4 Galah (Rose-breasted cockatoo), 0.0.3 Kea, and 0.0.2 Jackass penguin.

MIAMI METROZOO.....*Lori Bruckheim*

February 1985 B&H include: Mammals - 0.1 Defassa waterbuck, 1.0 Maxwell's duiker, 1.0 Scimitar-horned oryx, 0.1 Slender-horned gazelle, 0.0.1 Ring-tailed lemur; Birds - 0.0.2 Wattled crane, 0.0.1 Yellow-billed stork, 0.0.2 Grosbeak starling and 0.0.2 Green jungle fowl.

ASSINIBOINE PARK ZOO.....*Phil King*

January and February 1985 B&H include: Mammals - 4 Gambian pouched rat (DNS), 1.1 Yak (DNS); Birds - 1 Triangular-spotted pigeon. Notable arrivals in the Bird Dept. include: 4 Wonga pigeon and 12 Jobi Island ground dove from the Taronga Zoo and two Ural owls from Helsinki.

BROOKFIELD ZOO.....*John S. Stoddard*

B&H for January and February 1985 include: Mammals - 11.11 White-toothed shrew, 1.1.1 Spiny mouse, 1.0 Lowland gorilla, 0.1.1 Goeldi's monkey, 0.1 Spider monkey, 0.1 Mandrill, 0.1 Black rhinoceros, 0.0.1 Green acouchi, 0.0.2 Golden lion marmoset, 0.0.1 Lesser spot-nosed guenon, 0.0.2 Guinea baboon; Birds - 0.0.1 Blue-shouldered robin chat (fledged). In addition, two polar bear cubs born in November 1984 came out of their den for the first time in February.

MILWAUKEE COUNTY ZOO.....*Carol J. Boyd*

February 1985 B&H included: 0.0.1 Black and white colobus and 0.0.1 Straw-colored fruit bat (*Eidolon helvum*).

DALLAS ZOO.....*Tami Jones*

February 1985 B&H include: Mammals - 0.2 Barbados sheep, 0.1 Addra gazelle, 0.1 Reticulated giraffe, 1.0 Llama, 0.1 Axis deer; Birds - 0.0.3 Society finch, 0.0.7 Mute swan; Reptiles - 0.0.5 Poison dart frog, 0.0.4 Philippine sail fin lizard, and 0.0.1 Poison arrow frog.



Coming Events

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 28-30, 1985

Boston, MA

1985 GREAT LAKES REGIONAL AAZK CONFERENCE

May 5-7, 1985

Detroit, MI

Hosted by the Detroit Zoo Chapter of AAZK. For further information, see page 139 of this issue of AKF or contact Anne Payne, Detroit Zoo AAZK, Detroit Zoo, Box 39, Royal Oak, MI 48068.

SECOND INTERNATIONAL CONFERENCE ON CONSERVATION BIOLOGY

May 5-8, 1985

Ann Arbor, MI

For additional information contact: Conservation Biology, Wildlife Management Center, School of Natural Resources, The University of Michigan, Ann Arbor, MI 48109-1115 (313) 763-1312.

PRIMATES, THE ROAD TO SELF-SUSTAINING POPULATIONS

June 24-28, 1985

San Diego, CA

Sponsored by the Zoological Society of San Diego and the Morris Animal Foundation. World leaders in the primate field will speak at this five-day conference focused on the preservation of vanishing species, both in the wild and in captivity. Experts on reproductive physiology, management of captive populations, facility design, disease, genetics, and wild populations will present papers and lead round-table discussions. For further information on registration fees, hotel accommodations, etc., contact: Morris Animal Foundation, 45 Iverness Drive East, Englewood, CO, (303) 790-2345 or the Zoological Society of San Diego, Box 551, San Diego, CA 92112-0551, (619) 231-1515.

1985 AAZPA ANNUAL CONFERENCE

September 8-12, 1985

Columbus, OH

AMERICAN ORNITHOLOGISTS' UNION ANNUAL MEETING

October 7-10, 1985

Tempe, AZ

1985 NATIONAL AAZK CONFERENCE

October 20-24, 1985

Miami, FL



AAZK AWARDS DEADLINE IS JUNE 1

Nominations are being sought for 1985 AAZK Awards. Let's recognize those individuals worthy of an award due to their commitment and performance in the zookeeping profession.

The EXCELLENCE IN ZOOKEEPING award, CERTIFICATE OF MERIT FOR ZOOKEEPER EDUCATION, and the MERITORIOUS ACHIEVEMENT AWARD will be presented at the 1985 AAZK Conference in Miami.

Last month, the AKF discussed the characteristics and qualifications for the Excellence in Zookeeping award. This month it features the MERITORIOUS ACHIEVEMENT AWARD.

This award is given to professional members of AAZK or AAZK-affiliated chapters for outstanding achievement in the zoo field and related activities. This award is to cover activities outside the scope of the Excellence in Zookeeping awards. Any keeper or AAZK Chapter is eligible and more than one award may be given each year.

Unlike the Excellence in Zookeeping awards, this award may be given on the basis of isolated noteworthy breeding successes or other individual spectacular achievements. This would include such things as keeper participation in AAZPA Bean Award projects, individual breeding projects carried on outside the zoo proper, wildlife conservation efforts, zoo and wildlife education programs, and many other related activities.

The guidelines for this award are broad and very general and cover almost any activity associated with zoos and wildlife; however, the persons receiving such must be professional animal keepers or AAZK Chapters in keeping with the goal of our organization, which is professional animal care.

QUALIFICATIONS

1. The nominee must be a full-time animal keeper, employed in any North American zoological institution or aquarium.
2. The nominee must have been employed at least one year on a permanent status at a zoo or aquarium, or in the case of an AAZK Chapter, must have been on active status for at least one year.
3. The nominee must be nominated by his or her peers. They need not be from the same zoo or aquarium.

NOMINATION PROCEDURES

1. List name, position, institution, years of service in the field, and the recommendation of peer or colleague.
2. List the outstanding achievements: Exhibits, Breeding, Education, Conservation, etc.

SELECTION PROCEDURE

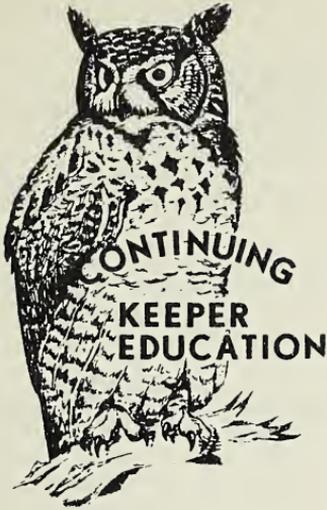
The awards committee, consisting of five people, will independently review each nominee.

REMEMBER THE DEADLINE FOR ACCEPTANCE OF NOMINATIONS

JUNE 1, 1985

Send nominations to: Mike Crocker, AAZK Awards Committee, Dickerson Park Zoo, 3043 North Fort, Springfield, MO 65803.





Update on Listing of Courses,
Programs Offered by Colleges
and Universities for Careers
in the Zookeeping Profession

Dear Fellow Keepers and AAZK Members,

In answer to the often asked question about where one can learn to be a Zoo Keeper, we can now add a list of schools that teach related classes and courses. The brief notes describe a little about each entry but, by no means, define the programs in depth. Where possible, the name of a contact at the school is listed. Of the 172 schools that were contacted, 12 responded that there were directly or indirectly-related classes and even

degree programs; eight responded that there was nothing available specific to captive animal care although there were general biology and wildlife management programs at these; the others may yet respond, and the list will be updated as this happens. I will continue to keep the master list for awhile, and copies will be available from me, or from National Headquarters. If you know of more sources of initial training, or continuing Keeper education in facilities other than zoos themselves, please let me know.

Training programs in zoos is another project.

The following list is for information only, and is in no way an endorsement of the programs by AAZK. Students are advised to get more information from the institutions themselves to assess the appropriateness of the courses to their situations.

Thank you for all you are doing to improve captive animal care.

Sincerely,

Patricia E. Sammarco
Keeper Education Committee Coordinator
Zoo Keeper

Phoenix local Community Colleges
Through Mike Carpenter
Rio Salado Community College
135 N. 2nd Ave.
Phoenix, AZ 85003

Biology of Zoological Gardens
Animal Behavior

Moorpark College
Exotic Animal Training and Management Program
7075 Campus Road
Moorpark, CA 93021

North American School of Animal Science
Depot WGOCA
4500 Campus Drive
Newport Beach, CA 92660

UNIVERSITIES LIST, cont'd

- North Orange CountyAnimal Care Course
Regional Occupational Program Job Placement Service
2360 West La Palma Avian & Exotic Animal
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England
- Wildlife Preservation Trust Int'lat Jersey, Channel Islands, British Isles - 16 or 10 or 6 weeks of intensive training in the techniques of captive breeding of endangered species. Application deadline is June of previous year, starting date by arrangement.



VALENTINE FLOWER SALE AT LOS ANGELES ZOO

*Submitted by John Haley, Secretary/Editor
Los Angeles AAZK Chapter*

Valentine carnations were sold this year by the Los Angeles Chapter of the AAZK. For \$1.25, any Zoo employee could purchase a valentine for a favorite friend, boss or animal. Orders, taken ahead of time, came with a valentine card for a personal message. On 14 February, 215 carnations were delivered on the zoo grounds. Some orders for animals were popular, with the gorillas leading the list with eleven carnations. Some employees ordered flowers to take home.

Material costs were low, allowing the Chapter to realize better than 50% profit. The only drawback was preparation (each carnation was arranged with fern, baby's breath and ribbon) and delivery time. However, the positive feedback received from those who bought or received valentines made it well worth the effort. If you are looking for a little sunshine in the dead of winter, try a valentine sale!





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Program: The training program consists of 16, 10 or 6 weeks of intensive work in all divisions of the zoo. Trainees work in close contact with zoo staff in all phases of animal keeping and breeding. Each trainee spends two weeks in each section and a final two weeks on an independent project. Daily duties are supplemented with weekly seminars on a variety of topics. The program is flexible in terms of length and focus.

Eligibility: The program is designed for individuals with previous practical experience with animals: zoo and animal center staff and postgraduates in conservation-related fields.

Application: Applications may be obtained from the address below. Selection is made in July/August of each year. Applications should be submitted by 1 June for training beginning the following year.

Dates: Starting date is by arrangement.

Location: Jersey, Channel Islands, British Isles.

Fees: Tuition is free. Full room and board is approximately \$66.00 per week. Trainees are responsible for air fare to and from Jersey, Channel Islands, as well as personal expenses.

For application and further information write or call:

Training Program
Wildlife Preservation Trust International
34th Street and Girard Avenue
Philadelphia, PA 19104
(215) 222-3636

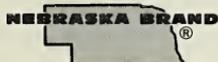
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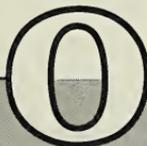
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CHINESE GUESTS AT THE LOS ANGELES ZOO

By
Christine Henderson, Keeper
Los Angeles Zoo, Los Angeles, CA

In the Spring of 1984, after much political maneuvering and meeting of the minds, the government of the People's Republic of China gave its permission to allow a pair of giant pandas (*Ailuropoda melanoleuca*) to be flown to the United States. These animals would eventually be shown in two zoos, starting with the Los Angeles Zoo to commemorate the XXIII Olympiad.

A pair of three-year-olds were chosen from the Beijing Zoo. Both of these animals were wild-caught at only several months of age. They had shared an enclosure in Beijing so there was no introductory problem when they were put together in the newly built exhibit at the L.A. Zoo, dubbed the China Pavilion.

The Chinese had named the pandas when they were initially taken from the wild. The male's name, Ying Xin, translated into "welcoming the new", so named because he was found close to the Chinese New Year. Yun Yun is the female's name, roughly translated into "forever and ever".

The luck of the draw was how I happily came to be chosen as the panda's primary keeper. Our zoo director, Dr. Thomas, felt it would be the fairest way. The keeper chosen as relief, Mike Dee, was also my immediate supervisor which proved to be very helpful.

The China Pavilion was built from scratch in a record five and one-half weeks. The Chinese gave basic requirements for the night quarters and exhibit areas. These included size, substrate material, "beds", protective coverings and "toys". The Chinese insisted on having a rubber tire hung on a chain and a playground jungle gym. The beds were constructed of oak planks framed in iron. As it turned out, the pandas were more than content to sleep on their beds in every conceivable position.

Los Angeles summers can get to be quite hot and muggy, temperatures of 100+ degrees with high humidity aren't uncommon in August. Giant pandas are more accustomed to cool, misty mountains so we had an air conditioning system put in to cool the night quarters and the indoor viewing room. The viewing room was made of block and concrete with large glass windows for the patrons. The pandas were also provided with an 18-inch-deep pool which proved to be a life saver for Yun Yun. She would sit down, splashing with her paws and observe her surroundings in a matter of fact manner. Ying Xin only entered the pool once, against his will, when Yun Yun pushed him in.

Both the indoor and outdoor exhibits were set up to be viewed from two sides. This was done in anticipation of the large crowds wanting to see the pandas. The outside exhibit was enclosed by a brick wall and chain link fencing which completely covered the exhibit. The outer exhibit was divided into two parts with a gate separating them that could be operated from the outside. This set-up was very convenient when the pandas had to be separated or for better outdoor photography. Plexiglass covered the fencing surrounding the exhibit from the wall to a height of three feet. This was to prevent the pandas from climbing the fence, keep patrons from getting fingers chewed off and keep thoughtless patrons from throwing garbage at the animals.

CHINESE GUESTS AT THE L.A. ZOO, Continued

The indoor viewing room had a floor of concrete but the outside had decomposed granite as a substrate. Grass sod was planted and held up quite well. There were various logs, rocks, and stumps to climb on. There were also several existing eucalyptus trees and large clumps of planted bamboo. These were initially covered with sheetmetal to allow the bamboo to become established. The metal eventually had to be removed when the female found a way to get inside; it'll probably take a good year for the bamboo to recover.

The Beijing Zoo gave us a very specific diet to feed the pandas. It consisted of the amount of bamboo to be fed and the ingredients (in grams) of a rice porridge fed twice daily. They were also fed apples daily and twice a week beef rib bones (no meat). The bones could be fed either raw or baked. We preferred baked to minimize parasites and make the bones easier to digest. Ying Xin never cared much for his share of the bones, but Yun Yun would usually devour hers. On at least one occasion she was observed to be holding a bone in her paw and for some unknown reason she rubbed the bone all over her head.

Uncrating the pandas was uneventful. The exhibits weren't quite finished so we kept the pandas in the three stalls of their night quarters for several days. When they were finally allowed to explore their new daytime living areas, they sniffed out every corner. The male seemed more at ease than the female; she paced and panted most of the first day. After a couple more days they both were settled in, playing and sleeping and eating like any other pandas.

All went smoothly for the first five days but about the fifth day the male started showing intestinal problems. It began as slightly loose stools but escalated into pure liquid. At first it was attributed to the long travel and foreign environment. Later it was determined that the whole cow's milk we were giving him was too rich so we switched to lowfat. That didn't help either even though he could tolerate it in China. Apparently, our processing was different enough that he couldn't tolerate American milk.

The Chinese assigned a veterinarian, keeper, and interpreter to travel with the pandas and advise on the pandas' care and handling. These people told us what nutrients they were looking to get into the pandas by feeding milk and we tried other dairy products which would satisfy those needs. Cottage cheese gave results like the milk; live culture yogurt didn't seem to upset him as long as it was given in small doses, about one-half cup twice a day.

Ying Xin still had loose stools off and on accompanied by bouts of gas and mucous plugs. According to the Chinese there were all common signs of indigestion in pandas although they aren't something you would want to have happen at all.

Another part of Ying Xin's prescribed diet that was probably adding to his problems was sugar. Apparently the pandas were so imprinted on this particular ingredient that the Chinese felt the pandas wouldn't eat their rice porridge without it. The L.A. veterinary staff as well as the keepers were strongly opposed to feeding sugar as it could cause more digestive upsets by promoting a bacterial overgrowth in the panda's gut. After several discussions and a little bit of pleading, we talked the Chinese into allowing us to eliminate the sugar. Although several times when the male panda went off feed the Chinese insisted on putting the sugar in to encourage him to eat.

CHINESE GUESTS AT THE L.A. ZOO, *Continued*

Ying Xin had his ups and downs. He initially gained weight, about seven pounds in as many weeks. He had a prolonged bad spell after that, sometimes not eating anything but bamboo for 24 hours, that seemed to clean him out for a few days. The zoo lab ran antibiotic sensitivity tests on fecal cultures but the few, basically harmless bacteria cultured out proved to be resistant to everything. So the only drug treatment Ying Xin received was a trimethoprim-sulfa oral antibiotic and lots of antacid. The antacid helped a great deal to alleviate the gas buildup Ying Xin frequently experienced.

The last two weeks of the pandas' stay in L.A. were much less troublesome for the male. He seemed more active, was eating better and his stools were showing improvement. His weight was below what he originally weighed, but we felt he would soon gain it back considering how well he was doing. My personal thoughts on the whole situation are that Ying Xin's system was upset by the change in diet and environment and after we corrected everything we could, it still took a long time for him to recuperate and adjust.

The female, Yun Yun, was a different story altogether. Very little phased her. She gained weight steadily, leaving us 25 pounds heavier than when she arrived. She had a couple of off days but they were few and far between. She was generally an active animal (as pandas go) always trying to get into mischief. After taking care of her for three and one-half months, I now know that nothing is panda-proof.

For the first two months the pandas were compatible; they would eat side by side and both would initiate play activity. Neither was more aggressive than the other although since the female was 30 pounds heavier she usually "won" their play fights. As time went on the male got weaker from his digestive problems and the female thrived. Ying Xin started avoiding confrontations with Yun Yun as she had become more aggressive in her playing. There were several times when I felt it was necessary to distract Yun Yun and give Ying Xin a chance to escape. I usually accomplished this with apples or water.

Finally the fighting became so severe we decided it was best to keep the pandas separated. I noticed the usual time for the bad fights was late afternoon when the female was most active. So I would allow them to interact until about 1:00 p.m. and then preferably lock the female outside and the male inside. By this time Ying Xin had become reluctant to come into the night quarters and I often had to go out with him to coax him in for lock up. I have to admit it was a bit exciting to be able to hand-feed a panda with no bars between us. As long as he was docile during his illness we felt fairly safe around him, but as soon as he started feeling better we took more safety precautions.

October 27, 1984 was the last viewing day by the public. On October 30, the pandas were crated up and driven to the airport to catch a 1 a.m. flight to San Francisco where they would be exhibited for nearly three months. The three nonviewing days were something the Chinese insisted upon; they wanted the pandas to "rest" before their flight. I don't know what exactly the pandas needed to rest from. Very rarely did they take any notice of the thousands of people who came to scrutinize them.

The Los Angeles Zoo is back to normal now, no more thundering herds racing to the China Pavilion, no more 10-12 hour work days for me and unfortunately, no more Ying Xin to pamper or Yun Yun to scratch. I miss those two black and white clowns very much and I still have hopes that one day our zoo will get this or another pair for keeps.

I would like to add my thanks to our research department and zoo security for their many hours of help during the pandas' stay.



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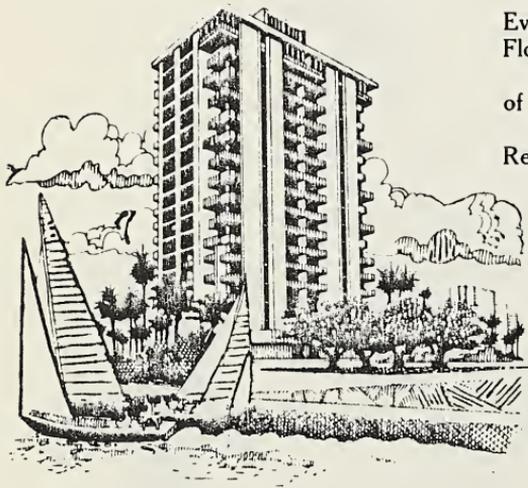
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By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

NUTRITION
(Feeding Herbivores)

In Part I of this series, I mentioned that most turtles are omnivorous; however, they may tend to be primarily carnivorous or primarily herbivorous. Tortoises are primarily herbivorous, but a small amount of commercial canned dog food can be added to their salad from time to time.

Like chelonians, lizards also have a wide dietary requirement. Food preferences of herbivorous lizards vary depending upon a particular individual.

Salads comprising fruits and vegetables should be offered to herbivores about 2 to 3 times a week, and should include 2 or 3 varieties each of fruits and garden vegetables, and at least one green leafy vegetable. Tortoises require a relatively high percentage of dietary roughage from fiber; those not grazing outdoors should be provided with hay ad libitum.

In addition to balancing the herbivore's diet with a variety of foods, a small amount of vitamin/mineral supplements should be added to each salad. Care should be taken not to over-supplement with oil-soluble vitamins as they are toxic in excessive amounts. All foodstuffs should be fresh, carefully washed, cut to appropriate size, and should be varied from meal to meal. Table 1 suggests a list of foods from which to prepare salads, and Table 2 lists some food preferences of some captive herbivorous/omnivorous reptiles.

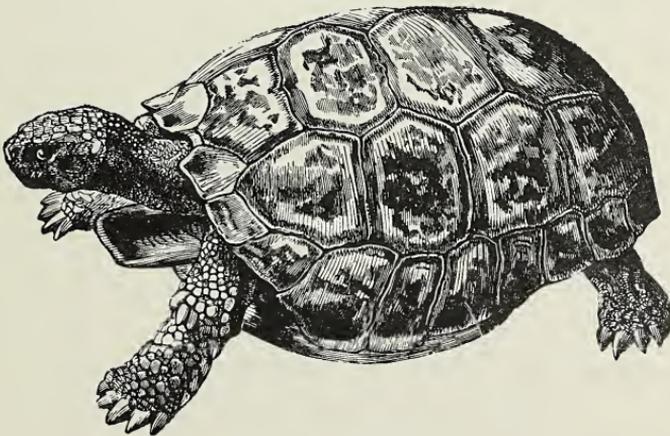


TABLE 1. Suggested Fruits and Vegetables for Herbivorous Reptiles

Fruits (1)	Garden Vegetables (1)	Green Leafy Vegetables (2)	Hay*(3)	Other****
Apples	Broccoli	Beet Greens	Alfalfa	Bone
Bananas	Brussel Sprouts**	Cabbage**	Clover	Canned
Blackberries	Carrots	Collard Greens	Cowpea	Dog Food
Blueberries	Cauliflower**	Dandelion Greens	Kudzu	Dandelion
Grapes	Celery	Kale**	Lespedeza	Flowers
Oranges	Corn	Mustard Greens	Mint	Kelp***
Peaches	Cucumbers	Spinach**	Peanut	Marine
Pears	Green Beans	Swiss Chard	Saltbush	Algae***
Plums	Green Peppers	Turnip Greens	Soybean (sprouts**)	Misc. fungi
Strawberries	Onions			Cacti
	Peas		Timothy	
	Pumpkin		Vetch	
	Squash			
	Sweet Potatoes			
	Tomatoes			

* Relatively high in vitamin C and low in phosphorus

** Goitrogenic; vary diet with non-goitrogenic green forage

***Exclusive food source of Marine Iguanas

****Offer in season

(1) Choose at least 2 to 3 items for each meal

(2) Choose at least 1 and vary with each meal

(3) Offer ad libitum for animals that are not grazing outdoors

Table 2. Food Preferences of Some Herbivorous/Omnivorous Captive Reptiles*

Reptile	Small Mammals	Birds	Reptiles	Fish	Insects	Worms or Slugs	Eggs	Fruits	Vegetables	Flowers
Lizards										
Chuckwalla					0			X	X	X
Common iguana	0	0			0		0	X	X	X
Desert iguana					0			X	X	X
Skink (some)	X	X	0		X			X	X	
Chelonians										
Box	X	0		0	X	X	0**	X	X	X
All tortoises*** (family Testudinidae)					X					X

* X=usual food, 0=occasional food

** Hardboiled

*** Occasionally offer canned dog food



MINNESOTA ZOO MONORAIL FINANCING IN DEFAULT

Financing for the Minnesota Zoo Monorail is in default. The fully automated peplemover system was installed in 1979 for \$8.4 million under an installment purchase agreement between the Minnesota Zoo Board and a group of institutional investors consisting of a number of local banks and insurance companies. Problems with the debt service payment started as early as 1980 because of insufficient Zoo revenues and the withdrawal of funding by the Minnesota State Legislature. Following unsuccessful and protracted negotiations between the investors and the Zoo Board, the contract has been declared in default. A litigation concerning the financing is pending in Federal Court. The investors recently announced their intention to shut down the system, effective 15 March, 1985. Meanwhile, in conformance with a default remedies clause provided in the contract, the system is being offered for sale.

The system, which consists of three 108-passenger, six-car automated monorail trains (see photo), traverses the Northern Trek portion of the Zoo grounds. This portion features large, cold-weather animals in outdoor habitats that closely resemble the animals' natural environment. Since its inception in 1979, the monorail has provided continual service to Zoo patrons. It operates year-round and affords Zoo visitors an excellent view of the animals even in the most inclement weather. Because the monorail essentially brings Zoo patrons close to the animals, its removal threatens the original Zoo concept.

A representative of the group of investors has indicated that a comprehensive inventory, condition assessment, and valuation of the system was conducted by a transportation consulting firm based in Washington, D.C. The

study indicates that the system has been maintained in excellent condition and would cost almost \$14 million to replace today. Should the system be sold and removed, Minnesota citizens stand to be the losers since the debt is only \$8.4 million.

FORECLOSURE SALE

The financing for the fully automated monorail peplemover system installed at the Minnesota Zoological Garden, Apple Valley, Minnesota is in default. The lenders have taken possession of the system and all equipment is offered for sale as a complete lot and/or in broken lots. The system is currently in excellent operating condition. A comprehensive inventory, condition assessment and valuation has been recently completed and is available upon request.



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ELEPHANT SET

PERSONAL REFLECTION ON THE MANAGEMENT PROGRAM AT SENECA PARK ZOO

By
*Timothy Stout, Zoo Attendant
Seneca Park Zoo, Rochester, NY*



This paper will give the reader a personal evaluation on the management of captive African Elephants at Rochester, New York. Currently, we have in residence two females with their ages estimated at seven years. These animals arrived at our zoo in May of 1979.

Every paper must have a beginning. I have decided to use my introduction into the management program as that beginning. At that time it was evident to everyone involved that we were losing control. The elephants realized that we were incapable of enforcing our commands. The attendants were finally awakened to the hard fact that they were no longer maintaining cute little elephants. To be fair to everyone involved, no one at our zoo was properly trained in the management of these animals. The last elephant (an Asian) housed at our zoo died many years previous to the arrival of our young Africans. The attendants involved in the handling of that elephant left our zoo several years after. This left our zoo in the uncomfortable position of having these two young elephants and no one to maintain them.

The original attendants had a dual responsibility. Their main responsibility was the maintenance of their charges. The establishment of a sound management program was secondary. These attendants would correspond with different elephant handlers to gain insight into their management. A basic philosophy that developed was an imbalance of positive and negative reinforcement. Each successive attendant would further modify the program to their personal philosophy. This led to confusion among elephants and people. The elephants could please and displease a person with a single act. Our management continued without incident until our smallest elephant began to assert her authority over the attendants and the larger elephant. This began to physically and mentally remove attendants from the exhibit. The physical removal took the form of aggression towards anyone who challenged her authority. The mental stress of her refusing to obey even the simplest command began to wear on the persons involved. We could no longer allow ourselves the false illusion that we did not have a problem. The most radical solution to our problem was the restructuring of the entire zoo staff to accommodate further training. More time would not solve the problem of too little experience. Obviously, management was aware of the situation; but a remedy needed to be found.

The attempts made by management to solve our problem allowed us the luxury of knowing that they were aware. This awareness did not remove them from being a scapegoat. Their delays in obtaining the necessary help would be blamed on their inaction. As the time passed our frustrations took the form of gallows humor. A reflection of this period is a cartoon altered to show the people who had an encounter with our smallest elephant. The staff began to consider which one would be seriously injured. Other staff members began to offer some rather interesting solutions to our problem. One solution was the disposal of one or both of our elephants. The second solution offered was to obtain a trained Asian. Both are part of the hand-wipe mentality of our day, never accept you are part of the problem, just remove it from your life.

Finally, two solutions were evident to the County of Monroe and Seneca

Zoological Society: First would be to acquire the services of an elephant consultant; second, the removal of our elephants from our zoo. The more popular decision was the employment of Don Meyer as our consultant. When I first became aware of this decision I began to hear stories of how an elephant is broken. At our first meeting, Don would prove that this was not his method. What began that day is what I hope to be a long and prosperous friendship.

The emphasis of our management program is a committee concept in which everyone shares in the responsibility of maintaining our elephants. This responsibility is increased by the use of bi-weekly meetings. At these meetings management and the attendants assigned to the section meet to discuss the direction of the program. As we have matured, these meetings have become an interesting forum of ideas. A set of minutes are taken and then issued to each member of the committee and the remainder of the staff. This further extends the responsibility to everyone.

As in most management programs we work our elephants with a minimum of two persons. Many times we have had five people in the exhibit with no problems. Our elephants have enjoyed the luxury of having our veterinarian intimately involved with their management. This has allowed them to view him without that awful needle. This became very important in the treatment of a tusk infection in the larger elephant. The insertion of a catheter into the tusk under no anesthesia with little protest is a credit to the program and to our veterinarian.

The daily maintenance of our elephants is performed by a team of two attendants. One functions as the leader for the elephants and the staff. This person gives the commands and disciplines as necessary. We have decided that in order to reduce confusion, only the lead person carries an ankus. The elephant recognizes the ankus person and obeys his/her commands. After the initial reservations, the old practice of everyone carrying an ankus is only a distant memory. The second person performs the actual maintenance of the animals. The most important tool of our program is the daily communication between individuals. After many weeks of working with the same person we tend to assume too much. Even the most basic procedures should be reviewed before entering the exhibit. This can eliminate potential problems.

In the short period of time that our management program has been in existence, our pool of qualified people has grown. This has been of assistance in staffing this area. Management is no longer confined to the one person-one elephant trap. We have released the elephants and management from that destructive tendency. Our elephants have learned to respond to a group of individuals, with a language common to all. The only inconsistent part is the degree of mutual trust that develops. This inconsistency lies within the person themselves and they must work to overcome the problem.

Everyone at Seneca Zoological Park are very proud to present this evaluation of our management program. We have decided to share our mistakes so you do not have to repeat them. I personally would like to extend my sincere appreciation to our elephants, the management committee, and the entire staff. Without their assistance and support there would be no management program and no paper to write.

Everyone at this conference considers themselves to be professional in our field. As professionals we are charged with the responsibility to spread our knowledge. This knowledge is not only a reflection of our successes but our mistakes as well. Let us not be so ashamed of our mistakes that we consider them failures and so proud of our success that we no longer listen and learn.



AAZK KEEPER TRAINING VIDEO TAPE PROJECT

The goal of the AAZK Keeper Training Video Tape Project is to produce quality video tape training programs suitable to supplement existing in-house training of entry level keepers. These tapes are not intended to be a complete training program in themselves. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes. Two tapes are currently available.

Zoo Keeper Safety; An Attitude Adjustment - This 18-minute program does not attempt to address the numerous variable specifics of this subject. It presents a safety approach to the job of zoo keeping, and promotes constant awareness and personal responsibility for safety.

A Zoo Keeper's Introduction to Feeds and Feeding - A half hour introduction to the complex subject of feeds and feeding of zoo animals. Topics covered include what, when, and where to feed.

AAZK KEEPER TRAINING VIDEO TAPE PURCHASE AGREEMENT RESPONSIBILITIES AND RESTRICTIONS OF THE BUYER

- 1) The tape may not be duplicated or made available to any person or institution for the purpose of duplication.
- 2) The tape may not be utilized for any commercial purpose.
- 3) Should the buyer decide the tape will not be useful to their training program, the undamaged tape may be returned within 14 days of receipt for a partial refund - \$10 for BETA and VHS, \$18 for 3/4 inch.

I, the undersigned, accept the responsibility for the restrictions listed above.

NAME _____ (Type or Print)

SIGNATURE _____ DATE _____

ORGANIZATION/INSTITUTION _____

SHIPPING ADDRESS _____

_____ ZIP _____

TELEPHONE () _____

TAPE TITLE _____

FORMAT:	BETA _____	VHS _____	3/4 INCH _____
	\$25 _____	\$25 _____	\$35 _____

Make checks payable to AAZK KEEPER TRAINING VIDEO TAPE PROJECT.

Mail to: B. Wayne Buchanan
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103

PARASITE SCREENING IN REPTILES
(End-of-Year Grant Report to AAZK)

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

(Editor's note: Susan has been conducting research into the presence of parasites in reptiles under a grant from the AAZK Research Grants Program.)

For more than four years, reptiles housed at the Atlanta Zoo, other zoos and scientific institutions, and in private collections (approximately 85 contributors), have been screened for parasites. Vials containing 10% formalin were coded with the donor's initials, and numbered. For example, if the Arizona-Sonora Desert Museum requested 150 fecal collecting vials, they were coded ASDM 1 through 150. The donor was instructed to label each vial with the trivial and scientific name of each animal. Once an identification was made, a parasite report was returned, and when requested, with suggested treatments.

The majority of fecal samples examined were negative for parasites; however, many harbored helminths and protozoa. Each sample containing parasite ova was split into four vials. One vial was retained so parasite eggs could be photographed (Ova were photographed in black and white, and in color, at magnifications of 100X and 400X for uniformity. Eggs were also measured with an ocular micrometer). The remaining three vials were mailed to three different parasitologists for egg identification. If there was an agreement in identification, the diagnosis was accepted. However, if there was a disagreement among the parasitologists, a fourth expert was sought for consultation.

Occasionally, adult parasites (and deceased reptiles) were contributed. Eggs were retrieved from the female parasite's oviduct, and were photographed. The adult worms and/or eggs were then mailed to parasitologists for identification.

During the screening process, it was noted that many fecal samples had similar parasite ova within the same shipment. A review of the literature revealed that the eggs were spurious (food-animal parasites). At first, the eggs were thought to have belonged to the reptiles, and the "experts" had also reported these spurious eggs as having belonged to the reptiles in question. Fortunately, the screening process included thousands of samples; therefore, the parasitologists' errors were able to be corrected. From this finding, a manuscript, entitled A Review of Fecal Pseudoparasites of Reptiles, was published in the Journal of Zoo Animal Medicine (Barnard, 1983).

As time passed, a wide enough sampling had been examined and photographed, and the most common parasite groups affecting reptiles had been identified and photographed, leading to two more publications; An Annotated Outline of Some Commonly Occurring Reptilian Parasites, ACTV Zoologica et Pathologica Antverpiensia (Barnard, in press), and A Color Atlas of Some Reptilian Parasites Including Some Commonly Occurring Artifacts, Compendium on Continuing Education for the Practicing Veterinarian (Barnard, in press).

Coccidia found in fecal samples were processed in the same manner as the helminths with the exception that only one protozoologist was consulted. Since information on reptile coccidia is readily available, and several

PARASITE SCREENING IN REPTILES, Continued

experts have on-going research in this field, it was felt that expertise in this area of parasitology had been well-established, and required no further consultation. During the screening procedure, it was discovered that Caryospora simplex was originally incorrectly described, resulting in its redescription. A manuscript, entitled Redescription of the Oocysts of Caryospora simplex (Apicomplexa: Eimeriidae) From an Ottoman Viper, Viper a xanthina xanthina, was published in Transactions of the American Microscopical Society (Upton, Ernst, Barnard, and Current, 1983).

To learn more about the nature of C. simplex, several experiments were conducted at the University of Auburn, Auburn, AL., using oocysts collected and sporulated at the Atlanta Zoo. These studies resulted in additional publications:

Upton, S.J., Current, W.L., Ernst, J.V., and Barnard, S.M.: 1983
Development of the viperid parasite, Caryospora simplex, in mice.
J. AL. ACAD. SCI. (Abstract), 54:114.

Upton, S.J., Current, W.L., Ernst, J.V., and Barnard, S.M.: 1984.
Caryospora simplex: Extraintestinal development in mice.
ASSOC. SOUTHEASTERN BIOL. BUL. (Abstract), 30:88.

Upton, S.J., Haynes, T.B., Current, W.L., and Barnard, S.M.: 1984.
Development of Caryospora simplex in human embryonic lung cell culture.
ASSOC. SOUTHEASTERN BIOL. BUL. (Abstract) 31:88.

Upton, S.J., Current, W.L., Barnard, S.M., and Ernst, J.V.: In vitro
excystation of Caryospora simplex (Apicomplexa : Eimeriorina).
J. PROTOZOLL. 31, (in press).

Upton, S.J., Current, S.L., Ernst, J.V., and Barnard, S.M.:
Extraintestinal development of Caryospora simplex (Apicomplexa:
Eimeriidae) in experimentally infected mice, Mus musculus.
J. PROTOZOLL., 31, (in press).

Upton, S.J., Haynes, T.B., Current, W.L., and Barnard, S.M.:
Development of Caryospora simplex (Apicomplexa: Eimeriidae) from
sporozoites to oocysts in human embryonic lung cell culture.
J. PROTOZOLL., 31, (in press).

Two new species of Caryospora were discovered during the screening process, and the following papers were published:

Upton, S.J., Current, W.L., and Barnard, S.M.: A new species of
Caryospora (Apicomplexa: Eimeriorina) from Elaphe spp. (Serpentes:
Colubridae) of southeastern and central United States. TRANS. AMER.
MICROSCOP. SOC., 103, (in press).

Upton, S.J., Current, W.L., and Barnard, S.M.: A new species of Caryospora
(Apicomplexa: Eimeriorina) from the green lizard, Anolis carolinensis.
TRANS, AMER, MICROSCOP. SOC., 103, (in press).

Upton, S.J., Current, W.L., and Barnard, S.M.: Systematics of the Caryospora
Leger, 1904 (Apicomplexa: Eimeriidae). (in review).

Although all coccidia studies were conducted at the University of Auburn, viable coccidia for these studies were maintained in Atlanta because of the dangerous nature of the work: to culture viable coccidia, it required the maintenance of many vipers. All expenses for coccidia cultures were paid for by the consultants at the university. However, information gained from these satellite studies are available for use in the diagnostic atlas.

PARASITE SCREENING IN REPTILES, Continued

In addition to requesting parasite examinations of their reptiles, contributors also requested husbandry information. It became evident that there was a need for a functional text on reptile husbandry. It appeared that texts already on the market were either too simplistic in approach, or too technical. Therefore, an outline was drafted for a reptile husbandry text (currently in publication in Animal Keepers' Forum as a twenty-one part series). Since "time" has been a major factor in publishing both the husbandry text and the diagnostic atlas, the two texts have been combined into one major "professional guide". A tentative publication date has been set for December 1985.

DONATIONS PAINT THE INTERIORS GREEN

By
Carol Beach
Submitted by the Woodland Park Zoo's
Plant Research Team

At least once and sometimes twice a week, zoo staff travel down the road, back up to the loading zone at the greenhouse, Interiors in Green, and fill the van to the brim with exotic plants the likes of a 10-foot ficus and a \$1,000 king palm. Sound expensive? These plants come cheap. They are donations from Interiors in Green and number anywhere from 30 to 50 plants a week, most of them tropical.

The plants, worth thousands of dollars, are not meant to beautify the front lobbies of the zoo buildings. They are for the animals to interact with. The zoo relies heavily on these donations, since there is virtually no budget for buying tropical plants.

The idea of greening the exhibits at WPZ has spread from the exterior exhibits to the indoor displays. Because of many generous donations made to the zoo, and especially those from Interiors in Green, many of the interior exhibits which once held plastic plants or no plants at all have sprung into new life and vitality. Particularly in the new Australian exhibit, the refurbished home of the tree kangaroos, the plants play an important role in contributing to the required 50% humidity atmosphere of the exhibit. This is accomplished by transpiration, the plant's natural method of releasing water through its leaves, thus recycling water and saving the zoo the expense of humidifiers.

In the Aviary, a visitor has the sense of visiting a South American tropical rain forest, with black-necked stilts poking among the tall plants edging the pool. Ficus and palm climb up the tiny slopes of the exhibit looking like miniature jungle.

Since the greening of the zoo is a relatively new practice, with little information on what works and what doesn't for different animal species, Woodland Park Zoo keepers have formed a research team, and applied for a small grant to conduct a nationwide survey of zoos and their use of plants with animals. They will then carefully and systematically test for compatibility each animal group with different plants. The lessons learned at Woodland Park should therefore help start a green revolution in zoos nationwide.

(Editor's note: This article originally appeared in Animal Kingdom, June-July 1984, and is reprinted here with permission of the author and Animal Kingdom.)

Chapter

Milwaukee AAZK Chapter

The AAZK Milwaukee Chapter held elections at their 4 February meeting. Newly elected officers are:

President..... Steve Wing
Vice Pres.....Tim Tews
Sec/Treas.....Mary Jo Willis
Corres. Sec.....Carol Boyd

---Submitted by
Carol J. Boyd

There are many talented professionals who make their home in the Tucson area. We anticipate a profitable learning and sharing experience from this venture as we take advantage of their expertise.

---Submitted by
Kerry Hoffman
George Montgomery

Tucson AAZK Chapter

The Arizona-Sonora Desert Museum and the Reid Park Zoo of Tucson, AZ are pleased to report the formation of the Tucson Chapter of AAZK. This is the first chapter in this area and has been greeted with enthusiastic support from staff and management at both institutions. A constitution and set of by-laws has been accepted by the founding membership and the March meeting has been set as our annual meeting. The election of officers is as follows:

President.....Kerry Hoffman (ASDM)
Vice Pres.....Jill Hickey (RPZ)
Secretary.....George Montgomery (ASDM)
Treasurer.....Ed Hansen (RPZ)
Officers-at-large:
Wendy Burroughs (ASDM)
Vicky Norwood (Univ. of Arizona)

This month's program was our first combined meeting with the Phoenix Chapter, an event we plan to continue on a quarterly basis. Mike Carpenter and Joannie Stinson (Phoenix Zoo) give us a good welcoming into the AAZK Chapters family. The Chapter will meet the second Tuesday of each month for business meetings and programs. Field trips are to be planned.

News

Los Angeles AAZK Chapter

The Los Angeles Zoo AAZK Chapter is pleased to announce the following newly elected officers for 1985:

President.....Kay Paul
Vice Pres.....Jennie McNary
Treasurer.....Nancy Hansen
Sec/Editor....John Haley

The year 1985 is already proving to be a very active one for our chapter. Membership has increased from a low of 56 in 1984 to our present enrollment of 126! Much of the credit for this dramatic turnaround goes to outgoing president, Gail Bruner. Her hard work and enthusiasm created a new-found interest in a formerly stagnant chapter. She initiated (with Jennie McNary) a Keeper craft sale prior to Christmas, which was a tremendous success. A newsletter was formed which has now doubled in content. It contains articles by Keepers concerning their animals; a monthly animal health article written by Zoo Veterinarian Ben Gonzales; upcoming events, fundraisers, editorials and other pertinent information related to the Zookeeping profession.

CHAPTER NEWS, Continued

Monthly guest speakers for 1985 have already included Dr. Noel Snyder, U.S. Fish and Wildlife biologist assigned to the California Condor Research Center. Bill Toone, Asst. Curator of Birds (San Diego) and our own Curator of Birds, Mike Cunningham, spoke on the Captive Condor Recovery Program, in which both zoos are actively involved. Future speakers are being selected from a wealth of conservation organizations in the Southern California area, such as the Desert Bighorn Research Center and the National Anteater Institute.

In the works is a mini-symposium on Management of Captive Marine

Mammals, planned for May, with speakers from Marineland, Seaworld, and the new Monterey Bay Aquarium. A career planning seminar is scheduled for June; and in July, a fun event entitled "Clash of the Keepers" will bring together Keepers from 5 area zoos for a day of volleyball, hamburgers, tug-of-war and beer. Lots of beer!.

Our plan is simple - keep Los Angeles AAZK diverse, educational and fun. With this goal in mind, we hope our Chapter will continue to expand throughout 1985.

---Submitted by John Haley

ATTENTION ALL AAZK CHAPTERS!!!

*from Gerald Payne
Coordinator of Chapter Affairs*

Chapters are reminded at there is an annual charter renewal fee of \$5.00 payable to National AAZK. Some Chapters are two to three years behind in payment for their charter renewal. Please check your Chapter's records and make certain that you are up to date. Renewal fees should be sent to the Chapter Affairs Coordinator at the Detroit Zoo, Box 39, Royal Oak, MI 48068.

All Chapters are also requested to please send a copy of their membership list, current officers and Chapter activities to the Chapter Coordinator. All material submitted for "Chapter News" to the Forum should be sent to me as well.

All Chapters who currently have their own Chapter logo design are asked to send a copy to both National Headquarters and to the Chapter Affairs Coordinator. Inquiries are received from newly forming chapters on what has been used in the past for Chapter logos and having a record on file will help eliminate duplication.

Chapters are also reminded that in order for an individual to be a member of a local AAZK Chapter, he or she must be a member of National AAZK. Membership applications are available from National Headquarters, 635 Gage Blvd., Topeka, KS 66606.

Anne Payne, also of the Detroit Zoo AAZK Chapter, is Coordinator for the Program Library. At the moment the library contains very few programs for use by chapters as programs for meetings. If you or your Chapter have a slide program or other material suitable for the Program Library, please let Anne know of its availability. Funds are available to cover expenses incurred in duplicating /producing a program for the library. Funding is granted after review of the program and approval by the Board.



SEASONAL PATTERNS OF FOOD CONSUMPTION
IN TWO NORTH AMERICAN FELIDS,

The Mountain Lion (*Felis concolor*)
and
The Bobcat (*Felis rufus*)

By
Kaci Thompson, Animal Keeper
Mill Mountain Zoological Park
Roanoke, VA

It has long been common practice to feed captive felids a constant, pre-determined amount of food six days per week, and to fast them on the seventh day (Crandall, 1964; Tongren, 1981). This has been the practice for the past several years at Mill Mountain Zoological Park. During this time, keepers began to suspect that the zoo's cats were consuming more meat during the winter, and consistently leaving moderate amounts uneaten during the summer months. As a result, an attempt was made to determine whether there was a seasonal variation in the amount of meat consumed by analyzing the daily feed reports kept by the keepers.

Methods

Subjects were one male and one female mountain lion (*Felis concolor*) acquired by the zoo as cubs in 1980, and one male and one female bobcat (*Felis rufus*) acquired by the zoo as adults in 1974 and 1980 respectively. Both species of cats were housed as pairs in outdoor enclosures furnished with unheated cinder block dens.

The daily routine for the mountain lions consisted of feeding four pounds of Nebraska feline diet[®] per animal, Monday through Saturday. On Sunday (the fast day), the mountain lions were provided with one beef femur bone each, which was gnawed but not consumed. The routine was similar for the bobcats, except that they were fed 1.5 pounds of feline diet per animal per day, and given beef ribs on Sunday. The diets were presented during the late afternoon, but most consumption occurred during the night.

Each morning, as the exhibit was cleaned, the amount of food eaten the previous night was estimated by the keeper on duty and reported in the daily record. Keeper estimates of food consumption were usually recorded as the number of pounds eaten or as the fraction of food eaten.

Prior to January of 1983, food consumption records were imprecise and sporadic. As a result, only records from 1 January, 1983 through 31 December, 1984 were used in this study. Subjective estimates of food intake were converted to the number of pounds consumed per day per animal. The average daily food consumption was calculated by dividing the total amount of food consumed each month by the number of non-fast days in that month. The average daily food consumption was then plotted by month.

Results and Discussion

A definite seasonal fluctuation in food consumption was observed in both pairs of felids (see Table 1). Food consumption in both species was highest during the winter months. During the summer months, food intake decreased by approximately 50%. The winter increase in food consumption is probably the result of the increase in metabolism necessary to maintain a high body temperature during the colder winter months.

TABLE I

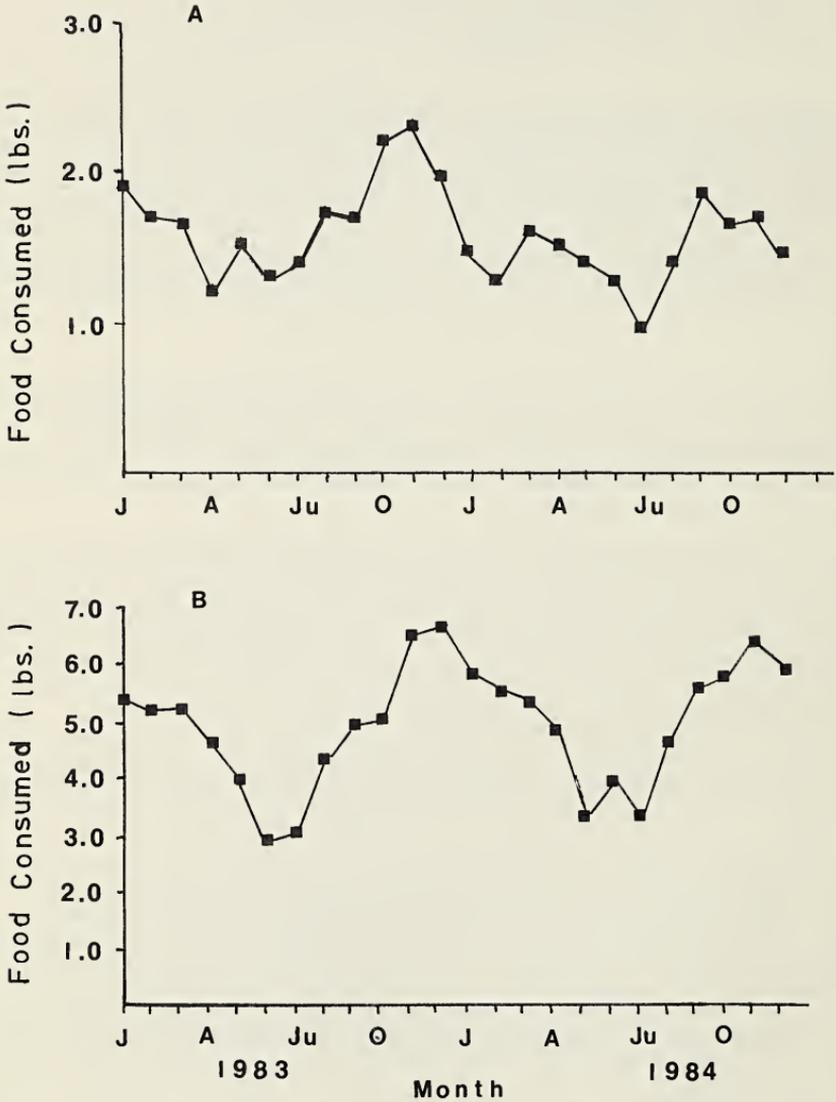


Figure 1. Seasonal variation in average daily food consumption for the bobcats (A) and the mountain lions (B)

SEASONAL PATTERNS OF FOOD CONSUMPTION IN TWO NORTH AMERICAN FELIDS, Cont'd

he cyclical variation in felid food consumption also has practical applications. Since the decrease in food intake during the summer is predictable and fairly consistent, it is now possible to adjust the diets during the warmer months by decreasing the daily amount given, or by increasing the number of weekly fast days. Through the analysis of subjective keeper feeding records, it has become possible to adapt Mill Mountain's feeding regime to the mountain lion and bobcats' seasonally fluctuating metabolic demands.

Acknowledgements

Special thanks to Beth Poff, for suggesting this study, and to Beth Poff, Laurie Thomas, Brant Deadwyler, Dawn Coulson, Steven Overcash, Gerry Gardner and Don Conner for their help in data collection.

Literature Cited

- randall, L.S. 1964. The Management of Wild Mammals in Captivity.
Chicago: The University of Chicago Press.
- ongren, S. 1981. What's for Lunch, Animal Feeding at the Zoo.
New York: G.G.G. Publishing Company.

Products Mentioned

braska Brand Feline Diet, Animal Spectrum Inc., 5801 Locust Street,
Lincoln, NE 68516.



SPEKE'S GAZELLE AT THE LOS ANGELES ZOO

y Neil Duncan, Hoofstock Keeper
Los Angeles Zoo, Los Angeles, CA

he Los Angeles Zoo has recently received a young trio of Speke's gazelle on breeding loan from the St. Louis Zoo. This "flabby-nosed" gazelle is among the smallest of gazelle species and is characterized by the folds of skin across the nose that are inflated to tennis ball size when the animal is alarmed. Their natural habitat is the arid zone in the border area of Ethiopia and Somalia, and their population status is not well known (IUCN Indeterminate" status).

he captive status of the Speke's gazelle is both good and bad: there are currently about 35 in captivity (all in the U.S.) and they are reproducing fairly well, but the founder stock consists of just four individuals (1.3) that the St. Louis Zoo received between 1969 and 1972. Breeding stock is now being "computer matched" to minimize the inbreeding coefficient of the captive population. The importation of more animals to alleviate inbreeding is not currently feasible due to political difficulties of their order habitat.

he three young Speke's gazelle have settled into their 60' x 40' enclosure well, and are now on view to the public. Precautions have been taken to keep these shy animals as calm as possible in their new environment: they have access to the barn area all day, they are taken off-exhibit by 5 p.m., and reed fencing has been placed around the exhibit perimeter to provide more cover and an occasional visual barrier from the public.

s our "herd" matures, we hope they will contribute to their own species' survival by producing healthy offspring.



He's Got A Song In His Heart

For those AAZK members who have been around for a few years, the name Oliver Claffey is instantly recognized as the "official" songwriter for the Association. Two of Oliver's songs - "Talking Zookeeper Blues" and "Zookeeping Girl" were presented by the composer at past AAZK National Conferences. While Oliver, a keeper at Metro Toronto Zoo, was not able to attend the 1984 Conference in Seattle, delegates heard his latest musical tribute to the zookeeping profession on the recently released Keeper Training Video Tape "A ZooKeeper's Introduction to Feeds and Feeding". For those of you not at the conference or who have not had a chance to see the new video tape, the following are the lyrics for Oliver's most recent zookeeping song.

We're Feeding At The Zoo

We're feeding at the zoo,
It's that special time of day
When zookeepers are catering to animal gourmets.
It's what many people come for,
What the visitors want to see,
Animals interacting with each other
And with me,
We're feeding at the zoo.

We're feeding at the zoo,
Horses heads and lumps of meat
And fluffy day-old chicks are what tree pythons love to eat.
We monitor food intake,
We know what each one gets,
If someone goes off eating
We might have to call the vets,
We're feeding at the zoo.

Oh, what a lovely job,
Feeding at the zoo,
It's amazing just how many people think that's all we do,
We're working in Applied Biology,
Professionally.

We're feeding at the zoo,
Balanced meals to all our friends,
The object of this exercise is healthy specimens.
We emphasize nutrition,
It's important for you see,
What they are is what they eat
And that goes for you and me,
We're feeding at the zoo.

Oliver M. Claffey
Music and Lyrics
© 1984.



1985 Great Lakes Regional AAZK Conference

The Detroit Great Lakes Regional AAZK Conference will be held May 5-7, 1985 at the Detroit Zoological Park, Royal Oak, MI.

Tentative Conference Schedule

<u>Sunday, 5 May</u>	<u>Monday, 6 May</u>	<u>Tuesday, 7 May</u>
Registration	Welcome	Presentation of papers
Ice Breaker at Belle Isle Zoo & Aquarium	Presentation of papers Lunch (provided) Tour of Detroit Zoo Volleyball game/Bar-B-Q	Lunch (provided) Discussion groups Closing dinner & auction

Please make checks payable to: "Detroit Chapter AAZK". Send completed registration form with registration fee to: *Anne Payne, Detroit Chapter AAZK, Detroit Zoo, Box 39, Royal Oak, MI 48068.*

Registration Form

Name: _____
Address: _____ City: _____
State/Province: _____ ZIP: _____
Phone No: () _____ Name of Zoo: _____
Area(s) of interest: _____
Fees: Member or Spouse - \$35.00 Non-Member - \$40.00
Total Fees Enclosed: \$ _____

(If you cannot attend the entire conference but wish to attend a portion of it, please contact us and we can make arrangements for you to do so.)

Motel Reservation Form: Detroit Great Lakes Regional AAZK Conference

Name: _____
Address: _____ City: _____
State/Province: _____ ZIP: _____
Phone No: () _____ Dates staying in Motel: _____
___ 1 person/double bed - \$35.00 per day ---2 people/double bed - \$37.00 per day
___ 2-4 people/2 double beds - \$41.00 per day
___ Do you wish to share a room with another person (to be matched by Motel)?

Heritage Inn Motel, 14700 E. 8 Mile, Detroit, MI 48025. (313) 527-1070.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings of positions which become available close to deadline are accepted.

ZOO ATTENDANT II/ELEPHANT KEEPER...requires elephant care experience. Will work in new elephant facility opening in summer of 1985. Salary \$12,660 to \$15,384. Contact: Dudley Brown, Fort Worth Zoo, 2727 Zoological Park Dr., Fort Worth, TX 76110 (817) 870-7053.

HOOFSTOCK ANIMAL KEEPER...zoo experience preferred. Pays \$11,000 per year, good benefits. Contact: Daniel Baffa at Lee Richardson Zoo, Garden City, KS (316) 276-2800.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within The Conservancy Nature Center, located in Naples, FL. The Animal Rehabilitation Center (Project A.R.C.) is a community-supported program, where native injured wildlife are brought in for treatment, and released, if possible, back to their environment. A student internship with this program involves wildlife handling as well as educational programs and special projects. Interns must be available for up to 4-5 months. Qualifications: a college student or recent graduate, studying wildlife or related field; some experience with people and wild animals; a sincere concern and interest in working with animals. Experience in handling birds is helpful and preferred. \$55/week stipend, housing provided. Internships available year-round. Submit resume, statement of goals, three references to: Julie Wasserman, Supervisor, Animal Rehabilitation Center, The Conservancy Nature Center, 1450 Merrihue Dr., Naples, FL 33942 or call (813) 262-0304, ext. 123.

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Information Please

I am trying to write a paper on Male-Infant Interactions in Non-human Primates. If you have any articles, research and documented observations on paternal behavior, please send them to: Kyle Curtis, 806 Devonshire, Champaign, IL 61820. I am trying to answer the following questions: Do adult male primates "help" parent infants? Is there a difference in quantity and quality if the male knows it is his infant? Does the male know if it is his infant? I would appreciate any help or suggestions.

The Atlanta Zoo is currently hand-raising a Himalayan Black Bear cub (*Selenarctos thibetanus*). We would appreciate any and all information regarding this species, especially its diet in hand-rearing. Please send information to: Ellen Bradfield, 1347 Benning Pl. #2, Atlanta, GA 30307.

Information is requested on captive rearing of the Ruddy Duck (*Oxyura jamaicensis*). Please send pertinent data to: Sandra Healy-Will, Bird House Keeper, Lincoln Park Zoo, 2200 North Cannon Drive, Chicago, IL 60614.

In the past few years the Columbus Zoo's Avian Department has experienced leg problems (loss of circulation) in our Bali Mynahs. Anyone having experienced a similar situation is asked to contact either Yvonne Clip-pinger or Jan Ford, Columbus Zoo, P.O. Box 400, Powell, Ohio 43065 or call (614) 889-9471, ext. 49.

AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

_____ \$20.00 Professional
Full-time Keepers

_____ \$15.00 Affiliate
Other staff and volunteers

_____ \$25.00 International
All members outside the
U.S. and Canada

_____ \$15.00 Associate
Individuals not connected
with an animal care facility

_____ \$50.00 Contributing
Organizations and Individuals
U.S. CURRENCY ONLY PLEASE

Directory Information

Zoo _____ Work Area _____ Special Interests _____

Mail this application and check or money order, payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to the *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size of no more than 6" x 10" (15 cm x 25½ cm.). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephoned contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

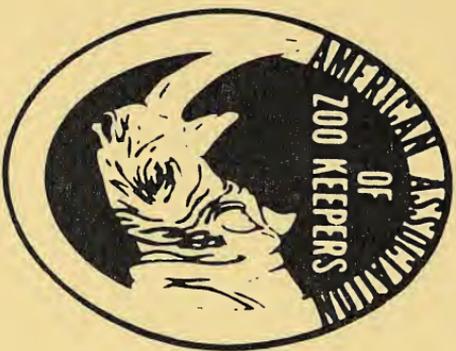
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**American Association
of Zoo Keepers
Topeka Zoological Park
635 Gage Blvd.
Topeka, KS 66606**

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MAY 1985

Animal Keepers' Forum



Dedicated to Professional Animal Care



Executive Editor: Alice Miser
Managing Editor: Susan Chan
Associate Editor: Bernie Feldman

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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CO-DIRECTORS REGIONAL COORDINATORS

States East of Mississippi - Diane Krug, Riverbanks Zoo, Columbia, SC
States West of Mississippi - Debra Stetcher, Woodland Park Zoo, Seattle, WA

Individual Regional Coordinators and the states under their oversight are listed elsewhere in each issue of *Animal Keepers' Forum*.

This month's cover artist is Natalie R. Mashburn and her drawing features Kubla Kahn (a.k.a. Chumley), a Bactrian camel at the Cincinnati Zoo. Natalie is a 1984 graduate of the Natural Resource Management program at that zoo and is currently attending Montana State University majoring in Animal Science. Natalie first encountered Kubla Kahn when she worked as an assistant to the camel and elephant trainers last summer. Thanks, Natalie!

Scoops and Scuttlebutt

TWO APPOINTMENTS MADE TO AAZK BOARD OF DIRECTORS

It is with deep regret that the AAZK Board of Directors accepts the resignation of fellow Board Member Verona Barr. Verona and her husband are on their way to becoming llama farmers, which when combined with their jobs has created a conflict where available time is concerned. Verona felt that the membership would be best served by an active board member who was responsive to board duties and other AAZK related projects.

In the short fourteen months that Verona served on the Board of Directors she was very active and put forward a number of suggestions and ideas that the board has investigated. Verona herself expressed an interest in and a desire to assume the responsibility for the Book Reviews which have become a popular feature in AKF.

The Board feels fortunate that there are other professional members who are interested in serving the membership through a term as Board Member. Professional member and Research Grant Committee chairman Frank Kohn of the National Zoo has been selected by the Board to serve the remainder of Verona Barr's term, through 1987.

Filling the vacancy as Book Review Coordinator will be Diane Forsyth of the Akron Zoo. Diane has been very busy over the past years shepherding the Exhibit Design Form to completion. The Board is confident that Diane will bring to the Book Review project the same drive and initiative she exhibited during creation of the Exhibit Design Form. Keep watching AKF this year for notices from Diane calling for book review volunteers.

Also recently appointed to fill an unexpired term on the Board of Directors is Oliver Claffey of the Metro Toronto Zoo. Oliver will complete the term of Mike Carpenter, through 1987.

CO-DIRECTORS NAMED FOR REGIONAL COORDINATOR SYSTEM

Diane Krug, Riverbanks Zoo, and Debbie Stetcher, Woodland Park Zoo, have been named as co-directors of the AAZK Regional Coordinator system. Diane will be responsible for regional coordinators in the states east of the Mississippi and Debbie for those west of the Mississippi. These two young women are replacing Mike Carpenter, Phoenix Zoo, who had headed up the RC system for the past few years. Vacancies still exist for RCs for New York and Canada, so if you are interested please contact either Diane or Debbie.

SCOOPS AND SCUTTLEBUTT, Continued

FROM THE MEMBERSHIP DIRECTORY EDITOR

Dear Fellow Members,

The 1985 edition of the AAZK Membership Directory is now available. Professional and contributing members will receive copies as part of their membership benefits, others may purchase the book from National Headquarters for \$3.00. Since the Directory includes members, their work areas, special professional interests, chapter affiliations and offices, as well as Keeper Accommodation List contacts, association activities and administrators, and our Constitution and By-laws, this is a valuable and useful tool.

If you are a Professional or Contributing member and have not received your new Directory by 1 June, please contact National Headquarters. Other members will find the guide to members, zoos and the association worth the purchase price.

If your entry is in error, please note that on your renewal card this year, or drop me a line. The new renewal card has worked very well in making the data on members available for the Directory, so please take the little extra time to fill it out completely, knowing that it makes working the Directory easier and keeps it as accurate as we can make it. To make it easier for you and me, you may indicate that your work area and area of interest are the same as published, but please continue to note the zoo with which you are affiliated, and your chapter membership. If I am missing your zoo's address, zip code, phone number, enter it with your updates.

Thank you for all your help. I appreciate all the help and advice that you give me.

Sincerely,

Patricia E. Sammarco, Directory Editor
Lincoln Park Zoo, 2200 N. Cannon Drive
Chicago, IL 60614

UPDATE ON COLLECTION CENTERS FOR DIET NOTEBOOK

The Diet Notebook Project offers a unique opportunity to share with other keepers the types of diets used to maintain exotics in captivity. This project has the potential to develop an excellent reference on captive diets but only if you participate. Forms may be obtained from the Collection Centers listed below and when completed should be sent to the appropriate center. Please type or print information, use metric units whenever possible and refer to the ISIS and IUCN listings for scientific names. Please become involved.

BIRD COLLECTION CENTER:

Kelli Westbrook
Little Rock Chapter AAZK
#1 Jonesboro Drive
Little Rock, AR 72204

MAMMAL COLLECTION CENTER:

Anita Cramm (replaces Terrie Correll)
Sedgwick County Zoo
5555 Zoo Blvd.
Wichita, KS 67212

SCOOPS AND SCUTTLEBUTT, Continued

REPTILE COLLECTION CENTER:

Brint Spencer
Minnesota Zoological Garden
Apple Valley, MN 55124

INVERTEBRATE/FISH COLLECTION CENTER:

Gary Glovek & Staff
John G. Shedd Aquarium
1200 South Lake Shore Drive
Chicago, IL 60605

ALL OTHERS:

South Florida Chapter AAZK
c/o Debbie Burch
17860 SW 112 Court
Miami, FL 33157

PUBLIC EDUCATION CHAIRPERSON CHANGE OF COMMAND

The AAZK Board of Directors has accepted with regret the resignation of Eileen P. Gerity as chairperson of the Public Education Committee. Eileen approached the board with the suggestion of such a committee two years ago at the Philadelphia National Conference and she has chaired the committee for its entire existence.

The committee, working under the assumption that "keepers need to realize the impression they make upon the public is lasting and the knowledge they offer can be a tremendous help to the general visitor" has begun to develop projects along this line. They include: pamphlets to explain the Species Survival Plan (SSP); pamphlets of commonly asked zoo questions from school children and one on wild bird care in a captive environment. Future projects being considered include a display demonstrating the daily activities of a zookeeper.

Eileen is to be thanked for her contributions to zookeeping professionalism. Stepping in to fill Eileen's position is Jay Jasan of the Turtle Back Zoo in West Orange, NJ. If you are interested in contributing to this committee, you should contact Jay.

LIBRARY RESOURCES PROJECT HEAD NAMED

Welcome Kaci Thompson, Mill Mountain Zoo, as the Library Resources Project head. We all know how wonderful it is to find a tedious part of our work already done, and perhaps done better than if we had to slave over it. The intent of the Library Resources Project is to identify unique and specialized libraries, filled with the information that we would have to spend a lot of time seeking and perhaps never find the key. In looking for those specialized libraries, a special library association has been found. Kaci Thompson is communicating with that group, for our benefit, to find those bits of information that are obscure but necessary for us to find, or perhaps not vital but still interesting and professionally useful. This wonderful link has been established through our liaison Brandy Pound, the Zoo Educators, Special Library Association, Kay Kenyon and Kaci Thompson. Thanks from all of us to them for the opportunity to continue our education and improve our professional animal care.

---Submitted by Pat Sammarco
Coordinator, Continuing Keeper Education



Births & Hatchings

LOS ANGELES ZOO.....*Kay Paull*

March 1985 B&H include: Mammals - 1.0 Great grey kangaroo, 0.1 Ring-tailed lemur, 1 Woolly monkey, 1 Saki, 0.4 Emperor tamarin, 0.1 Caracal, 1.0 Spekes gazelle, 0.2 Arabian oryx, 0.1 Gerenuk; Birds - 3 Northern rosella; Reptiles - 11 Urocoan rattlesnake and 3 Leopard gecko.

PITTSBURGH AVIARY.....*Curtis G. Robbins*

Hatchings for March 1985 include: 0.0.3 Emu, 0.0.3 Elegant crested tinamou (DNS), 0.0.4 Green-backed heron (3 DNS), 0.0.1 Red and white crane (DNS), 0.0.1 Doublestriped thick-knee, 0.0.1 Southern lapwing (DNS), 0.0.1 Scarlet macaw (DNS), 0.0.1 Greater roadrunner, 0.0.1 Tawny frogmouth, 2.1 Levaillant's barbet, 0.0.1 Many-colored chaco-finch (DNS), 0.0.1 Blue-gray tanager and 0.0.2 Superb starling (1 DNS).

BUSCH GARDENS, TAMPA.....*Susan Rackley*

B&H for March 1985 include: Mammals - 2.1 Nyala, 0.1 Dama gazelle, 4.1 Thomson's gazelle, 0.1 Kafue (red) lechwe, 0.0.4 African hedgehog, 0.0.1 Sitatunga, 1.0.1 Grant's zebra, 1.0 Reticulated giraffe; Birds - 0.0.6 Sun conure, 0.0.9 Red-crested pochard, 0.0.20 Mandarin duck, 0.0.6 Jandaya conure, 0.0.2 Goldie's lorikeet, 0.0.2 Stone curlew, 0.0.8 Indian ring-necked parakeet, 0.0.4 Black-necked swan, 0.0.4 Scarlet macaw, 0.0.6 Green-cheeked conure, 0.0.2 Greater sulphur-crested cockatoo, 0.0.1 Superb starling, 0.0.1 Crested tinamou, 0.0.1 Triangular-spotted pigeon, 0.0.4 Hahn's macaw, 0.0.1 Scaly-breasted lorikeet, 0.0.4 Golden-capped conure, 0.0.1 Forsten's lorikeet, 0.0.1 Festive Amazon, 0.0.4 Cockatiel, 0.0.3 Moustache parakeet.

DENVER ZOOLOGICAL GARDENS.....*Ann Rademacher*

January through March 1985 B&H include: Mammals - 1 White-handed gibbon, (DNS), 2 Axis deer (1 DNS), 1 Pere David's deer, 1 Ring-tailed lemur, 0.2 Beisa oryx, 0.1 Nyala, 1.0 Reeve's muntjac, 0.1 Lesser kudu, 0.1 Patagonian cavy; Birds - 1 Crested barbet, 2 Nene goose, 1 Grosbeak starling, 1 Bali mynah (DNS).

BROOKFIELD ZOO.....*John S. Stoddard*

March 1985 B&H include: Mammals - 6.0.17 White-toothed shrew, 3.3.1 Spiny mouse, 0.0.2 Cui, 0.0.4 Degu, 0.1.2 Black-faced grey kangaroo, 0.0.1 Owl monkey, 0.0.6 Goeldi's monkey, 0.0.1 Golden lion tamarin, 0.1.1 Guinea baboon, 2.0 Collared peccary; Birds (fledged) - 0.0.1 Violet touraco, 0.0.2 Humboldt penguin; Reptiles - 0.0.2 Hingeback tortoise.

SAN DIEGO ZOO AND WILD ANIMAL PARK.....*Jody Courtney*

Selected B&H for February and March 1985 include: Mammals - 4.1 Cotton-top tamarin, 0.1 Northern douc langur, 0.0.1 Lion-tailed macaque, 0.0.2 Pigmy marmoset, 0.0.2 Ring-tailed lemur, 0.0.6 Chinese dhole, 0.0.1 Ceylonese sloth bear, 0.1 Southern white rhinoceros (the 58th), 1.0 Chaco pampas deer, 2.1 Mhorr gazelle, 5.3 Slender-horned gazelle, 1.1 East African bongo, 4.5 Addax, 3.2 Addra gazelle, 2.1 Simitar-horned oryx, 4.5 Arabian oryx, 0.0.1 Kirk's dik dik; Birds - 1.0 Palawan peacock pheasant, 0.0.4 Golden conure and 2.0 Nene goose.

BIRTHS AND HATCHINGS, Continued

MIAMI METROZOO.....Lori Bruckheim

B&H for March 1985 include: Mammals - 1.0 Ring-tailed lemur, 1.0 Defassa waterbuck; Birds - 0.0.6 Mandarin duck, 0.0.5 Ostrich, 0.0.1 Bleeding heart dove and 0.0.3 Java tree duck.

METRO TORONTO ZOO.....Harry Hofauer

February 1985 B&H include: Mammals - 0.0.1 Kowari, 0.2.3 Indian fruit bat, 0.0.1 Hamadryas baboon, 0.0.1 Plains rat, 2.0 Mara, 0.0.2 Hog-nosed badger, 0.0.2 Slender-tailed meerkat, 1.0 White rhinoceros, 6.3 Barbary sheep; Birds - 0.0.7 Emu, 0.0.3 Black-footed penguin, 0.0.1 Tawny frogmouth; Amphibians - 0.0.5 Green and black arrow poison frog.

DALLAS ZOO.....Tamara Jones

March 1985 B&H include: Mammals - 0.1 Chimpanzee, 1.0 Suni, 0.1 Eland, 0.1 Pale-headed Saki, 0.0.1 East African porcupine, 0.0.1 Bolivian grey titi monkey, 1.0 Mexican fruit bat, 0.0.1 Dama wallaby, 0.2 Pygmy goat; Birds - 0.0.1 Spotted dove, 0.0.1 Jandaya conure, 0.0.3 Spur-winged lapwing and 0.0.5 Black swan.

PHILADELPHIA ZOO.....B. Bahner

February-March 1985 B&H include: 1 Prevost's squirrel (DNS), 1 South Albermarle Galapagos tortoise (DNS), 1 Scarlet kingsnake.

HONOLULU ZOO.....Alice Roberts

B&H for 13 March through 13 April 1985 include: Mammals - 0.4 Toggenburg goat; Birds - 0.0.2 Jackass penguin (1 DNS), 0.0.1 Glossy starling, 0.0.1 Grand eclectus parrot and 0.0.2 Rose-breasted cockatoo.

NATIONAL ZOO.....Tigertalk

The 2 November, 1984, birth of a western tarsier (*Tarsius bancanus*) at the Dept. of Zoological REsearch marks the first time this species has been successfully bred at a zoo. More recently, on 12 January, another tarsier was born. It began in November 1983, with the arrival of three tarsier pairs as part of a joint research project between NZP and Duke University Primate Center. Two females gave birth within a few months of arrival, though unfortunately both offspring died. It appears that one of the fathers may have had a hand in the death of one of the infants and the other infant may have died from a fall. Thus, two enclosures are now provided for each pair and the male is only allowed with the female and offspring when an observer is present. This technique has worked well for the two most recent births.



Coming Events

THE 16th ANNUAL CONFERENCE OF THE INTERNATIONAL ASSOCIATION OF AQUATIC ANIMAL MEDICINE AND WORKSHOP

May 12-15, 1985

Tacoma, WA

For more information, contact Tom Otten, Point Defiance Zoo and Aquarium,
N. 54th & Pearl St., Tacoma, WA 98407.

THE ANNUAL MEETING OF THE AMERICAN ASSOCIATION OF BOTANICAL GARDENS AND ARBORETA (AABGA)

June 19-22, 1985

Haverford, PA

NINTH ANNUAL INTERNATIONAL HERPETOLOGICAL SYMPOSIUM ON CAPTIVE PROPAGATION AND HUSBANDRY

June 26-30, 1985

San Diego

PRIMATES, THE ROAD TO SELF-SUSTAINING POPULATIONS

June 24-28, 1985

San Diego, CA

Sponsored by the Zoological Society of San Diego and the Morris Animal Foundation. World leaders in the primate field will speak at this five-day conference focused on the preservation of vanishing species, both in the wild and in captivity. Experts on reproductive physiology, management of captive populations, facility design, disease, genetics, and wild populations will present papers and lead round-table discussions. For further information on registration fees, hotel accommodations, etc., contact: Morris Animal Foundation, 45 Iverness Drive East, Englewood, CO (303) 790-2345 or the Zoological Society of San Diego, Box 551, San Diego, CA 92112-0551, (619) 231-1515.

1985 AAZPA ANNUAL CONFERENCE

September 8-12, 1985

Columbus, OH

AMERICAN ORNITHOLOGISTS' UNION ANNUAL MEETING

October 7-10, 1985

Tempe, AZ

Includes symposia on biology and management of bald eagles, avian olfaction, and the importance of competition in structuring avian communities. Workshops on use of visual aids in presenting scientific data, experimental methodologies and their use in scientific studies and Bald Eagle color marking protocol to be held on Monday, 7 October. For further information contact: Dr. Robert D. Ohmart, Center for Environmental Studies, Arizona State University, Tempe, AZ 85287.

1985 NATIONAL AAZK CONFERENCE

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FINAL CALL FOR AAZK AWARDS NOMINATIONS

Deadline - June 1, 1985

This is the last call for nominations for 1985 AAZK awards. This month features the last segment of a three-part series on the AAZK awards. The March and April issues of AKF discussed the Excellence in Zookeeping and Meritorious Achievement awards. This month features the CERTIFICATE OF MERIT FOR ZOOKEEPER EDUCATION.

The CERTIFICATE OF MERIT FOR ZOOKEEPER EDUCATION is given the zoo most actively promoting educational programs for zookeepers. Keeper training courses, staff seminars, and reimbursement for formal education are obvious examples of such programs. If you feel that your zoo merits such an award, please submit a brief letter of nomination, mentioning specific educational programs at your zoo.

QUALIFICATIONS

1. Any North American zoological institution or aquarium is eligible.
2. The keeper training program must have been in existence for at least a year.

NOMINATION PROCEDURE

This award will be given to the zoo most actively promoting educational programs for zookeepers--keeper training courses, staff seminars, and reimbursement for formal education, etc. If you feel that your zoo merits such an award, please submit a letter of nomination, mentioning specific education programs.

THE DEADLINE FOR ACCEPTANCE OF AWARD NOMINATIONS IS JUNE 1, 1985.

Send nominations to:

Mike Crocker
AAZK Awards Committee
Dickerson Park Zoo
3043 North Fort
Springfield, MO 65803



Viewpoint

EDUCATION IN ZOOS

By
Ted Daehnke, Keeper
Washington Park Zoo, Portland, OR

The educational materials presented to the public today by many U.S. zoos resemble training for trivia games. This collection of facts served a useful purpose at one time. Such programs attracted the public's attention, this in turn created a large group of people interested in and concerned about wildlife. Unfortunately, this group often reacts in a simplistic fashion when addressing wildlife management and conservation. They sometimes feel that once the killing of an animal is made illegal, the species' future is secure. Without a solid grounding in ecology it is not always obvious that we must also protect the species' habitat, routes of travel, many of the plant and animal species with which it interacts, and sometimes even its solitude. A change to an ecological approach in zoo education programs would not be easy. So much groundwork needs to be established first that such an approach to exhibit signs would be impossible.

One technique used to a limited extent today is large graphics relating to a group of animals rather than one species. These can illustrate food chains, habitat loss patterns and other broad ecological principles. Another approach which has considerable merit is the use of classes and lectures. Classes are limited to the number of people they can reach, but are capable of establishing a much better understanding of ecology. There is some additional benefit derived because participants spread the information to friends and acquaintances.

At present, the classes offered by zoos tend to be fact-oriented rather than ecology-oriented. This is a result of the way in which the material is generated. At zoos which are too small to support an education department, the keepers are usually too busy to develop and conduct classes. Once a zoo does form an education department, this group takes almost total responsibility for education materials. The keepers often do little more than insure that the facts presented are accurate. The personnel in the education departments are usually education specialists. Their skills and training are directed towards presenting information through the most efficient methods available. They are not ecologists. The people likely to have the best understanding of ecology are the animal management people, keepers, senior keepers and curators. Animal management should initially develop the material and education should edit the material and point out the best means of getting the information across. This merging of abilities insures that the public gets the best information available presented in the most effective fashion possible.





The newly reorganized Library Resources Project will focus on making zookeepers aware of library resources and how to locate printed sources of information. From time to time, library-related information of interest to the zookeeping profession will be presented in the Animal Keepers' Forum. The following article by Kay Kenyon, National Zoological Park Librarian, is the first in this series. Due to the length of this article, it will appear in two parts, this month and in the June issue of AKF.

--Kaci Thompson
Library Resources Coordinator

ZOO/AQUARIUM LIBRARIES: A Survey

By
Kay A. Kenyon
Chief Librarian
Smithsonian Institution Libraries
National Zoological Park Library
Washington, D.C.

Zoos have been in existence in one form or another for nearly 5,000 years, ever since Queen Hatshepsut of Egypt brought back a collection of animals from Africa. Royal zoos existed in China around 1150 B.C. and later in Assyria and Babylonia. In the 3rd century B.C., Ptolemy I established the Alexandria Museum. Not only was a zoo contained in this museum but the first zoological library as well. The earliest zoo in the Americas was a collection of animals under Emperor Montezuma in Mexico City around 1500 A.D. It had a staff of 300 keepers.

In more recent times, the Zoological Society of London opened its zoo to the public in 1828. By the mid-19th century zoos were opening all over the world. The earliest zoos in the United States were established in Philadelphia, Buffalo, New York City, and Washington D.C. during the late 1900s. The earliest known aquarists were the Sumerians, who kept fishes in artificial ponds 4,500 years ago. The first display aquarium was opened to the public in 1853 at Regent's Park in England. The first one in America was opened in 1856 at the American Museum in New York. Today there are over 1,000 zoos and aquariums throughout the world. Over 200 of these exist in North America.

The philosophy behind zoos and aquariums has changed since Queen Hatshept. At first, collections of animals were simply kept as curiosities, satisfying man's desire to know. When the Zoological Society of London was founded in 1826, its purpose was not only to introduce new and curious animals from foreign lands but to advance the science of zoology as well (1). The philosophy of zoos today has expanded and become very complex. Generally, however, their goals are to increase their role in recreation, education, research and conservation.(2)

In pursuing these goals, zoos' knowledge of animal management, animal behavior, veterinary medicine for exotic animals, and so forth, has increased rapidly and so have their information needs. Libraries have been established in some zoos and aquariums to organize all this rapidly expanding zoological knowledge and to provide access to information sources outside the institution.

ZOO/AQUARIUM LIBRARIES: A Survey, Continued

A library is not just a collection of books and serials. It must also provide information services and this involves having someone with some library skills. Keeping this in mind, there are about 40 zoos and aquarium libraries in North America.* Although 104 zoos reported having a library in a 1981 survey done by the Lincoln Park Zoo (3), most are not libraries as defined above.

Because zoo/aquarium librarianship is a new field of special libraries, there is little published information about it. The purpose of this article is to explore the unique features of zoo/aquarium libraries, their history, users, staff, collections and services, as well as some of the problems they have in common with other special libraries. For the purposes of this article, zoo libraries will refer to both zoo and aquarium libraries.

History

The earliest zoo libraries in North America were founded at the Philadelphia Zoo (1874), the National Zoological Park (1889), and the New York Zoological Society (Bronx Zoo) (1899). During the early 1900s, a few more zoo libraries were established (notably the Zoological Society of San Diego Library in 1916), but it was not until the 1970s and 1980s that the majority of staff zoo libraries came into existence. Thus, for most zoos, libraries are a relatively recent addition.

Zoo libraries have been established and maintained by different groups of people. Although most have been established by the zoo or zoological society, a few have been started by volunteer docent groups and some began with large donations by private persons. The relationship between the National Zoological Park and its library is unique among zoo libraries. Both are a part of the Smithsonian Institution. However, the zoo is a major museum within the Smithsonian, while the library has always been a part of the Smithsonian Institution Libraries (SIL). SIL supports the informational needs of the entire Smithsonian.

Today, as in the past, a zoo library's welfare and even existence is often dependent on the goals and philosophy of the institution it serves. Fortunately, those zoos seriously involved in research and conservation are increasingly becoming aware that libraries are essential in helping them with their goals. Robert Wagner, Executive Director of the American Association of Zoological Parks and Aquariums recently wrote, "Libraries are an increasingly important part of zoos and aquariums..." (4). Many zoos, however, are rather small, and if they are not research-oriented they do not have or need a library at present.

Users

The users of zoo libraries have a variety of backgrounds and needs ranging from general to specific. The largest groups of users are permanent staff members of the institution. Included in this group are curators, keepers, researchers, educators, veterinarians, pathologists, lab technicians, nutritionists, horticulturists, administrators, graphic artists, maintenance and construction persons, and police. Two other large groups of users are volunteers, and zoo docents. Other users include zoological society members, interns and the public (by appointment).

*The number 40 was derived from information gathered by the author, e.g., letters, telephone conversations, onsite visits and zoo conferences.

ZOO/AQUARIUM LIBRARIES, Continued

Collections

The collections of zoo libraries are specialized but at the same time cover many topics such as zoology, animal behavior, conservation, ecology, zoo management, endangered species, zoo design, pathology, veterinary medicine, nutrition, botany and horticulture. Aquarium libraries tend to specialize in seashore biology, fish and other invertebrates, marine mammals and aquarium management.

Collection sizes vary. The smallest library has under 200 monographs, while the largest has over 9,000. The majority of the collections number less than 1,000. The number of journal titles received by zoo libraries range between 0 and 650. Most zoo libraries have less than 50; only four have more than 200.

Zoo libraries that are fortunate in being located near a large library with a zoological collection, especially natural history museum and university libraries, may not need to develop their collections as extensively as others who are not as fortunate. A few zoo librarians have established relationships with a local larger library which has enabled them to use and/or borrow their information resources.

Zoo libraries have unique collections, many of which cannot be found in other types of libraries. Almost all have a collection of newsletters, guidebooks, brochures, annual reports and animal inventories from zoos and aquariums all over the world. The Ernst Schwarz Library at the San Diego Zoo microfilms its newsletters annually and keeps them on microfiche.

Two libraries have map collections. Many, such as the Burnet Park Zoo Library, the Arthur R. Watson Library at the Baltimore Zoo and the Honolulu Zoo Library, have slide collections while others have photograph collections. Several have large reprint collections - the Vancouver Aquarium Library has 2,000, the Minnesota Zoo Library has around 3,000 and the library at the San Diego Zoo has 15,000. The Lincoln Park Zoo Library has a collection of videocassettes of Marlin Perkins' television series *Zoo Parade*, as well as a collection of posters from other zoos. (5)

The National Zoological Park Library has a large collection of its zoo staff publications. The Shedd Aquarium is developing a collection of Great Lake materials, dealing with ecology, water quality, and marine life. The Washington Park Zoo has a large circulating collection of artifacts and specimens in its education library.

Many zoo libraries keep archival materials of their zoos such as keeper diaries and logbooks, scrapbooks, letters and newspaper clippings. The library at the Baltimore Zoo has 46 volumes of zoo archival material dating back to 1949, and the library at the San Diego Zoo has oral history tapes.

Staffs

Because zoo libraries are relatively new, many as yet do not have professionally-trained librarians. They are generally one person (or less) operations. Some have part-time clerical or student help. Nineteen libraries are managed by trained librarians either part-time or full time. It is interesting to note that almost half of these are volunteers who work full time in another library. Thirteen libraries were maintained by education specialists and the remainder by other zoo staff such as animal record keepers, secretaries, and even animal health technicians.

Only ten libraries are staffed full time. Some zoos make use of volunteers to staff their libraries. For instance, the Zoological Society of Cincinnati staffs its library five days a week with a different volunteer each day. It uses both professional and nonprofessional librarians.

There are more trained librarians in zoos today than there were five years ago. Hopefully this trend will continue especially for those zoos involved in research.

(Editor's note: This article is reprinted here with permission from the author and the Special Libraries Association from Special Libraries, Vol. No. 75 (no. 4): 329-334 (October 1984) © Copyright Special Libraries Association. Part 2 will deal with access, locations, services, networking and future trends. Part 2 will appear in the June 1985 issue of AKF.)



SMALL FELIDS...THEY HAVE A FRIEND

By
Karen M. Dvornich

I'm not a keeper but a person very interested in small felids. In late 1983 and early 1984, I mailed out a questionnaire to 96 zoos. Fifty-six zoos responded and 33 were very interested in obtaining my results. The response was so good that I was privileged to lead a Small Felid workshop at the 1984 AAZK Conference. The workshop attendees further reinforced my project.

My project involves obtaining as much information as I can on small felids, storing it in my computer and making the information available to whomever is interested. The information includes bibliographical references broken down by species and by category (i.e. behavior, captive management, etc.). My library search for books is just about completed and now I'm collecting journal information. The computer will also store names of field researchers as I get them. Last but not least, is the questionnaires' data and behavioral data I've collected on Felis caracal (since 1981) and Herpailurus yagouarundi (my current project at Woodland Park Zoo).

My goal is to present my "wealth" of information to keepers as an aid in captive management. Keepers are very important to me because they not only supply captive information, but ideas.

I have just recently completed my second questionnaire and have started mailing it out to zoos who responded to my first one. (The first questionnaire was also sent out to private breeders but only a few responses came in. Nevertheless, I'm trying again). If you have small felids and are interested in my project, please send me a note. Write to: Karen M. Dvornich, 2606 SW 340th Pl., Federal Way, WA 98023.



ELEPHANT SET

STANDARD ELEPHANT COMMAND UPDATE

By
Ron Ringer, Lead Elephant Keeper
Topeka Zoological Park, Topeka, KS



I want to thank everyone who has responded to my request for a list of elephant commands. There are still a number of zoos that haven't responded yet. Again, I would like to encourage anyone who works elephants to send me a list so our committee can put together a composite list of commands.

Our committee has recently put together the behaviors that will be included on the master list of commands. They are as follows:

- 1.) Sternal Recumbancy
- 2.) Lateral Recumbancy
- 3.) Return to a Standing Position
- 4.) Present Foot (for chaining and foot care)
- 5.) Walk with Keeper
- 6.) Move Backwards
- 7.) Move Forward
- 8.) Side Step away from Keeper
- 9.) Raise Trunk
- 10.) Release Command
- 11.) Stop Unwanted Behavior, i.e. No
- 12.) Hold Command

These are the only behaviors that will appear on the standard list of commands. As you can see, we are talking about very few commands which should make it easy for anyone to change over to this list.

I hope this list of behaviors will make it easier for people to respond to my original request (See January 1985 AKF, Page 20). Once again, send your commands to: Ron Ringer, Lead Elephant Keeper, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

Thanks again to those people who have sent me their commands and I'm looking forward to hearing from everyone else. Please send along any comments you might have on our committee's work.

(Editor's Note: Other members of the Elephant Commands Committee, which was formed following the Elephant Workshop in New Orleans last fall are: Tim Stout, Seneca Zoo, Rochester, NY; Susan Moy, Lincoln Park Zoo, Chicago, IL; Jean Hromadka, San Diego Wild Animal Park, Escondido, CA; and Smokey Jones, elephant handler and consultant, Westminster, CA.)



THE GREENING OF THE ZOO

By

Carol Beach

Submitted by the Woodland Park Zoo's
Plant Research Team



"There's a war going on with nature at the zoo," said zoo horticulturist Sue Maloney. "But it's a benevolent war, and it comes from letting nature and the zoo's Long Range plan be our guides."

When we discarded the metal bars and concrete pads from our habitat designs, we took on a new occupation, the greening of the zoo - to represent the animals in their natural homes and to enhance the public's understanding of the interdependency of plants and animals. Plants are an integral part of the exhibits and set the whole mood and tone of the zoo. In fact, it has become unthinkable at our zoo to design and construct new exhibits for the animals without considering the plants with which they could live.

Plants improve the quality of life for captive animals. They provide nesting materials for birds, privacy for most animals, exercise and play material. There are indications that the presence of plants reduces tension in captive animals, so often a problem in zoos, and stimulates animals to breed.

"The problem with most zoos," said former director David Hancocks, "is that they set out to exhibit just the animals. They should be exhibiting the animals' natural environments - it's the most important thing we can do here at Woodland Park. The animals are just one of the elements in a zoo visitor's experience. The trees, flowers, and shrubs are just as important."

The equal importance placed on habitat has caused some interesting problems. The gorillas, for instance, had to wait a full year after their new exhibit was completed before they could set foot in their new home because the plants needed to settle and take root. It was well worth the wait. Both the zoo and the gorillas were rewarded by an unusual habitat that deceived even the students of Dian Fossey who, looking at a photograph of the exhibit, mistook the habitat for a piece of the wild they were researching.

With the help of the Long Range Plan, the zoo became something more than just another park rimmed in green. It became a place where you could visit wild places without even boarding a plane or a train. "In a big city there are great psychological benefits when people have green places to go," said Maloney. The same is true, of course, for the animals.

"With the zoo's new look, we're having to train zoo visitors to observe animals in a new way," said Hancocks. "It takes more time. We're trying to immerse people in the landscape so all their senses are involved. There's something magical in that fleeting glimpse of an animal." So the crew-cut hedges and golf-green lawns have been discarded.

"But zoo horticulture is such a new field, the animals are, still outsmarting us," said Sue Maloney, who joined the zoo two years ago as our first zoo horticulturist. For years, people thought you couldn't put plants and animals together in the same exhibit. Much of the concern lay with animal destruction of the plants. But when given sufficient space, and the right sort of space, even animals such as gorillas can be kept in lush, green, natural environments.

THE GREENING OF THE ZOO, Continued

In a way, the designers of the Long Range Plan, Jones and Jones, Architects and Landscape Architects, made life easier for Sue Maloney and her staff, by using nature as the model. For instance, the African savanna exhibit was meant to have long grass, thus saving staff time on mowing. "There are not a lot of people mowing lawns in the savanna in Kenya," said Maloney. Conversely, there is the problem of keeping the grass growing with zebras and giraffes around!

There are also difficult decisions to be made about specific plants, to determine whether they are edible, attractive, or dangerous to animals. Authenticity is also important, and since some exotic plants are difficult to obtain, there is talk of zoos engaging in a worldwide seed exchange.

A few of the exhibits are natural just the way they are, requiring little maintenance. "The Marsh and Swamp exhibit is the most authentic as far as using native plants," Maloney said. Modeled after a New England swamp and marsh, the exhibit includes red maple, paper birch, tulip poplar, and red osier dogwood. Also, over 100 trillium were donated to the exhibit last year by Seattle Zoological Society Board member Dr. Russ Kurtz.

The climate of the Pacific Northwest makes our job easier than the job for many zoos. Many plants that are native to the bioclimatic zones represented at the zoo also grow in neighborhood gardens, such as the red-hot-poker, native to the savannas of Africa.

"We've done a lot of imitating of tropical habitats with plants that are actually frost-hardy," said Maloney. "For the most part, we are using ordinary ornamental plants you or your neighbor would have, but putting them together in a new way to give you the feeling of the natural habitat."

If the Woodland Park Zoological Gardens is moving towards becoming a botanical garden, who is taking care of all the plants? Maloney oversees a staff of three people and volunteers, who together keep everything green and growing on 90 acres of park land - not just in and among the exhibits, but shrub beds along Phinney Avenue, the plants and trees aside the parking lots, the playground area at the corner of Phinney and 59th, the wooded area along 59th to Aurora, the picnic areas, and the neighborhood park at 50th and Phinney. That makes about 30 acres per person. "By no means can we do the right job with just four people," Maloney said.

A volunteer gardener aid program was, therefore, set up in 1982. Some people who join are botany specialists, others have a wide variety of skills to take care of both the interior and exterior exhibits. Animal keepers also give routine daily care to plants in their exhibit areas, such as weeding, watering, and thinning out dead plants.

Aside from their aesthetic value and contribution to the naturalistic exhibits at the zoo, plants have their own virtue in cooling down the city, helping reduce pollution by grabbing particulate matter out of the air, and increasing the oxygen in the atmosphere. That's every reason to celebrate the continual greening of zoos!

(Editor's note: This article originally appeared in Animal Kingdom, June-July 1984, and is reprinted here with permission of the author and that of Animal Kingdom.)



1985 AAZK NATIONAL CONFERENCE

October 20-24, 1985

Miami, Florida



CONFERENCE '85

Please note the following information for our 1985 conference:

- There will be an extension of the special conference room rates at the Coconut Grove Hotel. The special rate will stay at \$75.00 a day until 1:00 p.m. check-out time on Saturday, 26 October.
- The Everglades will be our post-conference trip. Details will be forthcoming in future AKFs.

SECOND CALL FOR PAPERS

Papers are requested for the 1985 AAZK National Conference. This year's theme is "Husbandry/Maintenance of Traditionally Difficult Animals". Papers will be limited to 10-15 minutes with an optional five-minute question/answer period. The registration fee for the conference will be reduced for those people whose papers are accepted. Please notify us of any equipment needed. If you will be using video tapes, only VHS will be accepted. Please submit outline or abstract by 1 August 1985. Send papers, information, or questions to:

Brett Banner
AAZK Conference
South Florida Chapter
12400 S.W. 152nd Street
Miami, Florida 33177

Conference Committee Chairman: Rachel Rogers
South Florida Chapter AAZK
12400 S.W. 152nd. Street
Miami, FL 33177

Conference Headquarters: Coconut Grove Hotel
2649 South Bayshore Drive
Miami, FL 33133

Note: Conference Registration Forms and Hotel Reservation Forms may be found on pages 91-92 of the March issue of Animal Keepers' Forum.

Chapter

San Diego Zoo Chapter

Our Chapter has developed a newsletter which we publish monthly in order to encourage communication between the keepers at the Wild Animal Park and the San Diego Zoo, and to provide a forum for ideas as well as information for our members. The newsletter, called The Keeper, has been a critical success, but we found it difficult to finance as far as the printing costs are concerned for the volume we need.

To try to resolve the financial commitment involved, we held a fund raiser to generate the money needed to cover our monthly costs. We came up with the idea of a T-shirt fashion show and auction. T-shirts are always a popular commodity. Our treasurer, Heidi Ensley, wrote zoos around the country and asked for samples of their institution's T-shirts. We also acquired shirts from members who had collected them from their travels, as well as some nice environmental and animal-oriented shirts which we purchased.

We sent invitations to some well-known zoo personalities ahead of time, to act as models. We recruited keepers, veterinarians, curators and nursery personnel, and suited them up in our evening's finery, and presented them (hamming it up to music and a very inspired commentary). Because these people were all part of our Zoo world on a day to day basis, it was hilarious to see them taken out of context in our orchestrated line-up.

Following the show, we had an auction. The enthusiasm was great and the bids for individual shirts went up as high

as \$40.00! We earned \$560.00 by the end of the evening, enough to pay for at least one year of newsletter publication.

We would like to thank the following zoos who responded to our plea for T-shirts: Brookfield Zoo, Dallas Zoo, Woodland Park, Phoenix, Audubon Park, The National Zoo, The Los Angeles Zoo and Cincinnati.

We thought other Chapters might be able to use this idea to earn money for their needs. We guarantee an enjoyable event. We would also be pleased to send a copy of our chapter's newsletter to any chapter who might be thinking of starting a similar publication.

News

Los Angeles Chapter

The Los Angeles Zoo Chapter is hosting a Mini Symposium titled: Management of Marine Mammals in a Captive Environment. It will be held on 25 May from 4 p.m. to 10 p.m. in the Education Center on the zoo grounds. The cost is \$5.00 to local members and \$10.00 to non-members (includes membership). Speakers are:

Dr. Brian Joseph, D.V.M., Sea World: "Veterinary Care of Marine Mammals"

Ms. Gail Laule, Active Environments, Inc. "Behavioral Enrichment for Marine Mammals in Captivity" (demo at break)

Mr. Tim Desmond, Director of Training, Marineland: "Husbandry Training of the Killer Whale"

Mr. Barry Seif, San Francisco Zoo: "Breeding Project of Grey Seals"

Ms. Patricia Quinn, Monterey Bay Aquarium: "Sea Otters in Captivity".

For information: (213) 666-4650, Ex. 213.

The Los Angeles AAZK Chapter also hosted a Bake Sale at the zoo entrance on 6 April.



Keeper's Alert

ASSISTANCE FOR LODGING AT AAZPA NATIONAL

The Columbus Chapter of the AAZK would like to cordially invite you to attend the AAZPA Annual National Conference, September 8-12, 1985. Our Chapter will be hosting a variety of activities during the conference and we feel it will be an exciting experience.

We would also like to invite any national member who cannot afford accommodations to contact Joe Ridler, accommodations coordinator or Andy Lodge, Chapter president. Both can be reached at the Columbus Zoo (614) 889-9471. Our Chapter will arrange the housing to help ease your financial burden. We feel that everyone should have a chance to attend our conference.

We hope you join us at the Columbus Zoo to experience an educational as well as a fun time during the AAZPA Annual National Conference.

--Submitted by Andy Lodge, President
Columbus Chapter AAZK



NIXON GRIFFIS FUND FOR ZOOLOGICAL RESEARCH ANNOUNCES SEVEN GRANT RECIPIENTS

The Nixon Griffis Fund for Zoological Research (NGFZR), established in 1948 by New York Zoological Society Trustee Nixon Griffis, announced its first seven grant recipients on 7 March, 1985. NGFZR grants are available to members of the zoo and aquarium community. Fund recipients may be curators, keepers, veterinarians, or research and consulting biologists.

NGFZR grants, not to exceed \$3,000, are awarded semi-annually. The next closing period for grant requests is 1 July, 1985. For information about the Fund and grant applications, interested researchers should write to the Nixon Griffis Fund for Zoological Research, c/o New York Zoological Society, 185th Street and Southern Blvd., Bronx, NY 10460.

The March 1985 recipients were:

- Lee Boyd, Washburn University and Lonnie Kasman, San Diego Zoo
"Use of urinary estrone concentrations and marking behavior to assess the estrous status of Asiatic wild horses (Equus przewalskii)"
- Betsy L. Dresser, Ph.D., Cincinnati Zoo
"Embryo transfer between exotic and domestic cats, 7/1/85 - 6/30/86"
- Gail E. Foreman, Ohio State University
"Captive propagation of the smaller felids: courtship and parenting in Geoffroy's cat (Felis geoffroyi)"
- Dale L. Marcellini, Ph.D., National Zoological Park
"A study of the ecology, behavior, and captive husbandry of the New Zealand gecko (Naultinus elegans)"
- Jodie L. Pacy and William C. Satterfield, D.V.M., University of Texas
"Postparturient management of lowland gorilla neonates"
- Christine D. Sheppard, Ph. D., New York Zoological Park
"Passive immune transfer in birds"
- Donald Whitmore, Ph. D., University of Texas at Arlington
"Biochemical genetic variation in the North American captive population of the Siberian tiger (Panthera tigris altaica)"





Bird Calls

CREATING PAIR BONDING AND INCREASING BREEDING POTENTIAL IN UN-FLIGHTED GOLDEN AND BALD EAGLES (*Aquila chrysaetos* and *Haliaeetus leucocephalus*)

By
Steven R. Chindgren, Senior Keeper
Tracy Aviary, Salt Lake City, UT

Most zoos in the western United States have a constant source for receiving injured golden and bald eagles. In many cases these birds are adults that have most likely reproduced in the wild. For years these birds have been kept in cages at the Tracy Aviary and have made no attempts to build nests or breed. They were disturbed when keepers entered the cages.

Six years ago I decided it was not necessary to keep these birds in cages. We had an unoccupied crane paddock into whose center I placed some logs and dead trees for perches. When introduced to the new area the eagles took to the perches immediately. The eagle exhibit measures 60 meters by 50 meters, and the perches are designed so the birds can jump from perch to perch, reaching the highest perch and nests which are about five meters high.

Wild bald and golden eagles build nests on projections or ledges of cliff faces or in trees and occasionally on the ground. Eagle nests are often two to three meters across and one to one and one half meters thick or more. Tree nests tend to be deeper and more massive. Wild eagles commonly use alternate nests in different years. Some breeding pairs seem to use alternate nests in alternate years, others never use alternates, even though they spend time repairing all the nests, and birds that are unsuccessful in their nesting attempt at one nest may choose an alternate site the following year. Eagle nest sites known as eyries are occupied each breeding season for the entire life of each pair. The lifespan of wild eagles varies greatly and is difficult to monitor. In captivity they can reach ages of 20 to 30 years. Nest sites of wild eagles have been known to be occupied for centuries. It would appear that unoccupied nest sites must be magnets. The large nests can be seen from considerable distances and when not being defended would draw in unattached eagles that may pass by.

With this in mind, I set out to build several realistic looking nests to place in the exhibit. The first nest was built using sticks no more than one inch in diameter. Using wire the sticks were tied together until the nest was two meters by one meter deep. It was placed on the top of a dead pine that was cemented in the ground. Both bald and golden eagles were in the same exhibit and the latter were the dominate, keeping the bald eagles off the nests and high perches. It was apparent that the bald eagles must be moved to another enclosure. The golden eagles discovered the nests and began vocalizing and moving sticks to the nests. They spent so much time on the nests that the sticks began to come loose and fall apart. I have now built six nests and putting them together securely is essential. Each stick must be wired in two places, and every six inches a piece of chicken wire is placed and tied to the sticks, then continue adding sticks.

The completed nest may weigh 60-100 lbs. and should be strong enough to roll like a tractor tire. Fiberglass cloth cut in strips and woven throughout with the resin poured over the cloth will give additional strength.

CREATING PAIR BONDING AND INCREASING BREEDING POTENTIAL IN UN-FLIGHTED GOLDEN AND BALD EAGLES, Continued

Once placed in a tree, fill the bowl of the nest with loose bark, leaves and twigs. When attaching the nest to the tree, drill several holes at 40° angles and place pieces of 1/2 inch rebar to help support the nest. Plenty of perches must be placed so that the birds have easy access to the nest. At least two nests should be provided, three is even better.

Despite the fact that the golden eagles spent considerable time on the nests adding sticks and vocalizing during the breeding season, after four years no eggs had been produced. I had a feeling we had two males so a laprascope was performed, sure enough both were males. We were able to acquire a female from the Hogle Zoo in Salt Lake City. We are looking forward to the upcoming breeding season and feel we have increased the breeding chances for these species by creating a more natural captive environment.

Bald Eagles have been produced at Northwest Trek in Eatonville, WA in an open top exhibit where the birds built a nest on the ground!

Things to be aware of:

1. Make sure you have a pair! Sexual size dimorphism in eagles usually is well pronounced with the female being one-third larger than the male. But this rule does not always hold true with golden eagles, so if both birds are similar in size it would be wise to have the birds surgically sexed.
2. Make sure eagles have easy access to the nests so food and sticks can be easily carried there.
3. Increase feeding in February by giving smaller amounts twice a day, morning and evening. (Food transfers are an important part of developing a pair bond.)
4. Food - Golden Eagles: Rats, duck and chicken; Bald Eagles: Rats, duck, chicken, mackerel, carp and bird of prey diet.
5. Reduce keeper interference during breeding season February through May.
6. Provide fresh pine sprigs for eagles like to place them in their nests.
7. During copulation the male must be able to maintain his balance. So it is important that he has enough wing to do so. If one wing is severely damaged it may be helpful to clip the primaries from the other wing so both wings balance out.



THINK Safety!

Submitted by Jill Grade
Safety Column Coordinator

Beth Poff of the Mill Mountain Zoo, P.O. Box 13484, Roanoke, VA 24034, is looking for articles, ideas, resources, etc. on safety for use in the Safety Chapter of the Zookeeping Husbandry Fundamentals book. This will be your book. Let's all contribute what we can.

Is it really possible that absolutely nothing in regards to safety is happening in your zoo? I have received contributions for this column from Seattle, but nothing from other institutions. Is your zoo accident free?

I hope to include in this column articles on accidents which have already occurred, and ideas or ongoing programs for accident prevention. If one person from each institution listed in the AAZK Directory sent in JUST ONE bit of information, we would have enough material to run this column for three years. You could save a life! Accidents are painful and costly, to say the least. As professional keepers, I believe it is our responsibility to aid our fellows in accident prevention. Constant reminders to Think Safety! are a way to do that.

Articles need not be long and detailed. Cartoons and jokes are also good reminders. A contribution to the Think Safety! column would make a good Chapter project. Get together just once to put something together from your zoo. Xerox a few pages of your safety manual or company rules for safety. Think up a safety slogan. Remember, Keepers Care.

(Editor's Note: Contributions to this column may be sent to Jill at: International Birdhouse, 956 W. Huron, Chicago, IL 60622.)



Information Please

Information wanted. Anyone with information regarding breeding the Crested Cara Cara (Polyborus plancus cheriway) is urged to contact: Kerry Hoffman, c/o Arizona-Sonora Desert Museum, Rt. 9, Box 900, Tucson, AZ 85743. I am interested in breeding attempts as well as successful breeding.

Information is requested from those who house or exhibit Hippopotamus amphibius regarding exhibit substrate and feeding procedures. I would also like to hear from those who have experienced sand impaction in these animals and the treatment used even if the treatment was not successful. Please contact: Patricia Hook, Sr. Keeper of Large Mammals, Riverbanks Zoo, 500 Wildlife Parkway, Columbia, SC 29210.



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

NUTRITIONAL DISORDERS

A variety of nutritional problems arise when reptiles are kept in captivity. The incidence of these disorders should decrease as the reptile owner gains knowledge about dietary needs. If diagnosed early, nutritional deficiencies can be reversed through a change of diet. While nutritional deficiencies can occur in strict carnivores not fed whole-body food animals, they are more common in herbivores and insectivorous reptiles.

It is essential that keepers discuss feeds and feeding with inquiring novices. Too often the novice will feed solely ground beef and lettuce to a turtle, or only mealworms and crickets to their newly acquired pet lizard. Furthermore, the pet may be offered its food at an ambient temperature too low to permit adequate digestion. When a novice reports a sick reptile, the keeper should encourage the caller to seek veterinary care for his pet. It may also be necessary to have on hand a list of veterinarians in the immediate area who are willing to receive reptiles as patients.

Captive chelonians are the major victims of vitamin A deficiency because they are often fed unsupplemented greens (eg. lettuce), muscle meat, ants' eggs, or a strict diet of turtle foods sold in pet stores. Symptoms of vitamin A deficiency are abnormal drowsiness, excessive hiding, loss of appetite, swollen eyes, abnormal skeletal development, respiratory infections, and reproductive problems. Palperbral swelling renders the animal blind; consequently, it does not eat. Treatment consists of a veterinarian administering parenteral vitamin A in severe cases. In other cases, diets should be supplemented with vitamin A, with a variety of fruits and vegetables (Part 10, Table 1).

Vitamin A toxicity may be confused with vitamin A deficiency because symptoms can be similar (eg. loss of appetite, swelling of eyelids, hemorrhaging, and spontaneous fractures). Treatment is the avoidance of further vitamin A supplements and foods rich in vitamin A until symptoms reverse. The keeper may wish to refer to Composition of Foods, Agriculture Handbook No. 8., by B.K. Watt and A.L. Merrill, published by the United States Department of Agriculture, Washington, D.C.

Monotypic diets such as all-fish, all-muscle meat, and all-greens diet can produce thiamine (B1) deficiency. Clinical signs may include muscular tremors or twitching of the extremities, reduced muscle mass, sinking of the eyes, secondary infections, or loss of appetite. Parenteral thiamine treatment by a veterinarian is indicated in severe cases. However, thiamine deficiency is easily avoided by feeding a variety of whole-body animals to carnivorous animals, or an array of fruits and vegetables to herbivores. It is essential to supplement diets of exclusively fish-eating reptiles (piscivores). This can be accomplished by feeding dead, skinned rodents. Picivorous reptiles should never be fed furred animals because fur may cause intestinal impaction.

Biotin deficiency occurs in reptiles fed exclusively raw eggs. Since raw egg white contains avidin which forms a stable complex with biotin in the gastrointestinal tract, it renders biotin unavailable for absorption. Lizards in the genera *Varanus*, *Heloderma*, and *Tupinambis* are often subjected to raw egg diets by their novice keeper. Reptiles fed almost exclusively raw eggs may exhibit muscular weakness. Treatment consists of substituting small mammals and birds as a food source, and only offer raw eggs as a treat with supplemental multivitamins.

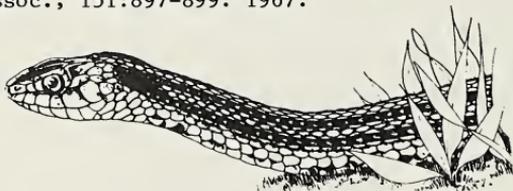
Vitamin C (ascorbic acid) deficiency has been associated with mouth rot (Ulcerative Stomatitis). Frye (1981) also reported spontaneous skin splitting in giant boas. I feel this should be investigated further because some reptiles are capable of ascorbic acid synthesis (Vosburg et al., 1982). Clinical signs of vitamin C deficiency are weight loss, edema, and diarrhea. Food animals allowed to void their intestinal contents prior to being offered to a reptile may be deficient in vitamin C. This problem can be avoided by providing food for prey animals until they are to be fed to reptiles. Herbivorous animals should be provided with a small amount of citrus fruit in their salad as well as other food items high in vitamin C. Parenteral vitamin C may be indicated during excessive stress, prolonged antibiotic therapy, mouth rot, or skin splitting.

Vitamin E deficiency (Steatitis) was originally described by Wallach and Hoessle (1968). Clinical signs are not always apparent and therefore the disease is usually diagnosed at necropsy. Crocodylians suffer from this nutritional disorder when fed exclusively oil-laden fish such as smelt, mackerel, or herring. Frye (1981) reported snakes suffered from loss of appetite, reduced skeletal muscle mass (atrophy), incoordination, or paralysis when consistently fed obese laboratory rodents. In severe cases of vitamin E deficiency, a veterinarian should administer parenteral vitamin E. It is not expected that a novice would be keeping captive piscivorous crocodylians. However, the reptile keeper should remember that vitamin E supplementation should be given to piscivorous crocodylians fed fish, or to snakes fed obese laboratory rodents. It is advisable to substitute lean, dead skinned rodents or dead chickens for fish when feeding piscivorous crocodylians. Chickens are also an excellent food substitute for obese rodents when feeding snakes.

In next month's series, nutritional disorders will be continued.

References

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Keeper Accommodations List

*Submitted by Oliver Claffey
Metro Toronto Zoo AAZK Chapter
Toronto, Ontario, Canada*

K.A.L. was started late in 1979 with several aims, primarily to help provide inexpensive accommodations for keepers traveling all over the USA and Canada. The project also promotes contact among keepers, fellowship in the AAZK, and information exchange at the keeper level.

K.A.L. is a list of keepers or other AAZK members who are willing to put up a fellow keeper, with or without family, for one or more nights. Keepers do travel a lot, not only to workshops and conferences, but to other zoos on vacation. How does it work?

The Toronto Chapter maintains a list of contact persons, one per participating chapter or institution. Each contact person keeps a list of keepers in their area who are willing to put up a traveler. Anyone wishing to travel contacts the Toronto Chapter with a list of cities and zoos which they wish to visit; we provide them with the relevant contacts if we have them. It is up to the individual to then write to the contacts and make his or her own travel arrangements. How can you help?

Appoint someone in your chapter as the contact for your zoo or city. Send that single name, address, zoo and home phone numbers to the Toronto Chapter. Keep your own list of colleagues who will provide accommodations.

This system allows us to keep an up-to-date list of institutions with contact people. The AAZK Keeper's Membership Directory is now featuring an explanation of K.A.L. and indicates which zoos have contact persons.

Being a contact person doesn't entail much work. Traveler's budgets are stretched further where hotels and motels are bypassed. Both guests and hosts make new friends with different ideas, information, and outlook on the zoo world, and it is a good way of uniting AAZK members around the world.

We now have 50 contacts in 29 States and four Provinces. Become a part of K.A.L. - help it grow and enjoy its benefits.

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THE COCKROACH CONSPIRACY: WHO WILL ENDURE?

By
Sandra Healy-Will
Keeper, Bird House
Lincoln Park Zoo, Chicago, IL

Dr. Frank M. Carpenter of Harvard University's Museum of Comparative Zoology traces the cockroach back more than 320 million years. Fossil imprints, dating back to the Upper Carboniferous times, show that roaches have undergone very little change. They have survived ice ages, floods, and all manner of catastrophes that have destroyed many other species, including the dinosaur. Our own bestial origins (2) in Neanderthal man, a race technically extinct, had its beginnings 70,000 years ago. Far before homo sapiens were able to get a few cells to stick together, the cockroach possessed ancient skills in survival. Adaptation, the fitness of an organism for a particular environment, is the key to the mystery of evolution. An astonishing fact is that they are "fit" to live anywhere on the planet except the polar regions. Three thousand-five-hundred known species exist. They came from their ancestral homes in Africa and Central Asia as stowaways on every means of transportation. At first they traveled by caravans and ships, later they included airplanes and submarines as a means of navigation.

That kind of resilience has brought them to the 20th century to face an arsenal of chemicals designed to annihilate their particular phylum, Arthropoda. Scientists began to study the roach because they were impressed with its time-tested abilities. But then it was discovered that the insect harbors bacteria causing typhoid, leprosy, plague, food poisoning, and a legion of other ills. Polio virus live in cockroaches as do the eggs of parasitic worms. Like flies, they spread disease organisms by walking on filth and depositing it wherever they go. (The American roach was found half a mile underground by Welsh coal miners. The Smokey Brown can be seen buzzing streetlights in Houston, and the Oriental can winter outdoors. Some cockroaches snorkel and prowl stream bottoms). The United States houses about fifty-five species, the five most common are the German (Blattella germanica), Smokey Brown (Periplaneta pugliginosa), Maderia (Lucophaea maderia), Oriental (Blatta orientalis), and the American (Periplaneta americana).

It is impossible for us to imagine that in our world of miracle "cures" that an insect can manage to remain so indestructible. A closer study of their behavior gives us clues to the realities of the problem. The roach is the truest of all omnivores being able to include in their diet wallpaper, electrical cords, stale beer, and will turn cannibal if the need arises. The American roach can live for three months on water, one month on nothing at all. A decapitated roach lived for several days. Cosmopolite that he is, the roach is able to reproduce at the whiff of another's pheromone, an aromatic chemical lure. "Prolific to a fault, a pair of German cockroaches and their offspring could, in one year, multiply to 400,000 insects" (1). After mating, most females carry the egg case for twenty days before depositing it in a hiding place. The German female protects her offspring against predators by drawing her egg case back into her body where it occupies a brood sac until hatching. The reproductive ability of the Surinam species has eliminated the male sex altogether. They are an entirely female species that produce female roach.

Robert Barth (4) of the University of Texas found a low incidence of homosexuality in several species.

THE COCKROACH CONSPIRACY: WHO WILL ENDURE?, *Continued*

Animals that feed on roaches are, for the most part, pests themselves. Small rodents and birds are among the least exotic foes. Even the most radical people who believe in using a natural means of extermination by putting predator and prey together are not willing to live with spiders, scorpions, wasps, toads and hedgehogs. We continue to believe that there must be another way of curbing the "roach boom". One of the most primitive means of extermination was to raise a foot over the crawling creature and attempt to smash it by bringing the foot down hard. Then it was discovered that the roach, via his cerci or tail, picks up the air movement which triggers a nerve impulse that sends him running in 54/1000ths of a second, faster than humans blink. Most poisons don't work on the roach unless so much is sprayed that he is forced to stand in it. Otherwise, his maxillary palpi, tipped with 2,000 porous pegs allow him to pretaste food and poison before he ingests it. They can tolerate many times more radiation than man. Electronic gadgets, designed to upset local magnetic fields thereby driving cockroaches away, were tested by Dr. Michael Rust at the University of California. He placed sixty cockroaches next to one of these devices "...and let it run--night and day. In half a year we had 5,000 insects."

Many chemicals have been created that will poison the cockroach. Carson (3) states that "the production of synthetic pesticides in the United States soared to 637,666,000 pounds in 1960. The wholesale value of these products was well over a quarter of a billion dollars." Professional exterminators make half a billion dollars yearly in repeat business. The amateur do-it-yourselfers spend one-hundred and fifty million dollars annually on dusts, sprays and Roach Motels.[®] Three thousand compounds were screened in 1980 by Raid[®] for use as roach pesticides. Many of these chemicals have been used and have found their way into our food chain. Indeed, according to Rachel Carson, we live "intimately with these chemicals--eating and drinking them, taking them into the very marrow of our bones--we had better know something about their nature and their power." (3)

The cockroach is being analyzed in infinite detail by major universities all over the world. An inspection of Biological Abstracts of papers published in major scientific journals over a period of two weeks yielded eight cockroach articles. The universities involved were: Stanford University; University of Oregon, Academy of Science, U.S.S.R.; Academia Sinica, Taipei, Taiwan; Burdwan Medical College, Calcutta; Institute of Nuclear Medicine, Delhi, India; Abeille Insect Sociaux, France. A complete list of these works are found in "Literature Cited.: (6)

Those facts and figures seem impressive to humans, but to the beast who has walked with mastadons, the data, as well as the poisons, find him undaunted. In his book, The Outermost House, Henry Beston philosophizes, "We need another and a wiser and perhaps more mystical concept of animals. We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And there in we err, and greatly err. For the animal shall not be measured by man. In a world older and more complete than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings, they are other nations...."

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THE COCKROACH CONSPIRACY: WHO WILL ENDURE?, Continued

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The Tucson AAZK Chapter is going to produce a 1986 Zoo-related calendar and wishes to solicit photographs from the membership and the public for this project.

The photographs must be horizontal format, 8 x 10 inch color prints of zoo animals or zoo activities. Photo entry fee is \$5.00 per photo, non-refundable. Photos will not be returned unless requested and accompanied by a self-addressed, stamped envelope. Selected photos will be accompanied by a short biographical sketch of the photographer, so please include pertinent data. Deadline for photographs is 31 July 1985.

We request from Chapters or members other information to include on the calendar such as: date of formation of your zoo, first captive births or hatchings, formation date of your chapter and dates of upcoming events, etc. Deadline for date of zoo facts is 30 June 1985.

Photographs and/or zoo facts should be sent to:

Arizona-Sonora Desert Museum
Attn: Kerry Hoffman
Route 9, Box 900
Tucson, AZ 85743

FORT WORTH ZOO EXPERIENCES
HERP BABY BOOM IN 1984

By
Rick Hudson, Assistant Supervisor
Dept. of Herpetology, Fort Worth Zoological Park
Fort Worth, TX

The year 1984 was the most successful one yet for the zoo's Herpetology Department. In all, 43 taxa of amphibians and reptiles reproduced, some rare and endangered, including 18 species which had never before been bred at the Fort Worth Zoo.

Raising juveniles of this many diverse species was constantly demanding and represented quite a challenge to the five Herpetarium staff members. Many extra hours of time were required to keep up with such a prolonged baby boom, for instance, within an eight-day period in October, three species of boas (Brazilian rainbow, Malagasay ground and emerald tree) gave birth, adding 60 babies to an already burgeoning population.

Regardless of how much or how little time and effort went into inducing a species to reproduce in captivity, it often seems minor in comparison to the work that lies ahead once the babies are hatched or born. Reproductive data (weights, dates, measurements) must be taken on each specimen and recorded. Living quarters must then be set up which may be simplistic or intricate, depending on the species and its individual requirements. Once each specimen has had time to acclimate to its new surroundings, the task of feeding begins. To the experienced herp keeper this usually presents little or no problem. However, there are always some exceptions - those finicky feeders which constantly test the skill and resourcefulness of the keeper. But persistence usually brings success, along with a sense of accomplishment.

Of the 43 separate births and hatchings that occurred in the Herpetarium this past year, we consider certain ones to be relatively significant achievements. Here is a brief review of the 1984 highlights of the zoo's Herpetology Department.

In April, two helmeted iguanas (*Corytophanes*) hatched after a 125-day incubation period, and of the five other iguanid lizards that reproduced here this year, this one stands out the most, mainly because they have traditionally been regarded as delicate and difficult to maintain in captivity, and have been bred by only a few other zoos. But the young proved extremely difficult to raise and eventually died, one after having lived for nine months. Obviously there is much to be learned about the requirements of the juveniles of this attractive lizard, and hopefully we will get a second chance in 1985.

Of the ten species of Colubrid snakes that bred here this year, certainly the most significant was the June birth of nine San Francisco garter snakes. The parents were confiscated in California by the U.S. Fish and Wildlife Department and then placed in four zoos, including Fort Worth, in hopes that they would eventually breed. And proudly we were the first zoo to accomplish this. Aside from being one of the most beautiful of North American snakes, they are classified as endangered and strictly protected in California where their last remaining habitat is being rapidly destroyed. So it is important that a captive breeding group of this rare snake become established in zoos to reinforce the total population, just in case efforts fail to protect them in nature. The first step towards this goal occurred at the Fort Worth Zoo.

Of the nine species of Crotalid snakes (pit vipers) that reproduced here in 1984 which included red pygmy and ridge-nosed rattlesnakes, ornate cantils and eyelash vipers, two others caused considerable excitement in the zoo's Herpetarium during July. The first was the beautiful Sri Lankan (Ceylonese) tree viper, a species contained in only a few U.S. collections and rarely bred in captivity. And though extremely difficult to induce to feed, most of the nine babies are now feeding and doing well. The second was the critically endangered Aruba Island rattlesnake, one of only four reptile species that is being cooperatively managed in captivity under the direction of the Species Survival Plan (SSP). The parents of the five babies were on breeding loan from the San Diego and Houston Zoos and represents yet another example of how zoos today cooperate with each other in attempts to improve the breeding potential and future outlook of rare species. And for the Aruba Island rattlesnake, zoos may hold its only hope for survival.

July continued to be one of significant events as four yellow spotted sideneck turtles (*Podocnemis*) hatched. In 1983 the Fort Worth Zoo became the first to ever successfully reproduce this protected species in captivity and this has become our most noteworthy turtle breeding project. Though juveniles were frequently imported years ago for the pet trade, they are now protected and prohibited from commercial exportation. Still a sizeable number of adults exist today in zoos, but the majority fail to reproduce. Only one other zoo, Columbus, OH, has achieved breeding success.

Three species of boas produced babies in October, the most important being the emerald tree boa. This species has not reproduced at the Fort Worth Zoo since 1973, and we were long overdue for success. It came on 4 October a day which will long be remembered as the day that two females gave birth within two hours of each other, producing a total of 15 healthy babies.

There were four species of amphibians, all frogs, bred at the zoo this year, the most exciting being that of the giant Mexican leaf frog (*Pachymedusa*). Named because of the peculiar reproductive mode of this species, the females lay their eggs attached to a leaf of a plant overhanging the water where the tadpoles later drop to complete their development. And so it was one morning in August when we arrived to find our pair together in amplexus producing a large, gelatinous mass containing hundreds of eggs. The leaf with the attached egg mass was removed and suspended over water in a jar where over 200 tiny tadpoles hatched out a few days later, many of which later metamorphosed into froglets, some of which are now one third the size of the parents.

The year 1985 began on a high note as a baby Mexican beaded lizard hatched in January, but unfortunately died after two days apparently from a ruptured yolk sac that failed to absorb properly. Though the Mexican beaded lizard is widely kept in zoos, it is infrequently bred in captivity, unlike its closest relative, the Gila monster of the southwestern United States. Today only four zoos have been able to hatch and successfully raise a juvenile of this species.

And finally, eleven fertile eggs were produced in September by the zoo's water monitors which are still incubating and are expected to hatch in several months. If successful, the Fort Worth Zoo will become only the third zoo (San Antonio being the first in 1980) to breed this large lizard. Perhaps of even greater significance is that our breeding male was one of those hatched at San Antonio, the result of a breeding loan with the Fort Worth Zoo which provided the female who laid the eggs.



YOUNG URBAN KEEPERS

By
Michelle Grigore, Keeper
Toledo Zoo, Toledo, OH

Editor's note: The following whimsical look at the zookeeping profession as inspired by an article on Young Urban Professionals (Yuppies) which appeared in the Toledo Blade Sunday magazine. Keepers at the Toledo Zoo are sharing a laugh over that article when the term "YUK" was born--they took the idea and ran with it and this article is the result.)

YUK. You might hear this word from the mouths of babes. It means they dislike what you just gave them. YUK also means something else entirely in 80's terms. There are, believe it or not, bonafide Yukkies here in Toledo - and they all know what the word means. They want to enlighten the rest of Toledo.

YUK is an acronym for Young Urban Keepers, a special type of Toledoans found only at the Toledo Zoo. This word designates a group of dedicated young people, ages 19-42, who live for aspirations of spotless cages, healthy, happy animals and, of course, the weekly volleyball game.

Yukkies have remained underground, rubbing elbows with other Toledoans who don't realize their true identities. Inspired by the Complete Yuppie article in the Toledo Magazine, they have decided to go public.

Toledo is home to 24 YUKS, married and single, and all with the goal of making the Toledo Zoo one of the best in the country. Workaholics abound among Yukkies; 5 o'clock finds most YUKS still hard at work. But when the last routine medical exam is finished, animal behavior observations completed and exhibit work finished, YUKS get together to relax. They move in closely-knit groups among many of Toledo's night spots. You can often spot them at the Nighttime Lounge at Holiday Inn West in the typical YUK dress: khaki shirt and pants, steel-toed shoes or duck boots and brown jacket. Penney's is an important source for YUK power uniforms, both male and female. Only the Big Mac[®] label will do for discriminating YUKS.

Yukkies often get together for dinner, drinks, birthdays, concerts or a "Dawn of the Dead" party at the local drive-in. Trivial Pursuit is a favorite pasttime when YUKS meet--but nothing can top the summer volleyball games. All true YUKS love volleyball and you can find them on the pool court two or three nights a week.

YUKS have their own language, and it revolves around their work. They never leave work at work; it goes with them to their homes, to parties, wherever they go. No out-of-town YUK vacation is complete without visiting the local zoo or aquarium. Families of YUKS have to learn to adapt.

YUKS agree, they aren't in the animal care business for the pay. They have found a career they enjoy and they take their job very seriously. The future of many valuable, endangered species is entrusted to Yukkies and they are continually trying to expand their professional knowledge about the animals for which they care. It takes training and animal sense to make a good YUK.

The Toledo Zoo Yukkies are a cosmopolitan bunch: they come from California, New York, Kansas, Pennsylvania, Cleveland and Toledo. Some have college degrees, while others have years of experience behind them. Meet Wayne, the "oldest" Yukkie. He's been living, eating and drinking

YOUNG URBAN KEEPERS, Continued

the Toledo Zoo for 14 years. Or mammal Yukkies who put in long hours after work to train the elephants so they can be handled easily for medical procedures. Bird House YUKS can be found hauling 50lb sections of trees into the building after work to create a dramatic forest setting in a bare display cage. The two-legged creatures in the aquarium tanks wearing aspirators are merely YUKS creating fiberglass coral reefs for the new saltwater fish. Walk into a tropical forest as you view the new crocodile pool - the result of long hours of work by the Reptile House crew. If you stumbled by the Lion House in the wee hours of the morning, you might see a YUK or devoted zoo volunteer involved in a 24-hour monitoring of the birth of an endangered species. Every YUK knows it takes cooperation among YUKS, the hard-working staff and volunteers to keep the zoo running.

On more Thursday evening dissolves as the last of the zoo visitors exits and the gates are locked. You can still find YUKS doing last minute clean-ups and daily reports. A few of them have started to gather in a pre-selected spot: some in their YUK garb; others, who had the day off, in their civies. More are coming, moving slowly and deliberately, talking over the events of the day. YUKS have gathered here to purge themselves of the tension of the day, to socialize with others who share the same professional goals and drive, but most of all - to play a mean game of volleyball!



TO THE MEMBERS: We regret to report that no job listings for the "Opportunity Knocks" section were received by deadline for this month's edition. We urge you to encourage those responsible for hiring at your institution to send pertinent data on jobs available to AKF for publication.

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Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

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INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers.

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Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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States West of Mississippi - Debra Stetcher, Woodland Park Zoo, Seattle, WA

Individual Regional Coordinators and the states under their oversight are listed elsewhere in each issue of *Animal Keepers' Forum*.

This month's cover artwork is by Diane Hagey, a Bird Keeper at the Riverbanks Zoo in Columbia, SC. The sketch is of a nine-day-old Black-footed penguin chick (*Spheniscus demerus*). Sometimes called the Jackass Penguin, this species is found on the islands off the coast of South Africa and the Cape Peninsula. After a 39-day incubation period, the newly hatched chicks mature quickly, leaving the colony for the open sea at about 3 months of age. This species has been observed swallowing stones prior to going out to sea and it is speculated that these may serve as ballast and assist the birds in diving for food. The first successful breeding of the Black-footed penguin was in 1905 at the London Zoo. Thanks, Diane!

Scoops

and

Scuttlebutt

ELEPHANT WORKSHOP ANNOUNCED

The Sixth Annual Elephant Management Workshop will be held October 6-8, 1985 at the Fort Worth Zoological Park, Fort Worth, TX. The workshop theme will be "Conservation Through Management" and representatives of the Asian Elephant SSP Group will meet. For further information, contact: Elephant Workshop, Fort Worth Zoological Park, 2727 Zoological Park Drive, Fort Worth, TX 76110.

MEMBERSHIP DIRECTORIES NOTE

Copies of the 1985 AAZK Membership Directory have been mailed to all Professional members of the association. If you have not received your copy, please notify National Headquarters in writing at 635 Gage Blvd., Topeka, KS 66606. Other membership categories may purchase this handy reference tool from National Headquarters.

AAZK SAFARI REMINDER

All AAZK members are reminded that the Fourth Annual Off-The-Job Training Safari to East Africa will depart 23 November for its 14-day adventure. Your itinerary will include stops in Nairobi, Meru National Game Reserve, Samburu National Park, Lake Baringo in the Rift Valley, and the Masai Mara Game Reserve in the Northern Serengeti. Cost of the trip is \$2285 from New York. If you have not received your Safari Brochure, drop National Headquarters a note and we will send you one. Safari arrangements, with World Famous Topeka Zoo Director Gary K. Clarke as your host, are being made by Park East Tours.

V.I.P.'s VISITING M.T.Z.

Very Important Pandas will be coming to Metro Toronto Zoo for a 100-day visit this summer. The Giant Pandas, Quing Quing and Quan Quan, are both about six years old and will bring pandamonium to Canada. This will be a first for Canada. Scheduled to arrive this month, the pair were found a near death in a game preserve last March and now are in fine shape for their visit.



Births & Hatchings

PHILADELPHIA ZOO.....Beth Bahner

B&H for April 1985 include: Mammals - 1 Kangaroo, 3 Geoffroy's marmoset, 1 Ring-tailed lemur, 1.0 Chamois; Birds - 2 Palawan peacock pheasant (DNS), 1 Red & white crane (DNS), 2 Renauld's ground cuckoo (DNS), 1 Lilac-breasted roller (DNS), 2 Brimstone canary; Herptiles - 1 Prehensile-tailed skink (DNS).

SEDGWICK COUNTY ZOO.....Scott Carter

February through April 1985 B&H include: Mammals - 0.0.1 Scrub wallaby, 0.0.1 Wallaroo, 1.1 Ossabaw Island swine (1.0 DNS), 2.0 Collared peccary, 2.3 Pygmy goat (0.1 DNS), 4.0 Four-horned sheep, 2.0 Karakul sheep (1.0 DNS), 0.0.1 Patagonian cavy, 1.1 Axis deer, 1.0 Damara zebra, 0.0.1 Arabian sand gazelle, 1.0 Orangutan; Birds - 0.0.4 Cereopsis goose, 0.0.1 Nene goose, 0.0.1 Rothchild's mynah, 0.0.1 Superb starling (DNS), 0.0.1 Kookaburra (DNS), 0.0.4 Black swan, 0.0.7 Elegant crested tinamou, 0.0.21 Emu (0.0.7 DNS), 0.0.1 East African crowned crane, 0.0.1 Yellow-crowned night heron (DNS), 0.0.1 Rainbow lorikeet (DNS), 0.0.1 Blue-capped conure, 0.0.1 Eclectus parrot (DNS); Reptiles - 0.0.5 Blue-tongued skinks and 0.0.10 Reticulated python.

BROOKFIELD ZOO.....John S. Stoddard

B&H for April 1985 included: Mammals - 0.0.5 White-toothed shrew, 0.0.1 Chinchilla, 0.0.1 Mandrill; Reptiles - 0.0.6 Poison arrow frog.

COLUMBUS ZOO.....Stacy Katz

B&H for March and April 1985 include: Mammals - 0.1 Blackbuck, 0.1 Barbados sheep, 0.3 Cavy (0.1 DNS), 2.1 Domestic goat, 1.1 Gemsbok, 0.2 Thomson's gazelle, 1.0 Four-horn sheep, 1.2 Bengal tiger, 1.3 Pygmy goat (0.1 DNS), 1.0 Red-fronted lemur; Birds - 0.0.1 Bald eaglet.

MILWAUKEE COUNTY ZOO.....Carol J. Boyd

Reported B&H for 1 March-30 April 1985 include: 29.29 Domestic goat, 0.0.1 Red kangaroo, 0.0.1 Siamang, 0.0.1 Titi monkey, 0.0.6 Meerkat, 1.0 Caribou, 0.0.2 Canadian goose and 0.0.4 Barn owl.

WOODLAND PARK ZOOLOGICAL GARDENS.....Harmony Frazier-Taylor

January through March 1985 B&H include: Mammals - 0.0.2 Wallaroo, 0.0.3 African crested porcupine (0.0.1 DNS), 1.0 Vampire bat (DNS), 1.1 Cotswold sheep, 0.0.2 Ring-tailed lemur, 0.0.1 Black and white colobus; Birds - 0.0.3 Small-billed tinamou, 0.0.1 Common trumpeter; Reptiles and Amphibians - 4 Red foot tortoise, 4 Leopard gecko, 3 Orange and Black poison arrow frog.

DALLAS ZOO.....Tamara Jones

B&H for April 1985 include: Mammals - 1.0 Kirk's dik dik, 0.1 Addax, 0.1 Sable antelope, 0.0.2 Emperor tamarin, 0.0.1 Serval, 0.0.1 Red kangaroo, 2.3 Spanish goat, 0.1 Suni, 0.1 Speke's gazelle, 2.2 Pygmy goat, 0.1 Slender-horn gazelle, 1.1 Markhor; Birds - 0.0.2 Grey peacock pheasant,

BIRTHS AND HATCHINGS, Continued

0.0.3 Edward's pheasant, 0.0.3 Fulvous whistling duck, 0.0.2 Green-winged king parrot, 0.0.3 Red-vented bulbul, 0.0.3 Red-legged seriema, 0.0.3 Pied crow; Reptiles - 0.0.1 Macquari turtle, 0.0.2 Sail-fin lizard, 0.0.9 Water python.

ASSINIBOINE PARK ZOO.....Phil King

March and April 1985 B&H include: 2 Yak (1 stillborn), 1 European bison (aborted), 2 Parma wallaby (1 DNS), 3 Wolverine, 3 Gambian pouched rat, 1 Squirrel monkey, 2 Ring-tailed lemur, 1 Red-fronted lemur, 1.0 Lion-tailed monkey, 1.1 Pere David's deer, 3 Common marmoset (1 DNS), 3.1 Pronghorn (1.0 DNS), 0.1 California bighorn sheep (DNS), 1 Black & white ruffed lemur, 0.1 Llama; Birds - 1 Triangular-spotted pigeon, 2 Red-whiskered bulbul, 1 Morning dove.

MINNESOTA ZOOLOGICAL GARDEN.....Brint Spencer

January through March 1985 B&H include: Mammals - 3.1 Nilgiri tahr, 0.0.1 Sugar glider, 0.1 Malayan tapir, 0.0.1 Celebes ape, 1.0.1 Flying fox (1.0 DNS), 0.0.3 Woodchuck, 0.1 Przewalski (Asian wild) horse; Birds - 0.0.6 White-crested laughing thrush (5 DNS), 0.0.1 Yellow-legged hemipode (DNS), 0.0.2 Red spurfowl, 0.0.4 Grosbeak starling, 0.0.1 Bornean argus pheasant (DNS), 0.0.2 Red-billed leiothrix, 0.0.4 Green avadavit, 0.0.1 Dhyal thrush, 0.0.2 Nicobar pigeon, 0.0.1 Pied imperial pigeon.

KANSAS CITY ZOO.....Dee Wolfe

B&H for January through April 1985 include: Mammals - 0.0.2 Giant fruit bat (1 DNS), 1.0 Bison, 0.0.4 Capybara, 0.2 Caracal, 1.0 Impala, 1.0 Orangutan (DNS), 4.0.1 Maned wolf (1 DNS); Birds - 0.0.3 Grey-necked wood rail, 0.0.6 Emu, 1.1 Hottentot teal, 3.1 Ringed teal, 0.0.2 Red-vented bulbul, 0.0.1 Sarus crane.

MIAMI METROZOO.....Lori Bruckheim

April 1985 B&H include: Mammals 1.2 Nubian (pygmy) goat, 1.0 Ring-tailed lemur, 2.0 Waterbuck, 0.1 Dama gazelle, 0.1 Thomson's gazelle; Birds - 0.0.4 Bamboo partridge, 0.0.6 Red-crested pochard, 0.0.13 Mandarin duck (1 DNS), 0.0.2 Demoiselle crane, 0.0.5 Grosbeak starling (2 DNS), 0.0.2 Racket-tailed treepie (DNS), and 0.0.1 Yellow-billed stork (DNS).

SAN ANTONIO ZOO.....Debi Reed

March and April 1985 B&H include: Mammals - 0.2 Grizzled grey tree kangaroo, 0.1 Topi, 3.2 Dama gazelle, 2.2 Arabian sand gazelle (1.1 DNS), 2.0 Dorcas gazelle (1.0 DNS), 2.0 Springbok, 3.5 Aoudad (0.1 DNS), 1.0 Scimitar-horned oryx, 1.0 Sable antelope, 1.0 Waterbuck, 1.0 Mouflon, 1.0 Llama, 1.1 Collared peccary, 0.0.1 Dama wallaby, 0.0.11 Dwarf rabbit (9 DNS), 0.0.3 Four-toed hedgehog (DNS); Birds - 1 Eyton's tree duck, 0.0.9 White-faced tree duck (5 DNS), 0.0.7 Red-billed tree duck, 0.0.4 Black-necked swan (1 DNS), 0.0.4 Moluccan rajah shelduck, 0.0.8 Ringed teal (2 DNS), 0.0.10 Rosy-billed pochard, 0.0.5 American goldeneye, 0.0.2 Green junglefowl, 0.0.13 Elliot's pheasant, 0.0.3 Demoiselle crane, 0.0.4 African spur-winged plover, 0.0.2 Slender-billed cockatoo, 0.0.1 Green-winged macaw, 0.0.2 Pygmy kingfisher (DNS), 0.0.2 Lilac-breasted roller (1 DNS), 0.0.2 Picathartes (DNS), 0.0.1 Arrowmarked babbler, 0.0.4 Red-billed buffalo weaver (1 DNS), 0.0.1 Superb starling (DNS), 0.0.1 Painted conure, 0.0.1 Melba finch, 0.0.1 Diamond firetailed finch, 0.0.1 Duyvenbode's lory,

BIRTHS AND HATCHINGS, Continued

0.0.3 Roul roul (2 DNS), 0.0.1 Palawan peacock pheasant, 0.0.2 Kookaburra, 0.0.1 Owl finch; Aquarium - 0.0.20 Seahorse (2nd generation), 0.0.1 Saratoga Springs pupfish, 0.0.2 Four-eyed fish (1st time in collection), pupfish, Lyretailed cichlid; Reptiles - 0.0.4 Pueblan milk snake, 0.0.8 Green tree python (DNS), 0.0.7 Southern ridge-nosed rattlesnake (both species 1st time in collection).

TAMPA/BUSCH GARDENS.....Susan Rackley

April 1985 B&H include: Mammals - 5.3 Thomson's gazelle, 2.0 Dorcas gazelle, 0.1 Uganda kob, 1.0 Kafue (Red) lechwe, 0.0.1 Cape buffalo, 1.1 Addax, 1.1 Scimitar-horned oryx, 1.2 Grevy zebra, 1.0.1 Grant's zebra, 0.0.1 Guinea baboon, 0.1 Defassa waterbuck, 0.0.1 Blacked-capped capuchin monkey; Birds - 0.0.5 Sun conure, 0.0.2 Forsten's lorikeet, 0.0.9 Ringed teal, 0.0.16 Mandarin duck, 0.0.4 White bellied and yellow-thighed caique, 0.0.1 Golden mantled rosella, 0.0.1 Bare-eyed cockatoo, 0.0.2 Mexican military macaw, 0.0.3 Scarlet macaw, 0.0.6 Jandaya conure, 0.0.8 Orinoco goose, 0.0.1 Red-necked ostrich, 0.0.2 Chattering (Yellow-backed) lory, 0.0.3 Golden (Queen of Bavaria) conure, 0.0.1 American flamingo, 0.0.2 Black-capped lory, 0.0.4 Mute swan, 0.0.5 Abyssinian blue-winged goose, 0.0.4 Indian peafowl (blue phase), 0.0.1 White-cheeked touraco, 0.0.2 Black-winged stilt, and 0.0.2 Black-necked stilt.



REFERENCE SEARCH PROJECT OFFERS SERVICES

The Reference Search Project Team is pleased to formally offer its services to the AAZK membership. So that we can better provide you with the information you want, please provide us with as much of the information requested on the form as possible. We will then search through our computer files and other bibliographic sources to find books, articles, etc. that are pertinent to your area of interest.

At the present time we will be charging \$0.25 plus \$0.05/page to cover the cost of postage, paper, etc. Billing will be sent with the information. Please be patient with us. This is a new service and not all of our sources are on-line (most journal articles, for example, must be referenced manually).

We are always looking for new bibliographies, conference proceedings, publications, etc. Remember, the item that you contribute may help a colleague to be a better keeper. Keepers Care!!

Thanks for your continued support.

The Reference Search Team

AAZK REFERENCE SEARCH PROJECT
BIBLIOGRAPHIC SEARCH

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Please send this completed form to : Jenny Rentfrow,
1951 Eden Rd., Mason, MI 48854.



Coming Events

NINTH ANNUAL INTERNATIONAL HERPETOLOGICAL SYMPOSIUM ON CAPTIVE PROPAGATION AND HUSBANDRY

June 26-30, 1985

San Diego, CA

THE FOURTH INTERNATIONAL OTTER SYMPOSIUM

August 6-10, 1985

Santa Cruz, CA

For more information, contact Judy Mitchell, Center for Marine Studies, University of California, Santa Cruz, CA 95064.

1985 ANNUAL CONFERENCE OF THE CANADIAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

September 4-6, 1985

Toronto, Ontario

The Toronto AAZK Chapter will be taking an active part in this conference. For more information, contact Toby Styles, Manager, Public Relations, Metro Toronto Zoo, P.O. Box 280, West Hill, Ontario, Canada M1E 4R5.

1985 AAZPA ANNUAL CONFERENCE

September 8-12, 1985

Columbus, OH

The Columbus Chapter of the AAZK would like to cordially invite you to attend this conference. Our Chapter will be hosting a variety of activities. We would also like to invite any national AAZK member who cannot afford accommodations to contact Joe Ridler, accommodation coordinator or Andy Lodge, Chapter president. Both can be reached at the Columbus Zoo (614) 889-9471. Our Chapter can help arrange housing to ease your financial burden.

THE 3RD INTERNATIONAL WILDLIFE FILM-MAKERS' SYMPOSIUM

September 14-18, 1985

Bath Spa, Avon,
England

Held at Bath University, this Symposium will attract hundreds of delegates who are professionally involved in wildlife film, television, home video and sound recording. Extracts from, or full length showings of, the latest and best wildlife films from the cinema and television will be introduced by their makers who will also be ready to discuss their work. Further details and registration forms are available from: Bill Pay, Symposium Organizer, BKSTS 110-112 Victoria House, Vernon Place, WC1B 4DJ England.

1985 NATIONAL AAZK CONFERENCE

October 20-24, 1985

Miami, FL

Hosted by the South Florida Chapter. Conference and Hotel Accommodations Forms may be found on pages 91-92 of the March issue of AKF.





ZOO AND AQUARIUM MONTH PROCLAIMED FOR JUNE

"Zoos + Aquariums = Life" has been proclaimed as the theme for Zoo and Aquarium Month by the American Association of Zoological Parks and Aquariums (AAZPA). Since 1982 when President Reagan officially designated June as Zoo and Aquarium Month, the AAZPA and its 200 zoo and aquarium member organizations have launched cooperative programs such as the Species Survival Plan (SSP) to save wildlife.

Successful wildlife breeding in zoos has already saved from extinction such species as the Arabian oryx, Hawaiian goose, Pere David's deer, whooping crane, and bison. Other species like the Atlas lions, Mongolian wild horses, European bison, and ruffed lemurs survive only in protected areas. Some zoo species, like the Siberian tigers and Indian rhinos, are now rarer than Rembrandt paintings. And a few species, like the golden lion tamarin and addax, have been so successfully bred in zoos that they have been reintroduced into their original homelands. Increasingly, AAZPA programs have turned zoos and aquariums into modern-day Noahs. By life-saving efforts in breeding, conservation, research, and education, the zoo-aquarium ark is saving species from extinction.

In most of the world's wild places, animal populations are declining. Trends too far advanced to be reversed will cause the expected loss of many creatures in the next century. At least 20% of some 4,000,000 species of animals are in danger of extinction. Some of them, such as the whooping crane, black-footed ferret, tiger and Asiatic elephant may well continue to exist only in zoos or in nature preserves.

Zoos are preparing for the next century by directing their efforts to the propagation of their animals. The SSP program both strengthens and coordinates captive programs so that zoos and aquariums can contribute to the world-wide effort to preserve vanishing species. A major problem to be solved is the lack of space. All the North American zoos combined constitute less than 20,000 acres. The solution is cooperation, and breeding loans among zoos are now common. The transferring of animals from zoo to zoo is of benefit to the individual zoos from the standpoint of improved exhibits; but, most importantly, breeding loans enhance the likelihood of propagation of the species involved. Each species designated for the SSP Program is managed by a committee drawn from the staffs of those zoos exhibiting that particular species.

Roughly 5,000 animals representing 34 species in about 100 zoos across the country are presently part of the program. Zoo managers hope that by the end of the century, 1,500 species will ride the "zoo ark", says Dr. Thomas J. Foose, AAZPA conservation coordinator.

Essential to captive management of large numbers of wild animals is the keeping of accurate records. This is accomplished through another important program: ISIS, the International Species Inventory System. Here captive animals are recorded on computer. Accumulated data is then circulated to participating institution members. References to the 51,000 living mammals and birds that have been inventoried by this AAZPA program help zoos locate proper mates or additional individuals for breeding programs. Through ISIS, the age, sex, parentage, place of birth or, for that matter, circumstances of death of an individual is easily retrievable.

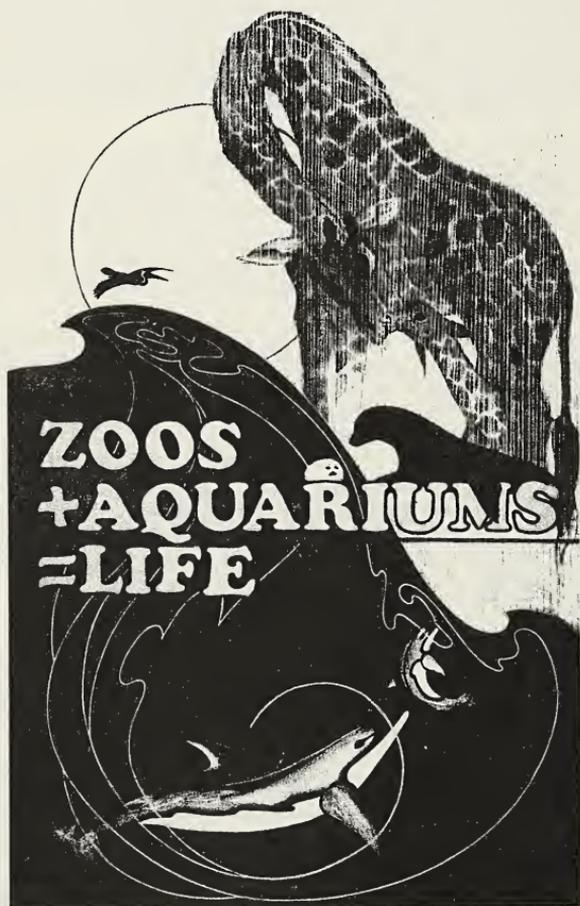
ZOO AND AQUARIUM MONTH PROCLAIMED FOR JUNE, Continued

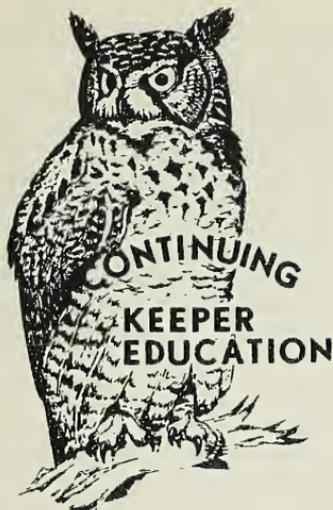
As AAZPA President Elvie Turner explains "it's clear that zoos and aquariums aren't just for kids anymore. Conserving the wildlife of the world is what today's zoos and aquariums must be about."

As the zoos and aquariums of America have joined forces in a collective Noah's Ark, it is important to remember that we, as members of the American Association of Zoo Keepers, contribute to this effort in a very meaningful way. After all, we are the crew.

Celebrate life this month at your zoo or aquarium. Help to make visitors aware of the important work being done by zoos and aquariums in the preservation of the world's wildlife and of the importance of providing a safe harbor in the next century for our collective ark.

---Excerpted in part from ZIP
(Zoo Idea Pack) from the
Friends of the National Zoo





The newly reorganized Library Resources Project will focus on making zookeepers aware of library resources and how to locate printed sources of information. The following is Part 2 of an article by Kay Kenyon, National Zoological Park Librarian. Part 1 of this article can be found on page 150 of the May 1985 issue of AKF. This article is reprinted here with the permission of the author and the Special Libraries Association from Special Libraries, Vol. No. 75 (no. 4): 329-334 (October 1984, ©) Copyright Special Libraries Association.

ZOO/AQUARIUM LIBRARIES: A Survey
Part 2

By
Kay A. Kenyon, Chief Librarian
Smithsonian Institution Libraries
National Zoological Park Library, Washington, D.C.

Access

The challenge to any library is to provide access to its collection. This is especially true of zoo libraries, yet many have not met this challenge. The lack of professional librarians is one of the main reasons for poor access.

Ten zoo libraries use the Library of Congress Classification System for all or part of their collections. Nine collections are catalogued under the Dewey Decimal System. Ten libraries have their own cataloguing systems. For example, the Oklahoma City Zoo Library uses a taxonomic system developed by the director, Lawrence Curtis, and is known as the "LC" System to catalogue its almost 5,000 volumes (6). The remaining zoo libraries have no system of cataloguing.

Another way to provide access is by indexing. Most of the serials in zoo libraries can be found indexed in such publications as *Wildlife Review*, *Key-Word-Index to Wildlife Research*, *Veterinary Bulletin* and on several online databases such as Zoological Record, BIOSIS and CAB Abstracts. However, some valuable material is not easily available to users. Many conference proceedings and most zoo/aquarium newsletters remain inaccessible for lack of indexing.

Location

As for most libraries, space is a major problem. When competing with other zoo departments for space, libraries often lose out. Recently, two zoo libraries had their space reduced. In one case, the library was cut and part of it became an office. In the other, the library was moved into a smaller location and its original space was used for exhibits. However, some zoos, such as the Des Moines Zoo and the National Aquarium at Baltimore, are planning larger spaces for their libraries.

Deciding on the best location for the zoo library can be a problem. A zoo can cover an area anywhere from 1 acre to 1,800 acres. Buildings are scattered throughout the park. The veterinary hospital may be at one end of the park, the administrative and education departments on the other end and the keeper areas in between. All have need of library services.

ZOO/AQUARIUM LIBRARIES: A SURVEY, *Continued*

In reality, however, most libraries have been placed wherever there is room. Some have been put in conference rooms, making them inaccessible when the room is being used for meetings. Many are in the education department, especially when the department manages them. Others are found in or near administrative offices. The Lincoln Park Zoo Library is tucked into the Primate House. The Washington Park Zoo has two libraries, one in education and one in research. Some of the larger zoo libraries, such as the one at San Diego, Baltimore, Detroit and Washington, D.C., have a central collection with satellite collections in various departments. At the National Zoo, these smaller collections are charged to an individual in that department on indefinite loan and can only be used as reference at that location.

Services

Zoo libraries provide a variety of services. Staff members are usually allowed to check out books. Less than half of the libraries allow volunteers and docents to borrow materials and those that do are generally managed by docents. If there is a librarian on duty, he or she will answer reference questions for the public, as well as for the staff. Some libraries request material from outside resources (especially from larger zoological library collections nearby) for their staff, but most libraries photocopy materials on request from other places. Libraries at the San Diego Zoo, the Bronx Zoo and the National Zoo circulate to their staffs a current awareness bulletin (photocopied pages of major journals received).

A few libraries are part of the computer age. The Calgary Zoo is putting its catalog on its zoo's microcomputer. The Baltimore Aquarium has access to computer literature searching from a nearby library. The zoo libraries at the San Diego Zoo, the Minnesota Zoo, the Bronx Zoo and the National Zoo have their own microcomputer or have access to a computer terminal to do bibliographic searches on DIALOG for their staffs. The National Zoo Library plans to install another terminal by August 1984 to give users online access to the Smithsonian Institution Libraries catalog. The circulation system will be online soon after.

Budget

At this time there is not enough information on budgets to come to any conclusions. Some libraries have money one year and none the next; many use budgets which are part of other departments, especially the education department; others rely entirely on donations.

Networking and Cooperation

Zoo librarians provide better service when they support each other through cooperation and networking. Many zoo librarians are not members of a special library group because they are not professional librarians. Some that are have found that their unique needs are not satisfied by existing library groups. To meet these needs, zoo librarians since 1980 have been meeting together annually at American Association of Zoological Parks and Aquariums (AAZPA) conferences as a special interest group. AAZPA represents almost every zoological park, aquarium, wildlife park and oceanarium in North America and most of their professional staffs. It is concerned with expanding their involvement in conservation, science and education and striving for higher levels of professionalism in the zoo world. (7)

The most important function of AAZPA is to provide a channel of communication among zoos and zoo librarians. It is essential that zoo librarians

ZOO/AQUARIUM LIBRARIES: A SURVEY, Continued

remain up to date on zoo goals, programs, research, and so forth, so that they can plan for the support of these endeavors. At the same time, zoo staffs need to be informed about what libraries are doing and what they are capable of doing for them.

Although AAZPA plays an important role in improving communication and cooperation, many zoo librarians have been unable to attend conferences. A newsletter, *Library News for Zoos and Aquariums* (8) has, therefore been produced three times a year since October 1982 by zoo librarians. Currently, the newsletter is sent to over 170 interested persons (librarians, educators, curators, veterinarians, zoo directors, AAZPA Board Members) in the United States, Canada and abroad. It has become invaluable as a means of communication between librarians and zoo staffs and especially between zoo librarians. The newsletter has encouraged its readers to "discover" each other--to share information, problems, experiences and ideas. Hopefully, by cooperating with each other we can improve our service to our users.

Future Trends

Zoo/aquarium librarianship is a new, developing field of special libraries in North America. The changing goals of zoos into areas of recreation, education, research and conservation have brought about an increased need for organizing zoological materials and providing informational services. One of the many challenges that face zoo librarians is to make zoos aware that by supporting their libraries, they are helping themselves and ultimately improving their zoos. There is a trend toward more trained librarians in zoos, and, hopefully, this will continue, especially for zoos seriously involved in research and conservation. Most collections of zoo libraries are small and need to be developed. This is especially true of serials collection. Access to collections, space, and money will continue to challenge zoo librarians. It is hoped that more libraries in the future will have access to computers to provide needed bibliographic information. The most important goal of zoo librarians today is to continue to increase networking. Sharing information and ideas is extremely important in helping zoos establish new libraries and improving existing ones in order to provide the best possible services to users.

Acknowledgements

The author would like to thank Cora Yockers and Sharon Barry for their review of the first draft, and to thank all the zoo/aquarium librarians for the information and support they provided.

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NWRA Announces Grants and Awards Program

The Awards and Grants Committee of the National Wildlife Rehabilitation Association would like to announce its small grants program. Funding is available to support a single \$1000.00 project or several smaller projects that add up to \$1000.00 for a project in the field of wildlife rehabilitation.

Applicants must demonstrate financial need, and submit a typewritten proposal which includes name(s) and resume of personnel involved, objectives of the project, a brief statement of literature reviewed, a brief description of how the work will be carried out, and an itemized budget. An annual report on progress will be required.

The committee has also established two awards as follows:

Lifetime Achievement Award - This would go to an individual whose primary identification is that of a wildlife rehabilitator who has contributed to the field in a major way for many years. The awardee will receive a plaque, \$100.00 and free conference registration. The award will be presented at the NWRA conference.

Significant Achievement Award - This would be to a person who has contributed something of significant merit to the field of wildlife rehabilitation within the last 2 years. Contribution can be a research finding, publication, organization of a program, etc., as long as the major theme is that of wildlife rehabilitation. The awardee would receive the same benefits as for the Lifetime Achievement Award.

The deadline for the submission of proposals and award nominees is December 1, 1985. Suggestions of individuals who might be appropriate awardees and proposals for grants should be submitted to:

Dr. Daniel R. Ludwig
Willowbrook Wildlife Haven
Forest Preserve District of DuPage County
P.O. Box 2339
Glen Ellyn, IL 60138
(312) 790-4913, Ext. 283



Viewpoint

NATIONAL CONFERENCE COSTS

Submitted by the Atlanta Zoo Chapter of AAZK

We at the Atlanta Zoo Chapter of AAZK are concerned about the rising costs of attending National AAZK Conferences. Many keeper, unfortunately, are being "priced out" of the conference scene.

Delegates to the 1983 Conference in Philadelphia voted to accept the bid of Miami to host the 1985 Conference. At that time there were two hotels under consideration as conference sites. The Conference Committee subsequently chose a site they considered to be the only safe lodging in Miami, considered by some a very dangerous city.

Our lodging this year will be at the Coconut Grove Hotel, where special conference rates will run \$75 per night. The conference is five nights long; to this add travel (especially for those traveling cross-country) and other expenses, and the total cost could easily be over \$1,000.

If Philadelphia delegates, as well as the rest of the AAZK membership, had been fully informed during the bid presentation as to the high crime rate and subsequently inflated prices of the site, perhaps a different location would have been chosen.

How do you feel? Would you like to see more reasonably priced national conferences in the future? We of the Atlanta Zoo Chapter of AAZK have prepared some suggested guidelines for future conference hosts, and the AAZK Board of Directors to consider.

1. All bids must appear in the AKF, so that the entire membership, and not just those attending a particular conference, is able to vote. All voting must be done via AKF so that the entire membership has access to the decision making process. Only in this way will the whole membership be fairly represented.
2. Bidding Chapters must prepare a list of projected expenses during their presentation. This should include: current and projected rates at the hotels under consideration, food prices at these hotels as well as price and convenience of other nearby eating establishments. In this way problems faced last year (and this year) will be avoided. For instance, members at last year's conference had to walk several blocks (in the cold) to find affordable meals, the fare served at the hotel being too expensive for some delegates. Also, there was a steep hotel tax about which many delegates had not been informed.
3. Accommodations should be chosen for convenience, safety, and affordability. Frills are a bonus, but not at the expense of limiting keeper participation. Remember that a conference schedule is very full and there is little time to enjoy costly luxuries such as a heated, olympic-sized swimming pool and aerobics classes.
4. Bidding Chapters should make an honest presentation of the problems inherent in their cities, before the vote is taken, so that members may vote in an intelligent, enlightened manner, weighing all factors.

VIEWPOINT, Continued

5. Alternative lodging and dining areas should be made available ahead of time, including KAL, campgrounds, and nearby facilities of varying price ranges. Hosts should give as many keepers as possible the chance to participate.

If AAZK strives to cater to the 'whole keeper', this must include the financial ability to attend national functions. This has to include making national conferences universally accessible to all members in the future. Your input is vital. AAZK needs to know the financial limits of its members. Only in this way can the needs of the entire membership be met in the future.

NATIONAL CONFERENCE COSTS - A RESPONSE

Submitted by the South Florida Chapter of AAZK

In response to the concerns expressed by the Atlanta Zoo AAZK Chapter, the South Florida AAZK Chapter would like to make the following points.

As keepers, we too are aware of the financial restrictions and consequently have tried to select a conference site which took into consideration both cost and location. Location included safety, accessibility to other Florida attractions, and over all a place that would provide an interesting and exciting representation of our city.

Miami, unfortunately, has been given a bad reputation which for the most part is untrue. Miami, like most large cities, has a crime rate and undesirable areas but not any more so or presenting any more of a danger to its residents than any other large city. The South Florida Chapter has taken this issue into consideration and chose our conference site accordingly.

The Coconut Grove Hotel worked with our Chapter by first lowering its rates by over 30% and even extended this lower rate until Saturday, October 26th check-out time. This is to enable delegates who wish to attend the post-conference trip to the Everglades (or any other nearby Florida attraction) to do so without searching for another place to stay. In calculating costs, we feel that there are many ways for delegates to reduce their expenses considerably. We realize that the cost of transportation will vary for many delegates depending on what mode they use and from where their trip originates. Researching low air fares, bus fares, train fares, and arranging car pools can help tremendously. Delegates can reduce hotel costs in half by just sharing rooms.

The advantages for delegates to lodge at the Conference site should be considered before alternative lodging is chosen. If too many delegates divide their lodging at different locations, it would be nearly impossible to acquire proper conference accommodations (i.e. banquet rooms, lecture rooms, etc..) at a reduced price. One is able to get a 'good deal' when a large number of people are promised at one location. Also the problem of transporting all delegates to one meeting place would be encountered. However, for those who are interested, the South Florida Chapter has an active KAL (Keeper Accommodation List), This alternative does have its limitations though, for there are not enough KAL participants to handle our entire conference. Yet, should anyone need information on our KAL, camping, or any other facilities we are more than happy to answer inquiries.

VIEWPOINT, Continued

Although many people do not think of this, most of a delegate's expenses can be deducted at the end of the year on their income tax return. In this manner one can recover most, if not all, money spent. Thus a conference does not have to cost an excessive amount and most people can attend if they just properly plan ahead.

The suggested guidelines for future conference hosts may sound reasonable on paper, but it is apparent that the hardships and problems encountered in planning a conference was not taken into consideration. The idea of bidding through the AKF is unsound for the time it would take to enable the entire membership to vote would be extremely lengthy. Also, it is most likely that only a portion of the membership would vote and then the whole membership would not be totally represented. This, in part, is why the Board of Directors attend board meetings at conferences and listen to Chapter bids in order to select the next year's conference site. If anyone has questions or comments on these proceedings they should attend these meetings or notify one of the Board Members so that the comments or issue in question can be discussed at the meeting. One of the issues brought before the Board of Directors by a bidding Chapter is projected expenses and we brought ours up at 1983's Conference Board meeting.

One extremely valid point brought up by the Atlanta Zoo Chapter is that we all must work together to make changes for the better where conference planning is concerned (as well as other issues). We hope that the creation of a 'Conference Guidelines' manual can be accomplished soon in order to help conference hosts in their planning. AAZK can be a very uniting factor to all professional zoo keepers and we urge all Chapters to plan fundraising activities to support your fellow zoo keepers in attending conferences. A National AAZK Conference provides not only an exciting time for everyone, but a very special way for keepers to unite, exchange ideas, and further their own education.



The Tucson AAZK Chapter is still planning to produce a 1986 Zoo-related calendar and wishes to solicit photographs from the membership and the public for this project.

The photographs must be horizontal format, 8 x 10 inch color prints of zoo animals or zoo activities. Photo entry fee is \$5.00 per photo, non-refundable. Photos will not be returned unless requested and accompanied by a self-addressed, stamped envelope. Selected photos will be accompanied by a short biographical sketch of the photographer, so please include pertinent data. Deadline for photographs is 31 July 1985.

We request from Chapters or members other information to include on the calendar such as: date of formation of your zoo, first captive births or hatchings, formation date of your chapter and dates of upcoming events, etc. Deadline for date of zoo facts is 30 June 1985.

Photographs and/or zoo facts should be sent to:

Arizona-Sonora Desert Museum
Attn: Kerry Hoffman
Route 9, Box 900
Tucson, AZ 85743



GETTING YOUR BOARD OF DIRECTORS
TO WORK WITH YOU

By
Anne Wiggins, Mammal Keeper
Jacksonville Zoo, Jacksonville, FL

This past December the Jacksonville Zoo tried something a little different in the way of improving Keeper/Board member relations. The Animal Department invited the members of the Jacksonville Zoological Society Board of Directors to spend a day with a keeper and work in the zoo as a keeper would. They were taken around the zoo in the area of their choice to see what is involved in running the zoo on the keeper level. It turned out very well and we hope to continue it on a regular basis.

As this was the first time this had been tried, some skepticism was noted but that did not discourage the plans for a day to be enjoyed by all. After receiving approval from the administration, a letter of invitation was sent to all board members. It was simply stated and included a date by which to respond, the different areas of the zoo and the animals they contain, a specific contact person, an itinerary for the day (our daily work routine), the fact that breakfast and lunch would be provided by the zoo, and a form they could fill out and return.

Five board members responded that they would attend and since this was a trial run, it seemed like a pretty good response. After the response date had passed and it appeared that all the letters were in, a list of those who had responded and which area they had picked was presented to the administration along with a menu plan and the amount of money needed to purchase the groceries. After all this was approved and the last minute phone calls were made confirming attendance, the Jacksonville Zoo was finally ready for its first "Board Day".

As it turned out the date chosen was the coldest day of the year so far. But, wrapped up in their warmest clothes, the board members assembled in the break room at 7:30 a.m. for a much needed cup of coffee, orange juice, blueberry muffins and a general getting to know each other session. The first order of business was getting everyone fitted with rubber boots and making sure everyone had gloves. After this was accomplished, we started out at 8:00 a.m. with each board member heading out to the area they had picked with their keeper/partner for the day.

While different keepers usually take different lunch hours, we had arranged lunch time so that we could all eat together. The menu, including barbequed chicken and all the trimmings, had been prepared the night before. It was something like a slumber party with the board members each wanting to tell what they had seen and done. It was interesting to listen to. This time also gave keepers and board members a chance to share ideas they had had that morning.

As some board members had picked two areas in which they wanted to work, we used this time to regroup anyone who wanted to change locations. Some asked to change just for a few hours in order to experience another area. One future consideration that came up was to have a half day for those who wanted to work for only that time. The afternoon was just as much fun as the morning and by quitting time, no one wanted to go home.

This experience was a very interesting one and fun for all involved. For

those zoos run by zoological societies, this experience enables those who make the major decisions about the zoo to see how things are run at the keeper level. It also gives them a close-up look at the zoo and the animals in it. It was a time for idea sharing and future plans and hopes about the zoo were discussed. We did not use this time to air our complaints or voice any bad feelings about the zoo. That was not what it was for. Our zoo, like any, does have its bad points and the board members could see them. During this day they observed some of our problems and I'm sure got a few things pointed out to them. But, most of all, it was done for fun and it was fun. If your zoo is not run by a society, ask members of your city council to come out for the day. It will be good experience for everyone. Have fun!



ZOO News From Japan

*Submitted by Yoshi. Yonetani
ZooDel/ Zoo Design and Education Lab
Kobe, Japan*

JAPANESE ZOOS RECEIVE AUSTRALIAN SPECIES FOR EXHIBITION

Last October 26th, six male koalas arrived in Japan. The group was comprised of one subspecies from the state of New South Wales which were sent to Tama Zoological Park, Tokyo and Higashiyama Zoological and Botanical Garden; and another subspecies from the state of Queensland for the Hirakawa Zoological Park, Kagoshima. The first subspecies is the same as found at the San Diego Zoo while the second marks the first export of this species outside its native country. Two males were distributed at each of the three locations.

If all goes well with the male koalas at these institutions and pre-set conditions for their captivity are met, it has been pre-arranged that female koalas will join the males later this year. Both Tokyo and Nagoya received their koalas from the Taronga Zoo, Sydney, and the koalas now at Kagoshima came from the Lone Pine Koala Sanctuary, Brisbane. The Tama Zoo's koalas are two and three years old; the Nagoya Zoo's are three and four years of age; and a two and four year old reside at the Kagoshima Zoo.

Moreover, since this fall season, two other groups (2.4 for one place) maybe sent to Yokohama-city and Saitama-prefecture. Osaka municipal Tennoji Zoo is also a candidate for a koala exchange with their sister city of Melbourne. These animals will probably be from Victoria and thus all subspecies of koalas will be represented in Japanese zoos.

Also in October, the Osaka Zoo received two pair of Tasmanian devils, these being the first of their species to come to Japan. Besides them, several other rare Australian marsupial have also come to Japan. Namely, 2.3 Southern short-nosed bandicoots, 2.3 Queensland ring-tails, 4.6 Sugar gliders, and 4 Potoroos (1.3 plus 1 baby born this year). Within this business year, Australian native cats and Brush-tailed possums will be sent out and the Australian wombat is holding on the export-list for the zoo collection. Except for the possum and wombat, the others will be the first to be exhibited in Japanese zoos.



Book Review



How to Attract the Wombat
By Will Cuppy
University of Chicago Press,
Chicago and London, 1983
159 pages

Review by Karin S. Newman
Milwaukee, WI

Will Cuppy takes a humorous look at the animal kingdom in his book How to Attract the Wombat. The book is made up of short essays on an odd array of animals from various groups in the phylogenetic scale. Each brief excerpt has biological information on that particular animal written in such a way as to entertain as well as to inform the reader.

The cast of mammalian characters includes "Mammals for Beginners" (small mammals), "Advanced Mammals" (larger mammals such as the llama, the yak and the Giant Anteater), and "Problem Mammals" (those curious marsupials). Amphibians are featured in "Pleasures of Pond Life". The Mollusk family is well represented in "Octopusses and Those Other Things". This chapter even includes some little known fanciful facts about Sea Serpents.

Preceding the insect chapters is some important information on "How to Swat a Fly". Presented as Ten Easy Lessons, the author has released his notes on fly-swatting, compiled from many years of experience at his Long Island beach cottage. "Birds Who Can't Even Fly" and "Birds Who Can't Sing and Know It" introduce representative avian species.

Most of the information in the book is presented to tickle the funny bone and those that know something about animals may appreciate the humor more than those that do not. Although the information is generally correct, there are some notable errors. For example, Mr. Cuppy classifies rabbits as rodents. One must remember that this book was written in 1935 when this designation may have been considered correct. Current research on behavior and social structure in the various species mentioned may also prove other points invalid. All the same, the book is very entertaining. Although you may not learn how to attract the wombat, you will enjoy Will Cuppy's view of the animal kingdom.

(Editor's Note: After a lapse of many months without book reviews, the AKF staff hopes to rejuvenate this column. If you have a book you would like to see reviewed or would like to review a book, contact Book Review Coordinator Diane Forsyth at the Akron Zoo, 500 Edgewood Ave., Akron, OH 44307.)





This is the T-shirt design for the upcoming 11th Annual AAZK National Conference, hosted by the South Florida AAZK Chapter. The design will be in full color. More information on prices, T-shirt colors, and sizes will be available in the July AKF.

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

NUTRITIONAL DISORDERS
(continued)

In Part 11 of this series, I discussed vitamin A deficiency and toxicity, thiamine (B1), biotin, vitamin C (ascorbic acid), and vitamin E (steatitis) deficiencies. In continuance, I shall summarize several additional commonly occurring nutritional problems.

Symptoms of vitamin D and calcium deficiencies include painful joints, loss of appetite, loosening or loss of teeth, crossed eyes, cataracts, bone deformities and fractures, and in chelonians, mishapen, soft and/or pliable shells. Ideally, a diet should contain a ratio of calcium to phosphorus of 1:1 to 2:1. Monotypic diets such as skeletal muscle meat, visceral organs, many vegetables, mealworms, and crickets are low in calcium and high in phosphorus: Table 1 lists reported calcium to phosphorus ratios (reprinted from Jackson and Cooper, 1981). Treatment of these deficiencies consists of short periods of ultraviolet light (Part 3, Table I), dietary vitamins C and D, bone meal supplement, or crushed egg shells. For aquatic species, cuttlebone or plaster of Paris blocks can be dropped into the water.

Mealworms and crickets fed to insectivores should be shaken in bone meal powder prior to feeding. Those raising their own mealworms will be able to provide a more nutritious diet for their reptiles if they add equal parts of ground monkey chow or ground, dried dog food to the bran or oatmeal medium. This should also be fortified with a multivitamin powder.

While it is essential that the reptile keeper relate the importance of vitamins to the inquiring novice, of equal importance is helping the novice understand that "more" is not necessarily "better". For example, vitamin D can be toxic, like all fat-soluble vitamins. Vitamin D toxicity has been reported by Wallach (1966) in the common iguana (*Iguana iguana*). Clinical signs may be loss of appetite and lameness. Prevention requires avoidance of excessive supplementation of dietary vitamin D or prolonged exposure to ultraviolet light.

Vitamin K deficiency primarily affects crocodylians. Frye (1981) reported that this deficiency may be manifested by bleeding of the gums as deciduous teeth are shed. Occasionally, the crocodylian diet should be supplemented with synthetic vitamin K. Where clinical signs of deficiency are apparent, a veterinarian should treat the animal with parenteral vitamin K.

Some reptiles such as herbivorous lizards and chelonians may inhabit ecosystems rich in iodine. It seems reasonable that such animals may suffer iodine deficiencies in captivity. Iodine deficiency may cause an inactive and swollen thyroid gland (goiter with hypothyroidism). In addition to a natural requirement for iodine, Wallach (1969) reported that captive animals fed monotypically iodine deficient (goitrogenic) vegetables will suffer this

REPTILE CARE: Relating To The Inquiring Novice - Part 12, Continued

condition (Part 10, Table I). Some of these foods include cabbage, kale, Brussels sprouts, broccoli, soybean sprouts, lettuce and spinach. Symptoms of this deficiency are loss of appetite, abnormal drowsiness, and swelling of the subcutaneous tissues. Hypothyroidism can be prevented by dietary iodine supplement in the form of iodized salt at a ratio of 0.5 per cent of the total diet, and by providing a well-balanced diet by varying the types of green leafy vegetables. In severe cases, a veterinarian should administer sodium iodine orally or parenterally.

Chronically anorexic reptiles, or those fed an imbalanced diet, may exhibit symptoms of protein deficiency such as steady loss of weight and depletion of fat stores, resulting in skeletal protuberance. In addition to providing the deficient reptile access to its preferred temperature (Part 6, Table 1), the novice should immediately take their pet to a veterinarian who is experienced in reptile husbandry and medicine. Treatment should begin by balancing the reptile's electrolytes with parenteral 5% dextrose and 0.3% potassium at 4% of the animal's body weight for 4 days, followed by easily absorbed proteins, amino acids, and continued dextrose for 2 to 4 weeks. The reptile should then be physiologically ready for a rich diet designed for debilitated animals (Table 2, adapted from Frye, 1981) for 2 to 4 more weeks. It can be reasonably expected that the reluctant feeder will return to a normal dietary program after 6 to 8 weeks. At this time, the veterinarian may decide to release the improving animal to its owner.

All reptiles can suffer from gout (excess uric acid in the blood with uric acid salt deposits in the tissues). Clinical signs are seldom apparent in the visceral form, and the symptoms are common to many other diseases. They may include abnormal drowsiness, excessive hiding, dehydration, shedding problems, and swelling of the eyes. On the other hand, the arthritic form may be recognized clinically, as the reptile may suffer from swollen and painful joints. Cowan (1968) reported dehydration and metabolism of the body's own protein (endogenous protein metabolism) to be causes. Also, Cowan (1968) and Frye (1981) reported that high amounts of dietary (exogenous) protein may be responsible for gout in reptiles, but many experts disagree. Aminoglycoside antibiotics used in treating reptiles was reported by Bush (1978) to cause gout in these animals. Treatment consists of reversing the causes by rehydrating the animal, nutritionally restoring nitrogen balance, and the administration of parenteral vitamin A. Generally, aminoglycosides should be avoided as antibiotic therapy unless no other drug is indicated from sensitivity testing.

Obesity can be a continuing problem with captive reptiles. It may be difficult to decide on an amount of food that an inactive, captive animal may require. To properly judge the weight of a particular reptile, it is helpful to observe many animals of the same species. Captive reptiles expend very little energy to obtain food in captivity and will quickly become overweight if fed too often. Pet owners tend to overfeed their animals to see how large they will grow, or are unfamiliar with their pet's natural feeding habits.

It is suggested that keepers thoroughly review the subject of nutrition and nutritional disorders with their staff veterinarian. In doing so, zoo personnel will be able to provide the best possible nutritional care for their captives, and will be current on the subject when assisting the inquiring novice.

Table 1. Calcium to Phosphorus Ratios of Some Foods Fed to Reptiles

Item	Ca:P Ratio
Vegetables	
Broccoli tops	2.96:1
Carrots (boiled)	2.21:1
Cauliflower (boiled)	0.69:1
Cucumber	0.95:1
Lettuce	0.86:1
Tomato	0.62:1
Watercress	4.27:1
Fruits	
Apple	0.42:1
Banana	0.24:1
Cherries	0.95:1
Dates	1.06:1
Dried apricots	0.78:1
Grapes (white)	0.87:1
(black)	0.26:1
Melon (yellow)	1.59:1
Oranges	1.74:1
Pears	0.72:1
Raisins (dried)	1.85:1
Animal Products	
Beef liver	0.02:1
Muscle meat (beef)	0.06:1
(chicken)	0.06:1
(horse)	0.04:1

Table 1. (cont'd)

Item	Ca:P Ratio
Animal Products (cont'd)	
Locusts	0.13:1
Mealworms*	0.33:1
	0.07:1
Sardines	0.02:1

*Vary in Ca:P ratio according to the medium they are raised on

Table 2. Supplementary Diet for Debilitated/Anorexic Reptiles

Therapeutic	Manufacturer	Dose	Administration/Comments
Canned Dog Food		3 Parts	Administer orally, via stomach tube
Beaten Raw Egg		1 Part	Mix ingredients thoroughly
Nutrical, or	EVSCO	1 Part	Do not overdo this rich, unnatural diet; may cause enteric bacterial proliferation.
Pet Kalorie, or	Haver-Lockhart		
Convalescent Diet	Pedigree Pet Foods		
Water		1 Part	

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(Part 13 of this series will deal with Hygiene.)



Publications Available

Poisonous Snakes of the World - 220 ppgs, 1983 Reprint of 1968 Edition; #008-045-00009-7; Price: \$12.50.

This manual is intended to serve as a training aid and as an identification guide to the most widely distributed species of dangerous venomous snakes. Geographic distribution of all currently recognized species of venomous snakes is presented in tabular form. Information on habitat and biology of important snake species has been provided. First aid procedures in case of snakebite and suggestions for the definitive medical management of the snakebite victim are presented. There is also a table of world sources for antivenins.

Pocket Guide to Pest Management - 112 ppgs, 1983 Reprint of 1980 Edition; #008-045-00022-4; Price: \$5.00.

This Pocket Guide was prepared as a source of information for Armed Forces Pest Management personnel, military and civilian. Although intended primarily for certified professionals, this publication will also be useful to public works officers and installation engineers in their planning and programming functions. This guide suggests uses of chemicals and other integrated pest management (IPM) treatments for the control of disease vectors and economic pests affecting the establishment and personnel. The use of any registered pesticides in a manner inconsistent with labeling instructions is prohibited. Under the current law, penalties may be levied against a purchaser who misuses a pesticide.

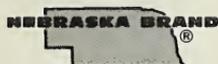
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Legislative News

U.S. DELEGATION REVIEWS INTERNATIONAL TRADE ISSUES AT CITES MEETING

Trade issues involving species as varied as Nile crocodiles, hooded seals, gyrfalcons, and green sea turtles were highlights of the fifth regular international meeting of member nations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which was held 22 April to 3 May in Buenos Aires, Argentina.

The U.S. delegation was made up of representatives from the Departments of Interior, State and Agriculture and the International Association of Fish and Wildlife Agencies.

Foremost among items that were scheduled to be discussed at the CITES meeting were proposals by Surinam, France, and the United Kingdom to change the trade status of certain captive-reared populations of green sea turtles. These proposals sought to transfer those populations of green sea turtles in Surinam, Europa and Tromelin Islands, and the Caymen Islands that qualify for a ranching exemption, from Appendix I to Appendix II of the CITES agreement. If this measure is approved, it would be the first step in the resumption of trade in green sea turtle products from ranching operations.

Among other proposals considered at the CITES meeting were requests to:

- *Change the trade status of populations of the Nile crocodile, proposed by Malawi and Mozambique by transferring those countries' populations from Appendix I to Appendix II;

- *Extend CITES status to the hooded seal, proposed by Sweden;

- *Increase protection of the North American population of gyrfalcon, proposed by Denmark and Norway.

CITES is an international agreement among 89 nations to regulate international trade in about 2,400 animal species and 30,000 plant species, in order to prevent their overexploitation. The U.S. joined CITES in 1975, at the time the treaty became effective.

---Dept. of Interior News Release

HOUSE HOLDS HEARING ON ENDANGERED SPECIES ACT REAUTHORIZATION

The House Fisheries, Wildlife Conservation and the Environment Subcommittee held a hearing on the Endangered Species Act on 14 March. The Act expires on 30 September and Subcommittee Chairman, John Breaux, and the Ranking Minority, Don Young, have introduced a bill to reauthorize the Act for three years.

The main topics discussed by the five panels of witnesses were western water problems, the establishment of a sea otter experimental population, the falcon exemption and the budget. The most noted witness was British naturalist David Attenborough who stressed the problems caused by the loss of particular kinds of environments. He asked that the U.S. spend more money on the protection of species stating that the U.S. serves as a world model for conservation and that presently the U.S. is perceived as "going backward on conservation, not forward."

The Colorado Water Congress testified on the conflicts between the administration of the Endangered Species Act and of water allocation and management systems of the states. They are working with the Secretary of the Interior to try to solve their problem.

Arguments for and against the establishment of an experimental population of sea otters off the California coast were presented by several witnesses. The opponents believe the conflicts between man and sea otters will increase with an additional population and that the population will not be easily contained. The proponents argue that another population is essential because the existing one is so vulnerable to oil spills.

The peregrine falcon exemption was discussed by a panel consisting of the Audubon Society, the Peregrine Fund, the North American Falconers Association (NAFA) and the Fish and Wildlife Service. Audubon proposes the repeal of the special exemption which allows interstate transport and sale of peregrines that were held in captivity on 10 November 1978 or are the progeny of such birds. They testified that the exemption has provided the opportunity for the creation of a large illegal interstate and international commerce in peregrine falcons. NAFA and the Peregrine Fund contend that there has been insufficient time to test the exemption. Although the exemption has been a part of the Act since 1978, regulations were not issued until 1984. They also argue that the exemption has not been abused.

Michael Bean, Environmental Defense Fund, testifying on behalf of ten environmental/animal welfare organizations stated that the "Act is failing to meet its objectives." He suggested that (1) the budget for the Act's implementation be increased at least two-fold; (2) that Candidate species (species that have been formally identified by FWS for future listing) need interim protection during the lengthy listing process; and (3) that the present prohibition from "taking" listed plants on federal lands be extended to include non-federal lands, unless the landowner has given express consent for the "taking".

Subcommittee mark-up of the bill was scheduled for 2 May with full Merchant Marine and Fisheries Committee mark-up scheduled for 8 May.

---AAZPA Newsletter, May 1985

CALIFORNIA CONDOR SUFFERS FURTHER SETBACK

Recent observations of the critically endangered California condor indicate a drop in the number of breeding pairs remaining in the wild. Nesting activity should have begun several months ago, and biologists at the Condor Research Center in Ventura, CA have observed only single adult condors in the territories of three pairs that nested in 1984. At a fourth territory, one member of the breeding pair is missing, but its mate has apparently formed a new pair bond with another bird. These birds were observed copulating early in the breeding season, but in recent weeks only the male has been seen. At the fifth site, the breeding pair has produced two eggs so far this season. Both eggs were collected for artificial incubation to supplement the captive population. One embryo died, but the other egg hatched on 11 April.

On 9 April, a severely emaciated, barely alive male (which was not one of the missing breeding birds) was found by a rancher and turned over to the Condor Research Center biologists. Unfortunately, it quickly died. The bird showed no external signs of trauma and there was no lead in its gizzard. Tissue samples have been submitted to various laboratories for analysis to see if there were any diseases or toxic substances present that would have caused the bird's death.

LEGISLATIVE NEWS, Continued

Biologists are concerned that the missing birds, which may number as many as six, reduce the wild population to as few as nine birds. A final count of the 1985 population will be made in September when distinct feather patterns are apparent, allowing biologists to identify individual birds.

Only one of the four missing breeding condors had been fitted with a radio transmitter, and it is not sending a signal. Given the vastness of the condor's range, this lack of tracking ability will make it difficult for researchers to locate the carcasses (if in fact the missing birds have died) and to determine the cause of death.

The California Condor Recovery Team - made up of Federal, State and private biologists - is reviewing the condor's current status, and will recommend whether or not the planned recovery effort for this great bird needs modification.

The captive population numbers 17 condors, all but one of them (Topo Topa) too young for breeding. Biologists hope that this population will eventually produce offspring that can be introduced into the wild.

---Endangered Species Technical Bulletin
Vol. X, No. 4, 1985



The Evolution of National Wildlife Law by Michael Bean of the Environmental Defense Fund has been reissued in a revised and expanded version. It covers wildlife law from its beginnings to the present day, examines the conflict between federal and state control, and discusses recent legislative programs for the protection of wildlife. First published in 1977 by the Council on Environmental Quality to wide acclaim, this updated version will be greeted no less warmly. It can be ordered from: Praeger Press, 521 Fifth Avenue, New York, NY 10017. The price is \$12.95 paperbound and \$39.95 clothbound.

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Candy Croft, Rio Grande Zoo	- TX,NM,CO,OK,KS,NE,SD,ND
Laurence Gledhill, Woodland Park Zoo	- WA,OR,ID,MT,WY,AK
Joanie Stinson, Phoenix Zoo	- CA,NV,AZ,UT,HI
Vacancy	- Canada



SNAKES DON'T EAT HAMBURGER!



By
Ken Kawata, General Curator
Milwaukee County Zoo
Milwaukee, WI

Snake feeding at some zoos has long been an act performed behind closed doors. The public is turned away on designated feeding days or for certain periods of those days, being allowed no access to reptile buildings. The reason behind this may be that many people would find the consumption of rodents, the mainstay of snake food in zoos, offensive. Or, perhaps, some zoo officials think that the people's banging on the glass partitions would stress "finicky eaters".

In the spring of 1983, the reptile keepers at the Milwaukee County Zoo suggested that the Aquarium/Reptile Building be kept open on Monday afternoons, the period set aside for snake feeding, during which the entire building had been routinely closed. "We believe that the time has come to open those closed doors and allow the light of knowledge in," they said.

This statement was supported by a new trend in Milwaukee. Increasingly, keepers have participated in public relations and public education activities. Keepers conduct elephant and camel demonstrations and reptile talks. Moreover, while caring for elephants, disciplinary actions are forcefully enforced if animals disobey keepers, in front of the public. There is a small amount of risk involved in this; we have received adverse publicity and angry comments from irate zoo patrons. Disciplinary actions, however, are a necessary part of our elephant management program. Instead of hiding our actions, both staff and volunteers try to establish dialogue with the public, to present a realistic view of the zoo operation. In this respect, there is no sense hiding the fact that snakes eat rodents.

Nevertheless, public snake feeding was a new concept to us. It was decided first that a group of students be invited during snake feeding to test their reactions. On 31 October, 1983, Mr. Phillip Hosler, a science teacher at Bay View High School, brought in a vertebrate zoology class to the building as part of their field trip. They were seniors of about 17-18 years of age from urban areas of Milwaukee. After the building was closed, keepers briefed the class on the feeding procedure. From the public area, students watched as mice and rats were being tossed into snake cages. Students were then asked to submit written comments.

This "experiment" proved to be quite interesting and rewarding. Of the 33 students, eight of them expressed varied degree of disappointment because it "was not what I had expected...I had expected it to be exciting, but it was a very calm process." Concerning the new experience itself, they commented:

---I found myself very interested in the reactions of the different snakes being fed. Seeing the feeding was...nowhere near as gruesome as I had pictured.

---A lot of people would think not to watch a reptile feeding because they would find it to be gross. But this isn't true, no blood is shed and it happens in a quick manner.

SNAKES DON'T EAT HAMBURGER!, *Continued*

----It really was very educational.

Should the public be allowed to watch snake feedings? The opinions were sharply divided:

- They would probably complain to the zoo management for letting their little kids see it.
- Some people may have very weak stomachs and may not be able to witness the eating of a fly by a frog.
- Some people would be frightened, and thus frighten the animals.

Although some did not think that the general public was ready for it, other suggested that the staff "keep the program".

- I think most people would like to see the feeding of reptiles.
- I really wish that the reptile feeding was open to the public.
- The zoo should start a new policy and let the public enjoy this amazing demonstration.

Admittedly, this "experiment" could not represent the reaction of the general public. Not only was it based on a small sample size with biased age and geographical distributions, but also it was a well-prepared, informed and supervised group of people, interested in biology. Still, the group's input was encouraging: 12 were in favor of opening the doors (three of them recommended some type of pre-education), six were against, one undecided and four had no opinion.

After more discussions, we elected to make preparatory steps toward "opening the doors". We summoned assistance from members of Zoo Pride, our volunteer organization, to communicate with the public and monitor their reactions. These volunteers were given training sessions by keepers to become thoroughly familiar with the subject. Additionally, keepers not directly involved in feeding were to be on the public floor. It was also decided that only certain select animals, showing willingness to feed in front of people, would be used (the rest would be fed in the rear service area), and that no live rodents would be fed.

On 4 June, 1984, for the first time in the history of the building (which was opened in 1968), the Aquarium/Reptile Building was kept open during snake feeding.

Judging from the comments by staff, volunteers and my sporadic observations, the public's response was overwhelmingly positive, which was indeed a pleasant surprise. Occasionally we saw a few people who seemed disturbed, but they just walked away with no really bad reactions. At least the visitors were given the option of staying or leaving the building. The only exception thus far was a negative letter from a visitor: "Much to our surprise, one of the King Cobras was being eaten by the other". We use Eastern Diamondback Rattlesnakes as feed snakes. In spite of the differences between the two species and the label which states that the diet consists of other snakes, the gentlemen mistook it for cannibalism.

At the end of the summer, Zoo Pride volunteers summarized their observations. A few excerpts:

- People with small children showed a lot of interest in having them watch the feeding.

---A few who initially did not care to observe, after hearing about the program, did so and were apparently glad they did.
---Children and adults alike were genuinely interested, no negative reaction. Comments heard: Interesting, educational, fascinating.
---Excellent response. People were very interested and asked many questions.

Public snake feedings have become a part of the routine in the building. Programs like this will undoubtedly further the cause of realistic animal information dissemination to the public. After all, we should not give the impression that zoo snakes eat hamburger!



Information Please

The Aviculture Department of the National Aquarium in Baltimore is seeking information on avian stroke victims and rehabilitation techniques. We would appreciate any data concerning this. Send to: Rita J. Johnson, National Aquarium in Baltimore, Pier 3 / 501 East Pratt St., Baltimore, MD 21202 or call (301) 576-3800, ext. 3747.

I am conducting research on the natural history of hutian, specifically the Jamaican hutia (*Geocapromys b. brownii*), the Bahamian hutia (*Geocapromys i. ingrahami*), the Cuban hutia (*Capromys pilorides*) and the Haitian hutia (*Plagiadontia aedium*). I need information from any zoos or other institutions currently housing the remarkable rodents, including diet, housing, where the animals were obtained from, etc. Any information will be appreciated. Please send information to Brenda Brochstein, 3420 Pine Meadow Rd., Atlanta, GA 30327.

In January-February of 1986, I am planning to visit some American zoos. With the limited time available, I can only visit a fraction of the zoological establishments currently open, so I would appreciate some help from AAZK members in selecting a fair cross-section.

I would be very grateful if members could send me a list of say 20 zoos that not only are representative of current American zoological practices, but also those that show the best in exhibit design, graphics, etc. My main interests are in Edentates, Small Mammals and Nocturnal House design and exhibit.

Please send suggestions to: Peter Merrett, Head Keeper, The Zoological Trust of Guernsey, La Villiaze, St. Andrew's, Guernsey, Channel Islands.



Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings of positions which become available close to deadline are accepted.

ANIMAL KEEPER/BIRD DEPT....each candidate must have graduated from an accredited high school and have one year of paid experience in the care and handling of a variety of birds, excluding pets; or have graduated from an accredited high school and have 6 months' experience in the care and handling of animals in a zoological institution; or have a bachelor's degree from an accredited college or university in biology, zoology, animal science or veterinary technology. Eligibility for a driver's license is required. This is an entry level position under the direct supervision of a Senior Keeper and/or Curator. Salary - \$13,314. All resumes to be sent to Fred Beall, Curator of Birds, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217. Deadline for applications is 1 July 1985.

ANIMAL KEEPER/ANIMAL HOSPITAL....each candidate must have graduated from an accredited high school and have one year paid experience in the care and handling of a variety of animals, excluding pets; or have graduated from an accredited high school and have 6 months' experience in the care and handling of animals in a zoological institution; or have a bachelor's degree from an accredited college or university in biology, zoology, animal science or veterinary technology. Eligibility for a driver's license is required. This is an entry level position under the direct supervision of the veterinarian or other senior staff. Salary - \$13,314. All resumes to be sent to: Dr. Michael Cranfield, Veterinarian, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217. Deadline for acceptance of applications is 31 July 1985.

PUBLIC RELATIONS ASSISTANT....individual should have strong copy writing skills, layout knowledge, special events planning experience necessary, and typing skills. Job will involve creative as well as clerical functions. All resumes to be sent to: Jill Paulson, Director of Public Relations, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217. Deadline for acceptance of applications is 1 July 1985.

ADVERTISING SALES....individual(s) sought to obtain paid classifieds for newsletter for animal professionals. 50% commission will be awarded. Please write: NEW METHODS, P.O. Box 22605, San Francisco, CA 94122.

WILDLIFE EDUCATION....the Wildlife Discovery Program (a Houston I.S.D. Magnet school) is taking applications for a position becoming available August 1985 and continuing until June 1986 (10 mos.) The duties of this position include planning and experiential instruction in an outside setting at the Houston Zoo to 3rd graders. Requirements are two or more of the following: 1) high school diploma (required), 2) education experience 3) wildlife biology background, 4) environmental/outdoor education experience. Please send inquiries to: Karyl Watz, Coordinator, Wildlife Discovery Program, Doris Miller Center, 5216 Feagan, Houston, TX 77007.

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AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

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|--|---|
| <input type="checkbox"/> \$20.00 Professional
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Directory Information : ZOO _____

Work Area _____ Special Interests _____

Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers.

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of Zoo Keepers
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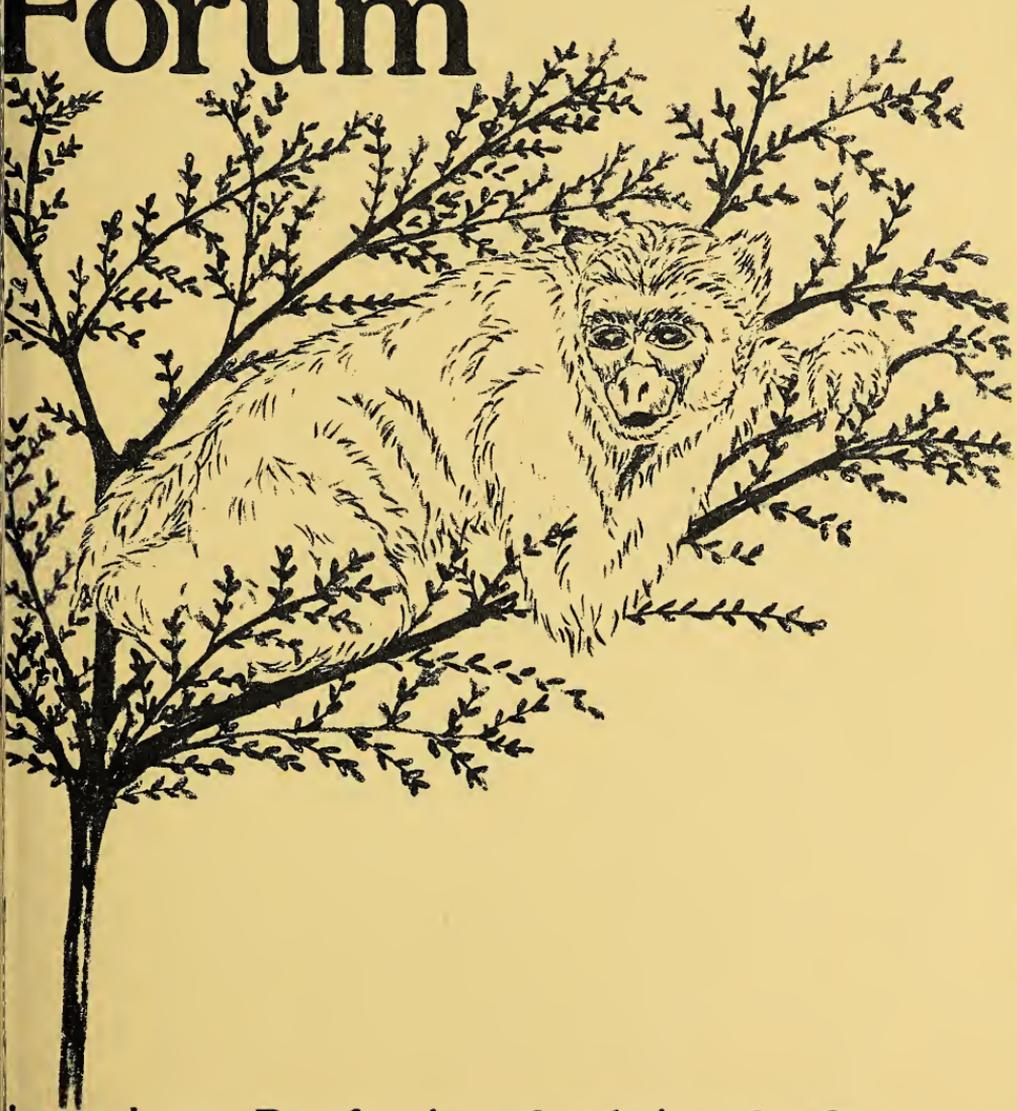
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JULY 1985

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Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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States East of Mississippi - Diane Krug, Riverbanks Zoo, Columbia, SC
States West of Mississippi - Debra Stetcher, Woodland Park Zoo, Seattle, WA

Individual Regional Coordinators and the states under their oversight are listed elsewhere in each issue of *Animal Keepers' Forum*.

This month's cover art is of a Muriqui or wooly spider monkey (Brachyteles arachnoides), the largest New World monkey and among the most endangered primates in the world. It is the most ape-like Neotropical primate species and is found only in the Atlantic forest region of southeastern Brazil. The species has never bred in captivity and presently there is only one captive individual in the world - in the San Paulo Zoo. It is believed there are only 200-250 Muriquis in seven small remanant forest areas in Brazil. The drawing is by Rose Palazzo of the Bronx Zoo. Thanks, Rose!

Scoops and Scuttlebutt

ELECTION REMINDER TO ALL PROFESSIONAL MEMBERS

All AAZK Professional members are reminded to send in your ballot for the election of new members of the AAZK Board of Directors to National Headquarters. Please return the pre-addressed envelope marked "Ballot" only - do not include any other correspondence to National in this envelope. Ballots and biographical sketches on the candidates will be mailed this month to all Professional members in good standing. Ballots must be post-marked no later than 31 August 1985.

ZOO/UNIVERSITY LIST AVAILABLE FROM NATIONAL HEADQUARTERS

The AAZK Keeper Education Committee has compiled a list of colleges and universities which offer courses and programs relevant to captive animal care. This list originally appeared in the April 1985 issue of AKF under the Continuing Keeper Education column. This list hopefully identifies some of the institutions at which individuals may either receive initial training for a career as a zoo keeper or can continue their education in their chosen profession. This list is now available from National Headquarters by sending a self-addressed, legal-size only envelope with 22¢ postage attached. If you are interested in obtaining a copy of this list or you receive questions from the public on this subject, please pass on the above information. List orders should be sent to: National Headquarters AAZK, 635 Gage Blvd., Topeka, KS 66606 Attention: Zoo/U List.

NEW AAZK ACCESSORIES AVAILABLE FROM ATLANTA AND SAN DIEGO CHAPTERS

Baseball caps, black with a white front and featuring the official AAZK logo are available from the Atlanta Chapter. The price per cap is \$6.75, which includes postage. Make checks payable to "Atlanta AAZK" and send along with your name and complete mailing address to: AAZK Baseball Caps, Atlanta AAZK Chapter, 800 Cherokee Avenue, S.E., Atlanta, GA 30315.

Solid brass belt buckles with the AAZK rhino logo are available through the San Diego Chapter. These high quality belt buckles are guaranteed for life by the manufacturer. Cost, including postage is \$15.00 each, prepaid. Make checks payable to "San Diego AAZK", and send to Debbie Hewitt, 3059 Bonita Mesa Rd., Bonita, CA 92002. Please include complete mailing address.

EUGENE MALINIAK RETIRES FROM NATIONAL ZOO

Eugene Maliniak, small mammal specialist, retired at the end of May after 35 years of service (over 20 years with the Department of Zoological Research) at the National Zoo. He specializes in the management and husbandry of exotic small mammals. His expertise and knowledge helped to establish captive colonies of such well-known zoo species as elephant shrews, tenrecs, rock caviés, acouchies, short bare-tailed opossum, degus, golden lion tamarins, tarsiers and many more. Eugene was voted the 1984 Keeper of the Year Award at National.

A REPORT FROM THE AAZPA WESTERN REGIONAL CONFERENCE IN ANCHORAGE, AK.

About 40 people attended this conference. Papers were given by various AAZK members. Wendy Wienker, Laurie Gledhill, Laurie Marker, Nancy Hollenbeck and Roger Hoppes are names we are all familiar with. Wendy Weinker reports that the atmosphere was very friendly and communication was open. The delegates visited the Alaska Zoo and went on a sightseeing tour that included near-blizzard conditions complete with being stuck in a snowbank. Some of the delegates went on a dog sled ride. Wendy would like to recommend more AAZK members attend AAZPA Regionals and give papers; it is a good way for keepers to participate in AAZPA. Next year, the AAZPA Western Regional will be held at the Pt. Defiance Zoo in Tacoma, WA - so plan to attend.

---Submitted by Debbera Stecher, Woodland Park Zoo

From The Newly Appointed RC Co-Cordinators

I would like to take this opportunity to thank the members of the AAZK Board for appointing me to the position of Head Regional Coordinator for the Western Region. I am looking forward to working with long-time members of AAZK and current R.C.s. Together Joanie Stinson, Laurie Gledhill, Candy Kroft and myself will work to enhance the R.C. program. The role of the R.C. is clearly defined as an out-reach position to acquire new members, to help keep existing members, and to act as liasion between Chapters and their administration. R.C.s also attend Regional AAZPA conferences to help spread the word of AAZK. In some cases workshops are held, in other cases talks are given and sometimes booths with AAZK information are set up.

If there is anyone interested in more information about the R.C. program or who is interested in getting more involved, don't hesitate to contact me: *Debbera Stecher, Head Regional Coordinator Western Region, Woodland Park Zoological Gardens, 5500 Phinney Ave. North, Seattle, WA 98103, (206) 625-5402 or (206) 745-9818.*

I would also like to thank the AAZK Board for appointing me to the position of Head Regional Coordinator for the Eastern Region. I will be contacting the R.C.s in the region soon and look forward to working together to produce new ideas for the R.C. program.

If anyone is interested in working with the program, please contact me. There is still a vacancy for an R.C. in New York. *Diane Krug, Regional Coordinator Eastern Region, Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210.*



Births & Hatchings

DALLAS ZOO.....*Tamara A. Jones*

May 1985 B&H include: Mammals - 4.1 Markhor, 1.1 Suni, 0.1 Sable antelope, 0.0.5 Giant Indian fruit bat, 0.0.1 Spider monkey, 0.0.1 Red kangaroo, 0.0.1 Bactrian camel; Birds - 0.0.2 Pied crow, 0.0.1 Abyssinian ground hornbill, 0.0.3 Spur-winged lapwing, 0.0.6 Fulvous whistling duck, 0.0.3 Red-vented bulbul, 0.0.5 Roseate spoonbill, 0.0.1 White-headed piping guan; Reptiles - 0.0.1 Philippine sail-fin lizard, 0.0.4 Surinam poison dart frog.

METRO TORONTO ZOO.....*Harry Hofauer*

Recent B&H in Toronto include: Mammals - 0.0.3 Wood bison, 1.0 Domestic yak, 1.0 Llama, 1.0 Alpaca, 4.5 Nubian ibex, 0.1 Mouflon, 6.2 Barbary sheep, 1.2 European reindeer, 1.0 Malayan tapir, 1.1.2 Bennett's wallaby, 1.0.4 Ring-tailed lemur, 0.0.1 Black lemur, 0.0.10 Common marmoset, 0.0.6 Slender-tailed meerkat, 2.2 Mara, 0.0.2 Plains rat, 0.2.6 Egyptian fruit bat, 1.0 Indian fruit bat; Birds - 0.0.11 South African yellow-billed duck, 0.0.2 Peach-faced lovebird, 0.0.2 South African ostrich, 0.0.2 Blackfooted penguin, 0.0.2 Tawny frogmouth; Reptiles - 1.0 Green tree python; Amphibians - 0.0.6 Green & black arrow poison frog; Invertebrates - 0.0.190 Brazilian giant cockroach.

SAN ANTONIO ZOO.....*Debi Reed*

B&H for May 1985 include: Mammals - 0.0.1 Grizzled-grey tree kangaroo, 0.0.1 Ruffed lemur (DNS), 0.0.1 White-handed gibbon, 0.1 Reeve's muntjac, 0.1 Beisa oryx, 1.2 Scimitar-horned oryx, 0.1 Topi, 0.1 Grant's gazelle (DNS), 1.1 Arabian sand gazelle (1.0 DNS), 1.0 Thompson's gazelle, 1.2 Springbok (1.0 DNS), 1.1 Kirk's dik-dik, 1.3 Aoudad (1.1 DNS), 1.0 Himalayan tahr; Birds - 0.0.2 Sacred ibis (1 DNS), 0.0.5 Scarlet ibis, 0.0.2 Crested screamer, 0.0.26 Red-billed whistling duck, 0.0.6 Whooper swan (2 DNS), 0.0.4 Bar-headed goose (1 DNS), 0.0.5 Orinoco goose, 0.0.2 Northern pintail, 0.0.17 Cinnamon teal, 0.0.6 Mandarin duck, 0.0.3 Hooded merganser, 0.0.11 North American wood duck, 0.0.8 Ruddy duck (4 DNS), 0.0.1 Roul-roul partridge (DNS), 0.0.11 Elliot's pheasant, 0.0.2 Green junglefowl, 0.0.2 Demoiselle crane, 0.0.1 Crested seriema, 0.0.2 Inca tern, 0.0.3 Diamond dove (2 DNS), 0.0.1 Painted conure, 0.0.3 Sun conure, 0.0.5 Burrowing owl (3 DNS), 0.0.1 Speckled mousebird (DNS), 1+ Jackson's hornbill (1st time in collection), 0.0.1 Toco toucan (DNS), 0.0.4 Dyhal thrush (DNS), 0.0.1 Picathartes, 0.0.2 Owl finch (DNS), 0.0.1 Diamond fire-tailed finch, 0.0.3 Red-billed buffalo weaver (2 DNS), 0.0.4 Rufous treepie; Reptiles - 0.0.1 Yellow-headed twistnecked turtle (1st time in collection), 0.0.2 Fan-footed gecko (possibly 1st time in North America), and 0.0.1 Pueblo milksnake; Aquarium - 1+ Pupfish, 15+ Seahorse and 0.0.4 Four-eyed fish.

PHILADELPHIA ZOO.....*B. Bahner*

May 1985 B&H include: Mammals - 1.- Echnida (DNS), 2 Acouchi, 0.1 Malayan tapir, 1.0 Barasingha, 1.1. Himalayan tahr (0.1 DNS); Birds - 6 Aleutian Canada goose, 2.4.4 Mandarin duck (4 DNS), 6 Hooded merganser (4 DNS), 3 Common white-eye (1 DNS), 2 North American ruddy duck, 1 Palawan peacock pheasant, 2 Red & white crake, 1 Victoria crowned pigeon, 2 Renauld's ground cuckoo (DNS), 4 Red-billed hornbill, 1 Green wood hoopoe, 2 Hooded pitta, 1 Orange-bellied euphoria (DNS), 1 Scarlet tanager, 2 Orange-breasted waxbill, 1 Blue-faced parrot finch, 1 Emerald starling; Other - 1 Prehensile-tailed skink.

BIRTHS AND HATCHINGS, Continued

WOODLAND PARK ZOOLOGICAL GARDENS.....Harmony Frazier-Taylor

B&H for April and May 1985 include: Mammals - 2.1 Sika, 4.2 Springbok, 1.2 Llama (1.0 DNS), 1.0 Welsh pony, 0.1 Cotswold sheep, 1.1 Alpine dairy goat, 2.1 Mountain goat, 0.1.1 Matchie's tree kangaroo (DNS), 0.0.1 Vampire bat, 0.0.1 Elephant shrew, 0.0.1 Walaroo, 0.0.3 Black-tailed prairie god, 0.0.1 Tree hyrax (DNS), 0.0.5 Domestic rabbit, 0.0.1 Ground Cuscus, 0.0.1 Greater galago, 0.0.1 Cotton-top tamarin (DNS), 0.0.1 Patas monkey, 0.0.1 Lion-tailed macaque, 0.1 Lowland gorilla (being raised by the mother within the troop. Binti is the mother and this is her first infant); Birds - 2 Silver-throated tanagers (DNS), 3 Golden tanagers (1 DNS), 1 Common trumpeter (DNS), 12 Hooded merganser (1 DNS), 7 Brazilian teal, 2 Black-necked swan, 1 Greater curassow, 1 Common goldeneye, 4 Small-billed tinamou (1 DNS), 6 Blue-winged teal, 4 Mandarin duck (1 DNS), 1 Snowy owl, 2.2 Bufflehead, 1.4 Cape Barren Geese (This was a first clutch for WPZ with 100% hatch and 100% survival over 30 days. They were parent-reared in an outdoor enclosure); Reptiles/Amphibians - 2 Redfoot tortoise, 3 Leopard gecko and 1 African fat-tailed gecko.

MILWAUKEE COUNTY ZOO.....Carol J. Boyd

May 1985 B&H include: Mammals - 1.0 Dall sheep, 0.2.1 Canada moose, 0.0.5 Meerkat, 1.0 Mandrill, 0.0.1 Tree shrew, 0.0.2 Mountain fruit bat, 2.1 Domestic goat, 1.0 Waterbuck, 1.0.1 Caribou, 0.0.1 Jaguar, 0.0.1 Shetland pony, 1.0 Impala; Birds - 0.0.9 Canada goose; Reptiles - 0.0.1 Indian cobra.

BROOKFIELD ZOO.....John S. Stoddard

B&H for May 1985 include: Mammals - 0.0.1 Mexican fruit bat, 1.0 Crab-eating monkey, 0.1 Guinea baboon, 0.0.2 Spiny mouse, 1.0.6 European harvest mouse, 0.1 Okapi, 5.3 Siberian ibex; Birds (fledged) - 0.0.1 Kookaburra, 0.1 Scarlet-crowned barbet, 0.0.1 Red-crested cardinal; Reptiles - 0.0.4 Poison arrow frog; Other - 0.0.13 Emperor scorpion.

DENVER ZOOLOGICAL GARDENS.....Ann Rademacher

B & H from 15 March to 31 May include: Mammals - 0.0.1 Ring-tailed lemur, 1.0 Black lemur, 0.0.2 Patagonian cavy, 0.1 Harbor seal, 0.1 Grant's zebra, 1.0 Przewalski's wild horse, 0.1 Hippopotamus, 1.0 Llama, 0.0.1 Reeve's muntjac (DNS), 2.1 Axis deer, 1.0 Pere David's deer (DNS), 5.0 Reindeer (1.0 DNS), 0.0.1 Nyala (DNS), 0.1 Eastern waterbuck, 4.3 Springbok (1.0 DNS), 2.1 Dall's sheep (0.1 DNS), 0.0.1 Golden-rumped agouti (DNS); Birds - 0.0.3 Double-wattled cassowary, 0.0.4 Emu, 0.0.4 Bar-headed goose, 0.0.2 Lesser snow goose, 0.0.3 Lesser snow goose (blue phase) (1 DNS), 0.0.5 Abyssinian blue-winged goose, 0.0.4 South African shelduck, 0.0.2 Mandarin duck (1 DNS), 0.0.2 Bufflehead (DNS), 0.0.8 Barrow's goldeneye (6 DNS), 0.0.6 Hooded merganser (1 DNS), 0.0.1 Roul-roul, 0.0.1 Himalayan impeyan pheasant (DNS), 0.0.3 East African crowned crane (1 DNS), 0.0.3 White-fronted crane (1 DNS), 0.0.3 African spur-winged plover (2 DNS), 0.0.6 Speckled mousebird (1 DNS), 0.0.2 Kookaburra (1 DNS), 0.0.2 Blue-crowned motmot, 0.0.3 Crested barbet (2 DNS), 0.0.1 D'arnard's barbet, 0.0.2 Fairy bluebird, 0.0.2 Black-headed gondek, 0.0.2 Yellow-billed cardinal, 0.0.3 Bali mynah (2 DNS), 0.0.2 Indian hill mynah.

LAFAYETTE ZOOLOGICAL PARK.....Gary D. Ochsenbein

Recent B&H include: 1 Columbian rainbow boa (DNS), 2 Black swan, 20 Emu, 3 Red-crested pochard, 1.1 Reeve's muntjac and 1.0 Black-handed spider monkey.

BIRTHS AND HATCHINGS, Continued

TOPEKA ZOO.....Bernie Feldman

From January to June 1985 the Keepers at the World Famous Topeka Zoo were both expecting and surprised by many of the animal births. It has been an exciting half year with new faces including: Sitatunga, Nene geese, two Reticulated giraffe (one born on Valentine's Day!), Darwin's rhea, Black and white colobus, White-handed gibbon, American golden eagle, North American porcupine, Burrowing owl, Blue-crowned pigeon, Degu, Giant Indian fruit bat, Dama wallaby, Rock hyrax, Brown-headed tamarin, Thick-tailed galago, African pygmy goat, Bar-headed geese and Trumpeter swan. In early June, we noted the birth of 1.1 Asian wild horses at the Zoo's Conservation and Propagation Center. These births bring to 10 the number of foals born since May 1980.

SAN DIEGO ZOO.....Jody Courtney

Selected B&H for April and May 1985 from both the San Diego Zoo and Wild Animal Park include: Mammals - 0.1 Bornean orangutan, 0.2 Przewalski's wild horse, 0.1 Jimela topi, 0.2 Addra gazelle, 2.3 Arabian oryx, 0.1 Masai klipspringer, 0.1 Forest buffalo, 1.1 Grevy's zebra, 0.1 Southern white rhinoceros, 1.0 Indian barasingha deer, 1.3 Addax, 1.0 Zulu suni, 0.1 Scimitar-horned oryx, 0.2 East African bongo, 0.2 Ugandan giraffe, 1.2 Nubian ibex, 1.6 Persian gazelle, 2.0 Red ruffed lemur, 0.0.1 Goeldi's monkey, 0.0.2 Brazilian jaguar, 1.0 North Chinese leopard, 1.1 North Chinese tiger, 2.0 Snow leopard, 4.0 Chinese water deer, 0.1 Alpine chamois, 0.1 Formosan sika deer, 3.3 Russian saiga; Birds - 0.0.19 Elliot's pheasant, 0.0.1 Malay argus pheasant, 0.0.1 Malayan crestless fireback pheasant, 0.0.6 Golden conure, 0.0.2 Blue and gold macaw, 0.0.3 Scarlet macaw, 0.0.2 Duyvenbode's lory, 0.0.2 Dusky lory, 0.0.2 Timneh grey parrot, 0.0.1 Toco toucan, 0.0.1 California condor, 0.1 Northern bald eagle, 0.0.1 Northern black vulture, 0.0.1 Brown-eared pheasant, 0.0.5 Himalayan monal, 0.0.3 Mikado pheasant, 0.0.3 Palawan pheasant, 0.0.13 Temminck's tragopan, 0.0.1 Citron-crested cockatoo, 0.0.3 Bali mynah, 0.0.2 Blue-crowned hanging parrot; Reptiles - 0.0.12 Common Indian cobra, 0.0.1 Maria Island lizard, 0.0.10 Cantil and 0.0.39 Tropical rattlesnake.

BABY'S NEW GENES.....from TIGERTALK National Zoo

Zoo efforts in captive breeding and careful keeper observation resulted in the most recent acquisition at the Monkey House - a lion-tailed macaque born 28 April 1985. The baby's mother, "Mom", is closely bonded to her current mate, "Gustav", who has sired 11 offspring in 26 years. Gustav's productivity prompted concern that he was flooding the gene pool of captive lion-tailed macaques, but keepers wanted to preserve his close relationship with Mom. They decided to try an experiment. First, Gustav was given a vasectomy in order to allow other males more opportunity for procreation. Then, on 31 October, when Mom was sexually receptive, she was moved to the cage of another male who had sired fewer babies. This enclosure was covered to block Gustav's view, and Mom successfully mated. Shortly thereafter, Mom was moved back with Gustav. The Monkey House staff waited in suspense through the female macaque's six-month pregnancy to see if Gustav would accept the baby as his own or attack it as the progeny of another male. So far, Gustav has been gentle with the newborn. And, thanks to the careful planning of the experiment, Mom and Gustav are still together and the baby bears new genes that should strengthen the lion-tailed macaque population.



Coming Events

THE FOURTH INTERNATIONAL OTTER SYMPOSIUM

August 6-10, 1985

Santa Cruz, CA

For more information, contact Judy Mitchell, Center for Marine Studies, University of California, Santa Cruz, CA 95064.

1985 ANNUAL CONFERENCE OF THE CANADIAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

September 4-6, 1985

Toronto, Canada

The Toronto AAZK Chapter will be taking an active part in this conference. For more information, contact Toby Styles, Manager, Public Relations, Metro Toronto Zoo, P.O. Box 280, West Hill, Ontario, Canada M1E 4R5.

1985 AAZPA ANNUAL CONFERENCE

September 8-12, 1985

Columbus, OH

The Columbus Chapter of the AAZK would like to cordially invite you to attend this conference. Our Chapter will be hosting a variety of activities. We would also like to invite any national AAZK member who cannot afford accommodations to contact Joe Ridler, accomodation coordinator, or Andy Lodge, Chapter president. Both can be reached at the Columbus Zoo (614) 889-9471. Our Chapter can help arrange housing to ease your financial burden.

1985 NATIONAL AAZK CONFERENCE

October 20-24, 1985

Miami, FL

Hosted by the South Florida Chapter. Conference Registration form and accomodation information may be found on page 220 of this issue of AKF.

1985 INTERNATIONAL MARINE ANIMAL TRAINERS ASSOCIATION (IMATA) ANNUAL CONFERENCE

Oct. 27-Nov. 1, 1985

Orlando, FL

Hosted by Sea World of Florida. For more information, contact Thad Lacinak, Vice President, IMATA, Sea World of Florida, 7007 Sea World Dr., Orlando, FL 32821.

1986 AAZPA REGIONAL CONFERENCES

Southern Regional	March 16-18, 1986	Baton Rouge, LA
Western Regional	April 13-15, 1986	Tacoma, WA
Great Lakes Regional	April 20-22, 1986	Milwaukee, WI
Northeastern Regional	May 4-6, 1986	Mystic, CT
Central Regional	May 18-20, 1986	Fort Worth, TX





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Viewpoint

*Submitted by Puget Sound Chapter,
Hosts of the 1984 AAZK Conference*

A national conference is an important function for any organization. It is an excellent way to learn new things, share what you know with others, see different facilities, see different parts of the country (or the world), and have a enjoyable time doing it. In many ways it is an indicator of how professional an organization considers itself to be. Any attempt to improve a national conference so that it can more effectively serve its members should be supported. To make intelligent choices, the membership needs accurate information on which to base their decision.

No two conferences are ever alike (that's partly why they are fun to attend). Organizers in each city face their own unique problems, in spite of all the advice from previous hosts. Change seems to be constant in the hotel industry; prices change frequently, new taxes are added, new owners bring in new staff and new rules and regulations, etc. The farther in advance that you try to plan means a greater chance for major changes (and possibly greater costs to delegates). This is especially true for a conference of our relatively small size. We don't have the same "pull" for getting good prices and commitments as a larger conference.

AAZK now operates on a two year cycle for choosing conference sites. This has proven to be a good system for a conference of our size. Local chapters handle virtually all arrangements and cover costs through fundraisers and fees. Staff burnout is kept to a manageable level (two years is long enough for a project like this when you work full-time). Because of the extra time needed, groups that vote on conference sites by mail are usually planning at least three years ahead, often four or five. They are usually larger groups (generally seating 500 delegates and up), with a larger financial base (through higher dues and registration fees ranging from \$100-\$150). They often employ a professional conference planner (which many chapters could not afford to do).

Choosing a hotel is usually a question of trade-offs:

1. It's almost impossible to find the perfect combination of convenient location, food services (in house or nearby), proper size of meeting and eating space, adequate hospitality room, and affordability.
2. Hotel contracts often won't allow food to be brought in by the group. It must be supplied by the hotel. To reduce costs to individual delegates it has become standard practice to include meals and/or coffee breaks in the conference package, whenever possible.
3. If the hospitality room is too close to guest rooms, complaints can be expected.
4. If the hotel can't provide all the necessary space, delegates get shuttled around more than needed in an already crowded schedule.
5. If you can't guarantee a certain number of filled hotel rooms ahead of time, costs of other services can double or triple. Hotel rooms in medium to large cities average \$100 a night and up, making this year's rate of \$75 a substantial savings.

An AAZK national conference is still one of the least expensive professional conferences to attend. The effort and planning needed to attend a conference is worth the investment. Ideas for future improvements to conference guidelines are always appreciated. Bring them with you! Let's all rally together and meet in Miami, showing them our support and appreciation for all their work towards such an important event!!



The Endangered Species Act.....AN UPDATE

ENDANGERED SPECIES ACT ON COUNTDOWN TO REAUTHORIZATION

The House Subcommittee on Fisheries, Wildlife Conservation and the Environment held its mark-up on the Endangered Species Act on 9 May. Approved by the Subcommittee were four amendments; two of particular interest. The first related to candidate species i.e. species identified by the USFWS for future listing action under the Act. Testimony indicated that a number of species have become extinct while awaiting their proposed listing and this amendment would require the Secretary of Interior or Commerce to implement a system to monitor the status of such candidate species during the listing process and to use the emergency listing authority when it is warranted.

A second amendment will encourage the establishment of an experimental population of sea otters off the California coast. This population would receive the full protection of the Act in the translocation zone. The otters will also be managed, through non-lethal means, in areas adjacent to the translocation site to reduce conflicts with fisheries.

Chairman of the Subcommittee John Breaux plans to offer an additional amendment at the Full Merchant Marine and Fisheries Committee mark-up session to limit the take of endangered species by anyone. This amendment is necessary due to a recent court decision which held that the Endangered Species Act does not apply to American Indians on reservations.

The Endangered Species Act, which has been reauthorized four times since it was enacted in 1973, established a comprehensive program for the conservation of endangered and threatened species. Currently, 831 animals and plants are listed as endangered or threatened, 333 of which are found in the United States. A total of 169 recovery plans have been approved, setting goals and procedures for bringing listed species back from the verge of extinction.

The Fish and Wildlife Service has requested a FY budget for 1986 of \$27 million for administration of the endangered species program, approximately the same level of appropriations approved by Congress for FY 1985. About \$23 million would support listing, recovery, consultation, research, and law enforcement programs; \$4 million is requested for endangered species conservation and restoration grants for the States. In 1985, 146 such cooperative projects were conducted in 37 States with the same level of support.

(Note: The current Endangered Species Act will expire on 30 September 1985 unless reauthorized by Congress. There are those who would like to amend the Act allowing exemptions for certain projects or interests i.e. western states water developers and their dams. I encourage all AAZK members to contact their State Representatives and Congressmen in support of the present Endangered Species Act without any amendments intent on accomodating special interest groups or projects. - Alice Miser, Legislative Coordinator.)



Chapter News

HONOLULU AAZK CHAPTER

Our Chapter participated in the 28th Hawaiian Science and Engineering Fair held 9-13 April. Two of our members, Tommy Higashino and Wendy Kuhns, served as State Fair Judges as well as choosing our Chapter's award recipients. We gave T-shirts and Annual Zoo Passes to the following:

Display Project #406 - "Heartworm: How It Affects Dogs" - Daniel K. Fuller & Kevin T. Johnson, 8th graders, St. Ann School.

Display Project #417 - "Life Cycle of External and Internal Parasites of Pigeons" - Scott Paiva, 8th grader, Our Lady of Good Counsel.

Display Project #254 - "The Wildlife/Wetland Refuges and Endangered Waterbirds of the Hawaiian Islands" - Cathleen M. Tibayan, 11th grader, Farrington High School.

--Alice P.S. Roberts

METRO TORONTO ZOO CHAPTER

Newly elected officers for the Metro Toronto Chapter of AAZK are:

President.....Marilyn Cole
Vice Pres.....Oliver Claffey
Harry Hofauer
Treasurer.....Neville Pike
Sec.....Patsy Vandenbussche

LOS ANGELES ZOO CHAPTER

The Los Angeles Zoo Chapter held a Marine Mammal Symposium on 25 May. The program sold out and raised over \$300, not to mention the educational benefits.

A possible symposium on Australian Mammals has been discussed for January. We are accepting papers for this two-day symposium, all interested please write:

AAZK/ LA ZOO
5333 Zoo Drive
Los Angeles, CA 90027

The LA AAZK & Keepers are challenging other local zoos and AAZK members to a "Klash of the Keepers, a picnic and party. Events included are: Tricycle Race, Obstacle Course, Wheelbarrow Race, Tug of War, Three Legged Race and Volleyball. The event is planned for 12 July.

The LA Chapter is currently selling T-Shirts featuring artwork by Linda Paul. The art is of a Zebra Duiker and the shirts sell for \$7.50 each.



Copies of Chapter News items should be sent to Chapter Affairs Coordinator Gerald Payne at the Detroit Zoo. A copy should also be sent to the AKF editorial staff for inclusion in this column.

CHAPTER NEWS, Continued

PUGET SOUND CHAPTER (Seattle, WA)

From birds of prey to Birds of Paradise, both native and exotic avians have benefitted from the fundraising efforts of the Puget Sound Chapter of AAZK in 1985.

In January, \$1630.00 was raised in one night at our annual Zoo Bowl. Bowlers paid their own expenses and found sponsors who would pay a penny a point plus 10¢ for each spare and 20¢ for each strike. Prizes were given for most money raised, high game and high series. Over 40 door prizes were donated and distributed by the luck of the draw.

Proceeds from the 1985 Zoo Bowl were used to purchase six radio transmitters. Five of these transmitters were used to track rehabilitated Bald Eagles released in the Skagit area during 1985 as part of Woodland Park Zoo's Eagle Release Program.

A rummage sale held on 30 March, 1985, raised \$1040.00 which will be used to pay airfare and living expenses for keeper Gregg Thompson to participate in the New Guinea Salvage Project. Gregg has been on a year-long exchange program at Taronga Zoo in Sydney, Australia, and had indicated his desire to work on the Salvage Project.

The New Guinea Salvage Project is a cooperative zoo effort which is trying to salvage birds, mammals and plants which will be destroyed when the mountain where they live is turned into an open-pit mine due to the discovery of gold and other minerals on the site.

Keepers and other Zoo employees, volunteers and docents gave both time and material goods to make the rummage sale such a success. Some of the more unusual items donated included a dishwasher, an electric range and a stationary exercise bicycle.

We are very happy with the results of our fundraising efforts, and are most grateful to those people who contributed in many ways to the success of these projects.

--Nanette Taniguchi, Secretary

TOPEKA ZOO AAZK CHAPTER

The Topeka AAZK Chapter, after re-activating in February 1984, has had monthly meetings discussing numerous fund-raisers and other activities relating to the zoo.

We've had volleyball & softball games and have participated in the Topeka Zoo's annual fundraiser, 'Animal Fair', held on the Sunday prior to Labor Day. We attempt to sell animal artifacts such as elephant footprints, 'Elephant Tea' (bagged elephant manure for plant fertilizer), feather earrings, bracklets, pens, quills and other animal-related items. We have profited quite well from it.

We had attempted to secure a grant from the Smithsonian Institution through the National Museum Act for a Great Ape Workshop in the spring of 1986, but were unfortunately denied funding. This activity began to foster a vision for our Chapter that we needed. It is always good to have a goal in mind when attempting any project or fundraiser. We are now considering other possible funding sources for this project.

During the weekends of the month of June, the Keepers gave spontaneous talks about their animals from predetermined and posted areas of the zoo, in honor of National Zoo and Aquarium Month. The favorite of all the Keeper Talks was The Elephant Discipline talk.

--Bernie Feldman, President



Update From The AAZK Public Education Committee

Submitted by Jay Jasan, Committee Coordinator

Brochures, articles and pamphlets are being accumulated that deal with educational programs in which keepers play a crucial role. The goal of this Public Education Committee project is to develop a directory which lists and briefly describes programs involving keepers. The directory will be of use to zoos who wish to get their keepers involved in educational programming as well as providing ideas for AAZK Chapter activities.

Other projects to be worked on include a display which may be kept at AAZK National Headquarters, representing the zookeeping profession. The display may be loaned to zoos or Chapters for use in programs such as "Career Days" at schools. A pamphlet dealing with frequently asked questions by zoo visitors and the best way to answer them,

If you have knowledge of public education programs involving keepers, or would like to participate further in the Committee, please contact or send descriptive information to: *Jay Jasan, Committee Coordinator, Staten Island Zoo, 614 Broadway, Staten Island, NY 10310.*



Publications Available

MAMMAL NUTRITION & DIET HANDBOOK - 672 pages/Index. Price in USA \$69.50/
Outside USA \$80.00, postpaid, add applicable sales tax, payment with order.
Available from James Lenarth Jr., P.O. Box 4480, Eureka, CA 95502.

A brief list of contents includes: Carnivora: Nutrition of the Dog. Diets, Natural & Synthetic, Cats and other Felidae. Viverridae. Ferrets. Raccoon and other Procyonidae. Rodentia: Sciurid Diets. Diets, natural & synthetic, Geomidae. Castoridae. Mountain Beaver. Rats and Mice. Dormice, Hystricomorph Rodents. Diets of Cricetidae. Food Habits for Aspodidae. Natural and semi-purified diets for Guinea pigs. Digestive physiology & feeding of capybaras. Artiodactyla: Diets, natural and synthetic, Swine, Wild Pigs, Peccaries & Hippopotamuses. New World Camelidae. Giraffidae. Diets for Caribou, Deer, Beef Cattle, Sheep & Goats, Gazelle, Antelopes. Freely grazing reindeer/ Captive reindeer. Pronghorn diets, synthetic and natural. Diets for Zebu cattle. Other mammals: Diets, natural and synthetic; Monotremata, Marsupialia. Foods of wild and captive : Insectivora, Tupaiidae. Diets for Chiroptera. Ecology and Dietary Habits of the Malaysian Flying Lemur. Endentate Nutrition, natural and synthetic. Natural & synthetic diets for Pholidota. Diets for Lagonmorphs. Diets, natural & synthetic: Tubulidentata. Subhuman Primates. Horses. Nutrition of the Hyrax. Foods and Feeding of Elephants. Diets for Marine Mammals. Diets for Germfree Mammals.





CONFERENCE T-SHIRTS

We are selling conference T-shirts for \$10.00 apiece if purchased at the conference. However, a \$1.50 savings is being offered for those who purchase T-shirts before the conference. Shirts will be attached to your registration packet when you arrive.

If you are not planning on attending the conference, T-shirts can still be bought at a savings. We do ask for \$1.25 postage and handling in addition to the discounted price of \$8.50.

Send your check or money order to:

South Florida AAZK Chapter
12400 S.W. 152nd Street
Miami, FL 33177

The design will be printed in 4 colors on the following choice of shirts:

White _____ Lt. Grey _____ Yellow _____

(*please put your order of preference 1 to 3)

SIZE: Small _____ Medium _____
Large _____ Extra-large _____

Quantity of Shirts Ordered: _____ @ \$8.50 each

Shirts will be printed by Harlequin Nature Graphics. Check your local gift shop for other Harlequin designs. This discount is being offered to establish an accurate quantity of shirts we will need to print.



Conference.....'85

For those interested in attending the 1985 Annual AAZK Conference but wish to find a roommate to share a double room and reduce costs, please contact:

Rachél Rogers
Conference Committee Chairman
South Florida AAZK
12400 S.W. 152nd Street
Miami, FL 33177

She will be happy to assist you. Please specify whether the roommate is to be male or female, and any other important details deemed necessary. Your promptness in registering early will be greatly appreciated and will enable Rachél to have enough time to match people.

REMINDER - Registration Deadline is Thursday, 15 August 1985

FINAL CALL FOR PAPERS

DEADLINE: 1 August, 1985

"Husbandry/Maintenance of Traditionally Difficult Animals"

There is still time for all interested delegates to share their unique knowledge and experiences with others by submitting papers for presentation at the 1985 Conference. It is only by this sharing of information that others may learn and advance in their specialized work.

Please submit your paper as soon as possible because presentation time is limited. Even if it is just a brief summarized paragraph and the paper is not completed, we need to get an idea of how many papers will be presented so we can properly schedule and prepare for them. If your paper is accepted, you will receive a \$15 refund from your registration. Remember - all papers will appear in the special conference issue of Animal Keepers' Forum at the end of the year so please arrange manuscripts according to "Guidelines for Typing Papers for AAZK Conference Proceedings."

Presentations will be limited to 15 minutes plus an optional 5 minute question/answer period. Please notify us of any equipment needed. If you will be using video tapes, only VHS will be accepted. Please submit an outline or abstract by 1 August, 1985. Send papers, information or address questions to:

Brett Banner, AAZK Conference
South Florida AAZK Chapter
12400 S.W. 152nd Street
Miami, FL 33177

Those intending to make a presentation should send the following information to Brett:

1. Name of Presenter
2. Zoo or organization presenter is affiliated with
3. Presenter's position or title
4. Title of paper
5. Outline or abstract of paper
6. Equipment needed (please check all that you require)

Videotape player (VHS $\frac{1}{2}$ " only)

Standard cassette player

16mm movie projector

Slide projector



EVERGLADES - Post-Conference Trip

The post-conference trip this year will feature an ecological area unique to South Florida. On Friday, 25 October, we will visit the Everglades, a fresh water river six inches deep and 50-75 miles wide. This river is made up of a variety of habitats from fresh water sloughs to brackish water mangroves. Our trip will give you a guided tour of the terrain and wildlife in this natural wonderland.

Beginning the day with a 3-4 hour canoe trip, we will explore the coastal prairies of the Everglades. After lunch and arriving back on shore, we'll make our way to several different types of environments.

The Pa-hay-okee Trail, highlighted by an observation platform, gives an overview of the 'river of grass' which is the true Everglades. From there, we'll move on to a local favorite, Anhinga Trail, named for the curious "snake bird". During the drier months this is a thriving waterhole which attracts quite a variety of wildlife.

Nearby Gumbo Limbo Trail is an excellent example of a tropical hardwood hammock. This spot is ideal for viewing native plants such as royal palms, gumbo limbo trees, wild coffee, ferns and wild orchids.

Although the end of October is only the beginning of the winter season and more concentrated wildlife, you can expect to see many birds (ospreys, anhingas, egrets, and purple gallinules) and reptiles (a variety of turtles, snakes and of course - alligators). Raccoons, deer and bobcats are less obvious, but are occasionally seen also.

The cost of the trip somewhat varies depending on the number of interested people; the more people the lower the cost. The expected cost will be \$29.50 which includes transportation, guides, canoe rentals, and lunch. We would like to limit the number of participants to 50. In order to provide us with the idea of how many people would like to see the Everglades, please take a moment to fill out and send the following information. We will keep you posted with more details. If you have any questions please don't hesitate to contact: Greg Sorini/Metrozoo, 12400 S.W. 152nd St., Miami, Fl 33177.

EVERGLADES POST-CONFERENCE TRIP INTEREST FORM

Name: _____

Address: _____

Phone: () _____

____ Yes, I am interested in attending the post-conference trip to the Everglades on Friday, 25 October 1985.

1985 AAZK NATIONAL CONFERENCE REGISTRATION FORM

October 20 - 24, 1985



Please fill in and return this form with your fee to:

Rachel Rogers
Conference Registration
South Florida AAZK
12400 S.W. 152nd Street
Miami, FL 33177

CONFERENCE REGISTRATION

NAME: _____

ADDRESS: _____ CITY: _____

STATE/COUNTRY: _____ ZIP/POSTAL CODE: _____

ZOO AFFILIATION (if applicable): _____

AREA OF INTEREST: _____

VEGETARIAN: _____ YES _____ NO

WILL BE PARTICIPATING IN ZOO OLYMPICS: _____ YES _____ NO

BRINGING AN AUCTION ITEM? IF SO, BRIEFLY DESCRIBE: _____

WILL BE SUBMITTING PAPER: _____ YES _____ NO
(\$15.00 will be refunded on acceptance of paper)

TRANSPORTATION: _____ (car, plane, etc.)

AAZK MEMBERSHIP STATUS & FEE:

Member or Spouse.....\$55.00
Non-member.....\$60.00
Late Registration Fee.....\$15.00
TOTAL FEES ENCLOSED.....\$_____

SINGLE EVENT RATES: Ice Breaker \$10.00 Paper Session I \$10.00
Sun. 20 Oct. Mon. 21 Oct.
Miami Metrozoo \$15.00 Dreher Pk Zoo \$20.00
Tues. 22 Oct. Wed. 23 Oct.
Paper Session II & Banquet \$30.00
Thurs. 24 Oct.

Please make this check payable to: "SOUTH FLORIDA AAZK". The deadline for registration is Thursday, 15 August, 1985.

Information Please

Information is requested on the diets and breeding of captive Macropods, particularly the Bennett's wallaby (M. rufogriseus), the Dama wallaby (M. eugenii) and the Gray kangaroo (M. giganteus). I am trying to investigate why we have sick animals (vitamin E related?), why others have died, and how it affects breeding. Please send any pertinent data to: Carl Gingerich, Houston Zoo, 1513 Outerbelt Drive, Houston, TX 77030.

We at the Cherry Brook Zoo have been invited to participate in the Atlantic National Exhibition in the last week of August until the 1st of September. An attendance of approximately 250,000 people will pass through the gates and we hope to attract a high percentage of them. We have been given a large building in which to set up our display and do not wish to promote just our zoo, but all zoos and the whole idea of conservation and zoo-keeping, and what is involved in this field. We would ask all AAZK members to send any brochures, pamphlets, posters, etc. from their institution to be included in this display. We, of course, are happy to pay any postage and handling. Any interested parties are asked to contact Lynda Collrin, Cherry Brook Zoo, R.R.# 1 Sandy Point Road, Saint John, New Brunswick, Canada E2L 3W2.

The Elephant Management Committee at the Topeka Zoological Park is developing text for graphics concerning elephant handling and discipline. We are interested in examples presently used in zoos or ideas for this type of graphics. Anyone having this information please send it to: Elephant Management Committee, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

As part of the Topeka Zoo's Diet Review Committee, I am interested in receiving information from other zoos about Polar Bear feeding (diets) and other information relating to it. Please send any information to: Tim Kurkowski, Lead Keeper Carnivores, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

I am interested in finding out how many zoos exhibit Kinkajous (Potos flavus) in hopes of getting a exhibit for our breeding pair not currently on display. Anyone who does, please write a short description and send it to: Debbie Evers, c/o Phoenix Zoo Education Dept., Box 5155, Phoenix, AZ 85010.

Any institution having information on the use of ivermectin in reptiles please send dosage rates and target parasites for each species of reptile to: Connie Sweet, Lafayette Zoological Park, 3500 Granby St., Norfolk, VA 23504.



Reptile Care: Relating To
The Inquiring Novice - Part 13

Reptile
Amphibian
Potpourri

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

HYGIENE

Infectious diseases can quickly devastate an otherwise healthy collection of animals. For this reason, all new arrivals should be quarantined for one to three months prior to their introduction into an established reptile collection. During this period, reptile novices should take their newly acquired pet to a herpetologically experienced veterinarian for a complete physical examination. The examination should also include sequential fecal examinations. Sick animals should be examined by a veterinarian, then quarantined until a cure can be effected.

To prevent the proliferation of bacteria, fungi, or parasites, all fecal material, uneaten food, and shed skins should be promptly removed from cages. Avoid transferring cage contents, uneaten food, and other items from one cage to another: attend sick animals last. Substrate material, other than newspapers, should be replaced every 3 to 4 months or sooner if unpleasant odors develop. Newspapers, as a substrate, should be replaced when soiled. Water in bowls, aquariums, and other receptacles should be changed 2 to 3 times weekly. Overcrowding of animals should be avoided; it is stressful and makes proper cage maintenance difficult. Cages should be disinfected immediately following the death of a reptile.

To prevent the spread of infectious diseases, all tools used to remove uneaten food, feces, and other items, including animals, should be dipped in a strong disinfectant immediately after attending each cage.

The type of disinfectant and duration of application is important; the longer applied, the more effective it is. Avoid using phenolic compounds because they are highly toxic to reptiles. Some safe disinfectants commonly used after enclosures have been washed are hypochlorite (Clorox®), iodophore (Betadine®, Purdue Frederick), and quarternary ammonium (Zephiran Winthrop). However, quarternary ammonia may not inhibit the growth of certain bacteria such as *Pseudomonas*. Other cleansing methods for caging include scalding hot water and table salt. Fish oils, algae, and other deposits on aquarium siding can easily be cleaned away if salt is applied with a damp sponge.

Reptile handlers should wash their hands after working with each animal. Hexachlorophene (Phisohex, Winthrop) is excellent for personal hygiene.

Part 14 of this series is entitled "Preliminary Physical Examination" and will deal with diagnostic considerations and some frequent complaints of reptile owners with comments on possible causes.





REINTRODUCED GOLDEN LION TAMARINS REPRODUCE IN WILD

The captive-bred golden lion tamarins that were reintroduced at the Poco das Antas Biological Reserve in Brazil have successfully produced three offspring. On 19 December, 1984, a male offspring was born. The young male has already begun foraging for his own food that includes fruits, insects and small invertebrates. A set of twins (sex undetermined) were born to another pair of newly-released parents on 15 February, 1985. The twins are still nursing and typical of golden lion tamarins, the father has been observed carrying the young and investing a great deal of effort in the care of the offspring.

The first births of these squirrel-sized, brilliantly colored monkeys are important to the staff of the National Zoological Park who have been working on this project for many years. Over a decade ago when the species became nearly extinct in the Brazilian Atlantic coastal forest, NZP undertook a program under the direction of Devra Kleiman, to solve the problem of breeding golden lion tamarins in captivity. More than 200 of these monkeys have been born at NZP, and the active little mammals are now being bred in many zoos around the world using techniques developed at NZP.

In 1984, 13 captive-bred golden lion tamarins were released in the 12,500-acre Poco das Antas Reserve. Considering births and deaths, it is estimated that as a result of reintroduction efforts, seven new tamarins are now living in the Poco das Antas reserve. While the adults have become somewhat acclimated to the forest, the youngsters should become so well adapted that they will be indistinguishable from the remaining wild population.

NZP/CRC REPORTS BIRTH OF 100TH PERE DAVID'S DEER

Mammologist Larry Collins of the National Zoological Park's Conservation and Research Center in Front Royal, VA reports that the birth of a Pere David's deer on 20 March 1985 brought the total of these rare animals born at CRC to 100. The milestone is significant because this deer exists only in captivity; none remain in the original marshy habitat that supported them in Northern and Central China. In fact, it is believed that Pere David's deer have not lived in nature for many centuries. For at least 2000 years the species has been bred in captivity but in the late 1800's, due to several great floods, much of the captive stock escaped into the surrounding Chinese countryside. The escaped deer were hunted down for food during the 1900 Boxer Rebellion. Fortunately, some deer had been sent to zoos in Europe, and in the early 20th Century, European zoo directors transferred their Pere David's deer to the collection of one of the most famous animal breeders of his time, England's Duke of Bedford. Their collaborative effort saved the species and today many zoos have breeding herds of Pere David's deer. The 100 births are a testament to the research and management efforts of the Conservation and Research Center staff.

---from TIGERTALK, April 1985
National Zoological Park

GIFT WILL BRING A BIT OF ASIAN RAIN FOREST
TO THE SAN DIEGO ZOO

By
*Debbie Hewitt, Senior Hospital Keeper
San Diego Zoo, San Diego, CA*

Joan B. Kroc, president of the McDonald's Corporation, and owner of the world champion San Diego Padres, has made a \$3.3 million personal gift to the San Diego Zoo, earmarked for reconstruction of the zoo's Cascade Canyon area. The largest single donation ever to the Zoological Society of San Diego, Mrs. Kroc's gift will rebuild the nearly two-acre canyon to house animals native to the Asian tropical rain forests, including birds, reptiles, primates, tigers and other mammals. Cascade Canyon will be re-named in honor of the Kroc family.

Construction will begin as soon as the busy summer tourist season is over and will take nearly a year to complete. Mrs. Kroc called on Monday, 22 April, after reading a story on the zoo's needs in the Sunday, 21 April, edition of The San Diego Union. Mrs. Kroc's gift is a perfect example of the people of San Diego coming to the aid of the zoo in a time of need.

The Asian Tropical Rain Forest complex will cover 77,000 square feet just inside the zoo's entrance, between the Reptile House and the Primate Exhibits. The project has been on the Zoological Society's priority list for funding for nearly a year. Conceptual architectural drawings were completed in February and working drawings will be finished late this summer. "Our goal with this area is to immerse the visitor completely in the mood of the rain forest," said Executive Director Douglas L. Myers. "The environment will be as complete as we can make it, with graphics and other storytelling devices to explain the uniqueness and interdependence of all elements in nature."

Mammal enclosures planned for the new area include exhibits for Babirusa, a wild species of swine; either Sumatran rhinos or Malayan tapirs; fishing cats; and Sumatran tigers. The tiger exhibit has been previously sponsored by an anonymous donor and will be named for a family member when opened next year.

Birds to be exhibited in the Asian Tropical Rain Forest complex include: Rhinoceros horn bills, Green junglefowl, Cissas, Pittas, Bulwer's pheasants, Parrot finches, and Black-necked storks and other marsh birds. Reptile exhibits will be built for false gavials, a kind of crocodile; and pythons. The area will be lushly planted with species appropriate to each rain forest biome. Dense tropical vegetation featuring figs, ferns, palms, and bamboos will extend into viewing areas to involve visitors in the sensations of a tropical rain forest environment.

Hidden barriers will separate people and animals, and animals from each other, in adjoining enclosures. Service and holding facilities will be out of view of the public and designed to standards set by keepers for the best care of zoo animals. Pedestrian and tour bus paths through the Asian Tropical Rain Forest exhibits will be separate and often not visible to each other. A series of viewing shelters throughout the complex will allow for quiet, long-term observation and provide centers for presentation of background information on the animals, plants and native habitats. The stream which currently runs the length of Cascades Canyon will be retained, but will be modified to serve the inhabitants of the new Asian Tropical Rain Forest section.



ONE OPINION ON ANIMAL TRAINING

Part I: To Do or Not to Do?

By

Dora M. Jacobs, Senior Herpetarium Keeper
Rio Grande Zoo, Albuquerque, NM



There is much discussion in the zoo world and among those who keep domestic animals concerning the validity of training animals. Among those who agree that it is valid, there is further discussion about technique. What I am presenting here is my philosophy, not an effort to write a history or a tactful overview. My opinions are based upon my subjective experiences plus observation and conversation with others. If your view is otherwise, please write it up. There is a real need for animal handlers to know the diversity of opinion and experience on such issues.

To begin with, I advocate the training of all animals kept in captivity. Since doing nothing is a form of training, since it conditions habits, this should include captive animals intended to be returned to the wild state. Even doing nothing can be planned to accomplish a goal. There are times when all captive animals may have to be medicated or shipped, and I think we owe it to them to teach them not to be stressed when touched or driven. Some are just plain too hazardous to fraternize intimately with, but we can at least get them used to our neutral presence in their territory.

Social animals, by their very nature, are easier to communicate with than solitary ones. Animals kept as domestic livestock in various parts of the world, such as elephants, yaks, camels, and reindeer, are relatively easy to control if trained and handled properly.

There is the further problem of unemployment among captive animals. Animals which can exercise their bodies and minds, especially if they can exert some control over what happens to them, are healthier and happier than those which are left to their own devices in a cramped, artificial environment. Training to respond to commands or other signals reduces the stress arising from random human interference imposed under captive conditions. Some animals furthermore enjoy interaction with people.

In summary, I feel that we owe it to our captive animals to give them ways of responding to us, in order to maintain them in optimal physical, mental, and emotional health. Our safety should also be enhanced by this policy. Hopefully, we can also gain some degree of mental stimulation and emotional satisfaction from living in harmony with the animals under our care.

Editor's note: Part 2 of this subjective series on Animal Training is entitled "What To Do" and will appear in the August issue. Part 3, entitled "What Not To Do" will run in the September AKF.)



THE VENOMLESS ALTERNATIVE FOR HERPETOZOOS

By
George H. Hanley, Reptile Keeper
California Living Museum
Bakersfield, CA

John Trestrail's outstanding guidelines for dealing with venomous snakes, completed in the March '85 issue of Animal Keepers' Forum, will be an important reference for reptile houses and private collectors. It concisely establishes an ideal model for safe policy and practice.

Many small zoos and reptile houses, unfortunately, have not the funds, the plant, or the paid personnel to implement the procedures outlined. At the California Living Museum (CALM) we have chosen the venomless alternative in which all rattlesnakes displayed have been rendered "safe" through an operation called a venomductectomy. Since all of our keepers are volunteers, the feeding and care of "hot" reptiles was deemed inadvisable. Many of our collection's reptiles were donated by local herpetologists whose gifts had previously been "fixed" by this operation.

Mr. Al Robbins of Bakersfield, who had detailed knowledge of reptile anatomy, had worked with Dr. Lewis Larson, a local physician, to refine this operation back in the 1960s. These gentlemen have trained a number of other herpetologists in this procedure. Most venomous specimens in private collections in Kern County had been operated on by the year 1981 when our living museum was established. These snakes through donation became a large part of the collection at CALM.

In the opinion of many herpetologists, a venomous snake needs its venom to assist in the digestion of its food. This is a myth that has persisted for over 50 years. I know of no experimental research to justify this belief. Mr. Robbins has a pet Indian cobra and a rattlesnake which were venomductectomized 20 and 18 years ago respectively. Both feed well and are in good health. Local amateurs in Kern County have had many such snakes made safe by this operation that seem to thrive. I am also aware that zoo keepers worldwide prefer to feed valuable snakes freshly killed or thawed rodents rather than live ones to avoid having the snakes injured by the rodents. Rarely do these snakes envenomate the dead rodents, yet they show no problem with digestion. Myths die hard.

The procedure for feeding our snakes is simple. Initially they are offered live food at which they strike. The chick or rodent is then removed, killed, and returned to the snake. This is desirable since the snake can no longer kill his own food. Most of the reptiles, however, soon learn to bypass step one and accept frozen chicks or rodents that have been thawed without going through any preliminaries. Fresh road-killed mice and rats are also well accepted and may be frozen for future use. Volunteer keepers can service these reptiles at no great risk. Keepers are expected to maintain their tetanus immunity.

Basically the venomductectomy consists of removal of a small section of the venom duct in the area just under the eye. The cut ends of the duct are tied off with surgical silk. Preparation consists of anesthetizing the serpent (ether), milking the venom glands, and sterilizing the incision site. Using sterilized surgical tools, the incision is made as a short horizontal cut between scales while an assistant holds the snake's head on its side. The skin is drawn back to expose the duct which lies

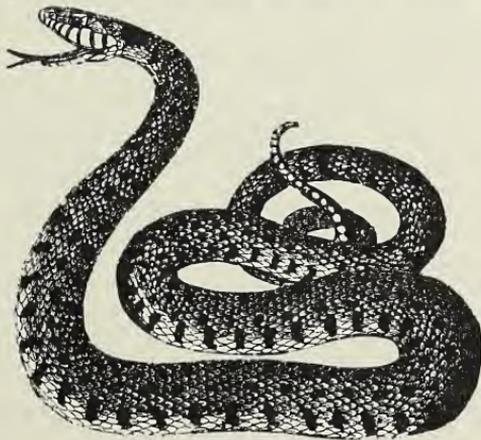
near the surface, between eye and lip. The tissues must not be allowed to dry out. A probe is slid under the duct, carefully avoiding nearby nerves. The duct is teased out into an available position. Two sutures are made off the duct on either side of the probe. The section of duct between the two ties is then snipped away. The skin is then pulled together. The entire procedure is repeated on the other side. During the latter part of the operation, the assistant gently massages the lung area to clear some of the ether. A week or two of isolation allows the mouth to heal. Wounds sutured together seem to heal no better than those that have been gently pulled together unsutured.

Check on the operations success consists of offering live food after complete healing. If the snake's strike does not kill the mouse, you have succeeded. Until this test is made, we treat the snake as if it were still "hot". The venomductectomy requires considerable practice to obtain proficiency.

At CALM we have learned much from working with devenomized snakes. Some remain nervous, and we believe they would bite if given the opportunity. Many, however, are quite docile, and never offer to bite. Specimens of many species may fall into either category. We have seen some individuals of each of the following species that could be safely handled: Crotalus tchelli, C. cerastes, C. viridis oreganus and C. v. helleri, C. atrox, C. ruber, C. scutulatus, and Agkistrodon piscivorus. Other individuals of most of these species have continued to be strikers. The only two Crotalus viridis of which we have personal knowledge remain strikers as do three Naja naja.

Docile individuals are especially useful in a zoo to enable close-up photography to be performed; for ease of veterinary care; for educational use in studying the heat sensing pits, eye structure, scale counts, sex differences, etc.; and for ready access to cages for cleaning. Common sense dictates that special caution be observed, even with docile snakes when recently fed, when in "milky eye" preparatory to shedding, or after the handler has been working with feed animals. All cages are kept locked individually between servicings.

Thanks to the venomductectomy CALM is able to provide an educational display of poisonous California species for our community using volunteer keepers who are free of risk. We have no need to stock expensive antivenin.



GORILLA ENCOUNTER AT LAST!

By
Alice Miser, Lead Keeper
Discovering Apes Complex
Topeka Zoological Park, Topeka, KS



**GORILLA
ENCOUNTER**
WORLD FAMOUS
TOPEKA ZOO

It was the culmination of years of planning and months of hard work. On 12 May 1985, the World Famous Topeka Zoo officially opened its new exhibit, Gorilla Encounter.

Gorilla Encounter is part of the Discovering Apes Complex, completed in two phases. Phase I, completed in July 1981, included Orangutan Impressions (a four-story exhibit with free-standing gunnite trees, and treetop-level viewing of Bornean orangutans from a bamboo treehouse), and 4000 square feet of animal management and service area.

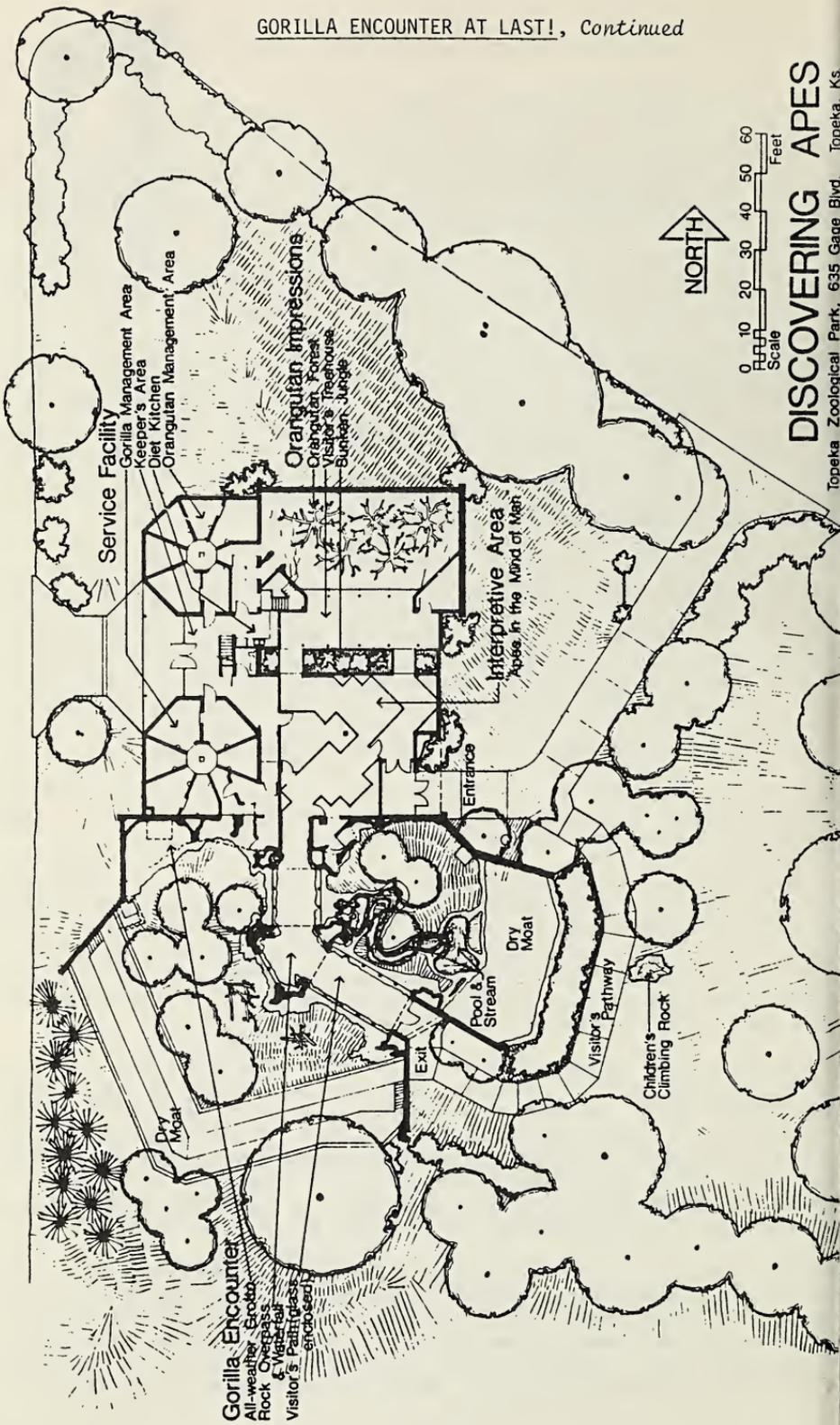
The animal management areas are two-story units, six for each species, arranged in a circular pattern around a central core (see Diagram). All controls for the units, pneumatically controlled doors, grated steel water-ers, air flow and feed chutes are located at second-story level around a clear acrylic keeper walkway. The walkway maximizes keeper visibility into each unit or of animals as they are moved through a doorway. Ape groups may be housed in two units, without giving access to the core area, via a connecting clear acrylic door. Units have various climbing apparatus and second-story viewing windows to the outside and keeper walkway.

Phase II includes "Apes In The Mind of Man", a interior graphics area demonstrating man's perception of apes through examples of movies, art, literature, etc. This is only partially completed at this time.

Gorilla Encounter, also part of Phase II, features Lowland gorillas viewed through a visitor's glass tunnel which bisects an outdoor exhibit. This allows the visitor to get nose-to-nose with a 400 pound male gorilla or look up as a gorilla walks by overhead. The gorillas move up over the tunnel at any one of three gunnite bridges linking the east and west halves of the yard. The gorillas descend into the west half via a waterfall or down the rock handholds of the end bridges.

The yard is moated on two sides with 30-40 foot high sculptured gunnite walls at either end of the tunnel. Each moat is at least 15 feet deep on its exterior wall. The yard is a 90% sand substrate with tall rye grass, landscaped to a rolling terrain. The exhibit is of southern exposure for winter heating and includes an all-weather heated grotto in hopes of keeping the gorillas outside most of the winter. Our gorilla entrance is fitted with a double set of rubber door flaps to allow the animals access to a portion of the off-exhibit area during foul or cold weather.

Gorillas have not been exhibited at the Topeka Zoo since July 1981. In 1982, our two gorillas, Max and Tiffany, were placed on loan to the Denver and Buffalo Zoos respectively, having been housed in the off-exhibit area in the Discovering Apes Complex in the interim. Max returned to Topeka in September 1984. Tiffany is still in Buffalo as part of the Topeka Zoo's cooperation with the Gorilla SSP. By mid-November 1984, the number of



DISCOVERING APES

Topeka Zoological Park, 635 Gage Blvd. Topeka, KS



In the Topeka Zoo's new Gorilla Encounter exhibit, lowland gorillas roam freely over gunnite rockwork and the special glass tunnel which bisects the outdoor yard. (Photo: Gary K. Clarke)

apes housed in the building grew to 12 (3.4 Bornean orangutans and 4.1 Lowland gorillas). Topeka temporarily housed 2.1 gorillas for the Henry Doorly Zoo of Omaha, NE while they renovated their ape facilities.

The Omaha gorillas returned to Henry Doorly on 14 May. We were fortunate to have all the gorillas stay through our grand opening, including a female on loan to Topeka from the Bronx Zoo. The various gorillas tested the exhibit's features to the fullest including running on the slanted glass roof of the tunnel. Prior to the grand opening, we transferred gorillas on and off exhibit as many as three times a day to condition them to come off-exhibit at the sound of a bell and also to maximize the various gorillas' experiences in the yard.

Two of the six gorillas, a male and female, were unable to go into the yard due to transfer and medical problems. They did, however, prove to be a compatible pair off-exhibit.

Ceremonies involving the Gorilla Encounter began one week prior to the Grand Opening and included previews for various groups (including a special picnic/preview for staff and their families), a formal dinner in the tunnel for over 50 zoo colleagues, live television and radio broadcasts throughout the week, a V.I.P night of dinner and dancing and the dedication by the mayor and officials of Topeka.

The climax of this week was Gorilla Encounter Day, a free admission to the public event, sponsored by Hill's Pet Products of Topeka. The day started at 6:00 a.m. with a staff breakfast of eggs, bacon, juice and lots of coffee. Work started at 7:00 a.m. in preparation for the crowd. The Zoo

GORILLA ENCOUNTER AT LAST!, Continued

gates opened at 9:00 a.m. and we had a steady crowd all day. The Topeka Zoo's last record, special event crowd numbered almost 15,000 people, but who could have expected the visitor total at the end of the Grand Opening day for Gorilla Encounter - 21,995!

Through the extraordinary efforts of various volunteer groups and a dedicated staff, we were able to keep the crowd moving, find lost children (or parents) and maintain our sanity. The public response to the exhibit was tremendous and visitor attendance since the opening has increased dramatically.

We toasted our efforts and accomplishments of the day with champagne and a heavy sigh of relief. We had survived a Gorilla Encounter at the World Famous Topeka Zoo.



Keeper's Alert

The Riverbanks Zoo AAZK Chapter is designing a zoo calendar for 1986. We would like to request photographs of keepers with their animals. Photographs must be black and white. Photos will not be returned unless requested and accompanied by a self-addressed, stamped envelope. Deadline for submission of photographs is 15 August 1985. Your help will be appreciated! Please send photos to: Diane Krug, Riverbanks Zoo, 500 Wildlife Parkway, Columbia, SC 29210.

The Los Angeles Zoo Chapter is planning a fund-raising event in August. We are planning an exciting style show with keepers as models and an auction of Zoo T-shirts and patches. We would appreciate your donation of these items from your Zoo to include in our auction. The Los Angeles Chapter would like to thank you in advance for your support. Send donated items to: Michael Cunningham, Los Angeles Zoo, 5333 Zoo Drive, Los Angeles, CA 90027.



AAZK REGIONAL COORDINATORS

Linda Rohr, W.D. Stone Memorial Zoo	- ME, VT, NH, MA, RI, CT
Vacancy	- NY
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Lee Payne, Detroit Zoo	- MI
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Alan Sharples, Atlanta Zoo	- FL, AL, GA, AR, MS, LA
Candy Croft, Rio Grande Zoo	- TX, NM, CO, OK, KS, NE, SD, ND
Laurence Gledhill, Woodland Park Zoo	- WA, OR, ID, MT, WY, AK
Joanie Stinson, Phoenix Zoo	- CA, NV, AZ, UT, HI
Vacancy	- Canada



INTRODUCTION TO COMPUTERS

By

Karen M. Dvornich, Docent
Woodland Park Zoo, Seattle, WA

Editor's note: Karen is a Docent at WPZ and is also involved in research on small felids. She chaired the Small Felids in Captivity session at the 1984 AAZK National Conference in Seattle. While Karen states her true love is animals and her research, she also works part-time as a systems analyst and telecommunications expert for a private corporation. As the field of zookeeping becomes more high-tech, computers are becoming a big part of our lives--for record keeping, management etc. Her article will hopefully take some of the frustration out of working with computers, especially if you are a novice.)

You all hear that we need a computer. But most of you don't know why you need one, what it can do for you, or how it will make your job a lot easier.

First of all, if you have to figure out diets, keep records, calculate a budget, write memos, then a computer could be a very helpful tool. Computers can store a lot of information, analyze it and create reports. Their limitations are the programmers (you in many cases) or the software purchased programs).

Computers on a whole can do just about anything, but not all can do everything. Let me explain the differences in computers and teach you some of the lingo.

IBM PC, Macintosh, Apple IIe, Kaypro, etc are all microprocessors. Micro means small. From micros you can graduate up to min-computers and then up to mainframes. Some micros are built so that their storage and memory can be increased. Others are not and those are usually the ones people outgrow very quickly.

Microprocessors vary in price. Think of them as you would a new car. The advertised list price doesn't include all the extras. What you want to see them for will make the big difference. Don't listen to your friends saying to get one brand or another. First, list out all that you would like the computer to do. Then think of growth. Do you eventually want to be able to swap information with another keeper at your zoo, another zoo or ISIS? Do you want to use it at home for awhile then start doing work-related projects? Are you the keeper willing to learn about computers for your zoo's about-to-be-purchased computer and will want a computer at home to help you out?

Once you have made your list, you can walk into a computer store and talk to a salesperson. Find one who is interested in what you would like to do on the computer and let him know what you are initially willing to spend. I will guarantee you that he or she will scare you to death with a sales pitch that you won't understand. Don't worry because you should never buy a computer the first time you go shopping for one. You are only here to see what is on the market that will fit your needs and budget. There are many computers available, but you can quickly shorten the list if you have an idea of what you want to do on the computer.) Try to remember some of the words you didn't understand so you can look them up when you get home.

INTRODUCTION TO COMPUTERS, Continued

In order to be prepared for your next visit to a computer store, let me explain what a computer is.

Most of us are lucky enough to have a desk. Think of your desk as your computer. Every morning you come in and sit down in front of it (a computer operator and/or programmer) and unlock the desk (turn the computer on, or boot it up).

On both sides of you are drawers containing your files. Disks or diskettes also store files. The more drawers you have in your desk, the more you can store. The larger the drawers, the more you can store in them. So, a computer with two disk drives has a better capacity to work than a computer with one disk drive and a double-sided disk can store more than a single-sided disk.

Your files are kept in manilla folders and you write labels on top so you can find them easily. Each file on a disk has a label or file name and no two names can be the same. When you want a file from your desk, you open the drawer, search for the file, take it out of the drawer, open it up on your desktop. The exact same thing happens with your computer. You must put the disk containing the file in the drive, type or key in the file you want to open and the file will appear on the screen.

If your desk is small and your folder large, you can either find a larger desk to work on or stay where you are. Then you will have to break the folder into little groups and work on them one at a time. And if you are in a hurry, you'll probably clear off the desk so you won't lose anything. But if it is a budget or the calculation of the amount of food an animal needs, you'll keep the calculator on the desk with you, along with the phone thus reducing the amount of space you have to work with.

If you have a large desk, you can get your work done a lot more easily and probably faster. Either way the work gets done, and the amount of time, and to a smaller extent accuracy, is the only difference. The difference in the size of the desks is what RAM is to a computer. RAM stands for Random Access Memory. Memory is the key word. If, for example you receive a letter from another keeper, the letter is on a hard copy (something you can always pick up and read). But thinking about the letter as you go through your daily chores is done with your memory. (You "read in" your letter into memory.) So the greater the RAM, the more memory your computer has to "think". Therefore, if you have a large program or file and 256K (RAM), you could probably read it all into memory. If you have a 64K, you will probably get a "memory full" message when you try to read the same large file in. Most of the software (programs) you buy tell you how much RAM they need in order to run. But that only specifies the needs of the program. What about your data? (Data is the information you enter into the computer.) The rule to remember is: Add 64K to whatever the software requires! But, there are some programs such as Dbase II that say they need 64K and can work effectively with data.

The calculator is a program or a tool, just as is the phone, your telecommunications link. They both take up memory as does the file you are working on. A keeper is another zoo may have a different calculator or phone but that doesn't stop him from sending reports or talking to other zoos. So, if one zoo has an IBM running on DOS and another has an Apple running on CPM, they can talk to each other using their computer via a modem.

In the preceding paragraph I used a lot of new words. So let's start with DOS and CPM. Both of these are operating systems. Every zoo has its own management (operating system). A keeper may move to another zoo and in time learn the new rules. But a diskette from a DOS machine cannot be read by a CPM machine. The reason is the diskettes are not compatible. When you buy diskettes, they are blank. You format them on your machine. Formatting tells the disk how to make the labels, and what commands that particular computer will ask.

One thing to remember is, IBM compatible machines (other brands said to be compatible with an IBM) are compatible ONLY if they are running on the same operating system. If they aren't, you need a modem to transfer reports from one to another.

A modem is a modulator-demodulator. You don't need to know what that means except that it does something then undoes it. A modem is set up with one computer and attached to a phone line. A program sends a report through the modem over the telephone line. The modem just scrambles up the data so it can be sent over phone lines. When the report reaches the other computer, the other modem un-scrambles the back data into computer language. Diskettes don't have anything to do with what came over the telephone lines. So to make a long story short: You don't need the same computers if you are willing to purchase modems.

Remember, you can't really break a computer. So, don't be afraid of it. A computer consists mostly of electronic components and processes data in a very logical way. When I used to complain to my programming instructor about the dumb computer, he would tell me to look in a mirror. It was my logic causing the computer to create dumb reports.

Always make a backup copy of everything you have. I know at first you will think that is a lot of extra work, but you WILL wipe out some of your programs or data one day and you WILL have to put everything back into the computer. If a backup is made, you will be more confident while learning and be more willing to try something new.

As I say to my co-workers sitting down in front of a computer for the first time: Go for it!



Keeper's Alert

ELEPHANT MANAGEMENT VIDEO AVAILABLE

The Dickerson Park Zoo in Springfield, MO, in conjunction with a local television station, has produced a video tape on Asian elephant management at Dickerson Park Zoo. The tape is not a step-by-step training guide to working Asians but a presentation of the basic techniques and theory used to manage the zoo's elephant herd. Copies of the tape are available from the zoo at \$90 each for 1/2" VHS or Beta and \$120 each for 3/4". Interested persons should contact Mike Crocker, General Curator, Dickerson Park Zoo, 3043 N. Fort, Springfield, MO 65803 or call (417) 833-1570 for more information.



Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AFK, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings for positions which become available close to deadline are accepted.

LARGE MAMMAL KEEPER...responsible for care and maintenance of Large Mammal Collection which includes three elephants (One Asian and Two African) and a variety of hoofstock species. Requires High School Diploma and one year paid zoo experience with elephant handling experience preferred. Send resume and references prior to 15 August 1985 to: Michael D. Tucker, Curator of Mammals, Caldwell Zoo, P.O. Box 428, Tyler, TX 75710.

CURATOR/MANAGER...Willowbrook Wildlife Haven, a nature/wildlife exhibit and rehabilitation center. Responsibilities include: supervision of personnel, capital improvement projects, facility care, educational programs, animal care, exhibits and financial and budgetary programs for the center. Desire applicant with Masters level in Zoology, Ecology, Wildlife Management or similar, and 2 years administrative experience. Salary \$22,889 - \$34,334 plus benefits. Mail resume to: Forest Preserve District of DuPage County, P.O. Box 2339, Glen Ellyn, IL 60138, ATTN: Personnel Department.

TEACHER...the Wildlife Discovery Program (a Houston Independent School District Magnet School) is taking applications for a teacher position becoming available August 1985 and continuing until June 1986 (10 mos.). The duties of this position include supervision of an instructional group, planning, developing and implementing experiential lessons at the Houston Zoo, and acting as a resource person in environmental/outdoor concerns. Requirements are at least two of the following: 1. Teacher certificate (required) Master's Degree preferred; 2. Teaching experience; 3. Environmental/outdoor education background; 4. Science background; 5. Strong leadership qualities. Please send inquiries to: Karyl Watz, Coordinator, Wildlife Discovery Program, Doris Miller Center, 5216 Feagan, Houston, TX 77007.

CURATOR/MANAGER (Waterfowl)...non-profit organization with 310-acre wetlands sanctuary on Maryland's Eastern Shore, Grasonville, seeking a self-motivated, conscientious person to assume responsibility for captive waterfowl collection, rearing young, some managerial work. Can share house on Sanctuary. Degree in zoology and teaching interests preferred but not required. Must have ability to meet and deal with the public. Send resume immediately to: Wildfowl Trust of North America, P.O. Box 519, Grasonville MD 21638.

ZOO VETERINARY TECHNICIAN INTERNSHIP...requires two years of veterinary technology or certification as a veterinary technician. Will work under supervision of the staff veterinarian and technician, to assist in the operations of the zoo hospital. To apply, send resume, transcript, and three references to: Dr. Barbara Thomas-Baker, Staff Veterinarian, Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210. Applications will be accepted until 25 July 1985. The position is a full-year program beginning 1 September 1985.

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AAZK MEMBERSHIP APPLICATION

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Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers.

Items in this publication may be reprinted. Credit to this publication is requested. Reprints may be ordered from the editor.

Postage Paid At Topeka

of Zoo Keepers
Topeka Zoological Park
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AUGUST 1985

Animal Keepers' Forum



G. Y. Yoshimura
FEO. '81

dedicated to Professional Animal Care



Executive Editor: Alice Miser
Managing Editor: Susan Chan
Associate Editor: Bernie Feldman

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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NATIONAL HEADQUARTERS, 635 GAGE BLVD., TOPEKA, KS 66606
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This month's cover features the Hawaiian Stilt drawn by keeper Gwen Yoshimura of the Honolulu Zoo. This bird was one of those used in the Hawaiian Stilt breeding project. Like other members of the stilt family, the Hawaiian subspecies is easily distinguished from other coastal birds by their long and very slender pink legs, which are some 8-10 inches in length. They have long front toes, only slightly webbed at the base, and hind toe is absent. The beak is long and straight and the wings extend beyond the tail. Stilts make their nests in or near water and both sexes incubate the eggs which are greenish-buff, marked with black or underlying grey and usually number four to a clutch. Thanks, Gwen!

Scoops and Scuttlebutt

ASSOCIATE EDITOR DEPARTS FOR NEW YORK

Bernie Feldman, Associate Editor for AKF since March of 1984, has resigned his position with the publication and as a keeper at the Topeka Zoo to take on new professional challenges at the Burnet Park Zoo in Liverpool, NY. Bernie will remain active in AAZK as Coordinator of the Animal Data Transfer Form Project (ADTForm) and those wishing to obtain forms should contact him at the Burnet Park Zoo (see related article this issue p. 252). We wish to thank Bernie for his assistance on the Forum during his tenure as Associate Editor. We will miss his enthusiasm and good humor.

DON'T FORGET TO VOTE!!!

All professional members are reminded to return their completed election ballots, postmarked no later than 31 August 1985, to National Headquarters. This election is being held to fill the positions of Kevin Conway and Pat Sammarco whose terms expire on 31 December 1985. Ballots should be sent in the special ballot only envelope and nothing else should be included as the ballots are not opened at National but are forwarded to Lynne Villers, Elections Chairperson for count and verification by her committee.

ELEPHANT WORKSHOP CALL FOR PAPERS

The Sixth Annual Elephant Management Workshop scheduled to be held from 6-8 October 1985 at the Fort Worth Zoological Park has issued a call for papers. The workshop theme is "Conservation Through Management" and papers on conservation, management, husbandry, health and related subjects are solicited. Papers will be limited to 20 minutes, but if you have a brief presentation you would like to make, you may submit it under the heading of "Five Minute Paper". Special audio-visual equipment needs should be noted when sending in your paper. Deadline for submission of papers is 26 August 1985. Those whose papers are accepted for presentation will be notified of date and time by return mail. Papers should be sent to:

Program Chairperson - Ralph Houy
Elephant Workshop
Fort Worth Zoological Park
2727 Zoological Park Drive
Fort Worth, TX 76110



FROM THE PRESIDENT

Dear Members:

This year's National AAZK Conference is now a short two months away. At this time I would like to invite all of our members to come to Miami to share ideas and information about professional animal care with your peers.

Miami conference delegates will have the opportunity to visit Metrozoo, one of the country's premier zoos for exhibit of wild animals. The Miami area also abounds with other animal facilities specializing in the breeding and exhibit of marine mammals, primates, reptiles, fish and birds.

The variety of animal facilities in the Miami area acts to compliment this year's theme for presentations which is "Husbandry and Maintenance of Traditionally Difficult Animals". Delegates attending the conference from outside Florida will return to their facilities with new ideas and information about animal care particular to the species they work with or have interest in.

I hope that everyone who attends the conference is able to stay for the entire conference. If full attendance is not possible, I strongly suggest one, two or three day attendance instead. Even reduced participation will allow you to tour Metrozoo or Dreher Park Zoo, attend some social functions or the paper sessions.

Our conference hosts have selected the Coconut Grove Hotel for conference functions due to its location and ability to provide conference functions in a relaxed and comfortable setting. Delegates planning to attend the conference who want more information about activities in the Coconut Grove area should contact the South Florida Chapter AAZK. All delegates at the conference will benefit by staying at the host hotel since its central location will allow for easy transportation to facilities we are scheduled to visit.

Don't believe that the conference will be restricted to just sitting for papers or walking through facilities! Delegates will be able to participate in Zookeeper Olympics at Metrozoo on Tuesday or the traditional volleyball and soccer games Wednesday at Dreher Park Zoo. Our hosts also promise a memorable Chinese Auction and closing night banquet at the host hotel. For those delegates staying after the conference there will be the post-conference tour of the Everglades hosted by the South Florida Chapter AAZK.

Make your plans now to join your friends and professional peers in Miami in October for the 11th National AAZK Conference. I look forward to seeing you there.

Sincerely,



Kevin Conway, President



Births & Hatchings

SAN DIEGO ZOO.....*Jody Courtney*

Selected B&H from the San Diego Zoo and Wild Animal Park for June 1985 include: Mammals - 0.1 Blesbok, 0.0.1 West Mexican margay, 2.0 Indian rhinoceros, 0.1 Pygmy hippopotamus, 1.0 Southern pudu, 1.1 Chinese water deer, 0.1 Forest buffalo, 1.0 Wood bison, 1.0 Mhorr gazelle, 0.1 Persian onager, 0.1 Eastern kiang, 0.1 Barasingha deer, 1.6 Formosan sika deer, 0.1 Slender-horned gazelle, 0.1 Scimitar-horned oryx, 1.0 Uganda giraffe, 1.0 Brush-tailed bettong, 1.1 Ring-tailed possum, 1.0 Gemsbok, 1.1.1 California sea lion; Birds - 0.0.1 California condor, 4.0.1 Brown eared pheasant, 0.0.1 Palawan peacock pheasant, 0.0.2 Elliot's pheasant, 1.0.1 Himalayan monal, 2.0 Great black or palm cockatoo, 0.0.1 Green winged macaw, 0.0.2 Gang gang cockatoo, 0.0.3 Toco toucan, 0.0.2 Bali mynah, 0.1 Andean condor, 0.0.3 Manchurian or red-crowned crane, 1.0.1 Nicobar pigeon, 0.0.1 Abyssinian crowned hornbill, 0.0.1 Southern yellow-billed hornbill; Reptiles - 0.0.2 Mona Island lizard, 0.0.9 Horned viper.

REID PARK ZOO/TUCSON.....*Ed Hansen*

March to June 1985 B&H include: Mammals - 0.0.1 Bobcat (DNS), 0.0.2 Agile wallaby, 1.0 Celebes crested macaque, 0.1 Lowland tapir (DNS), 0.1 Llama, 0.0.1 Reeve's muntjac, 0.1 Blackbuck antelope; Birds - 0.0.7 Common rhea (1 DNS), 0.0.1 Luzon bleeding heart (DNS), 0.0.1 Goura pigeon, 0.0.7 Crimson wing parrot, 0.0.1 Blue and gold macaw, 0.0.1 Red crested touraco, 0.0.2 Mute swan, 1.0.1 Blackneck swan, 0.0.2 Paradise shelduck, 0.0.1 Mandarin duck.

ARIZONA-SONORA DESERT MUSEUM.....*George Montgomery*

B&H for April through June 1985 include: Mammals - 0.0.1 Bobcat (DNS), 0.0.1 Jaguarundi (2nd generation), 1.0 Desert bighorn sheep; Birds - 2.6 Wood duck, 0.0.4 Redhead, 0.0.1 Lilac-crowned Amazon, 0.0.1 White-fronted Amazon, 0.0.1 Blue-rumped parrotlet, 0.0.4 Common moorhen, 0.0.2 Harris' hawk, 0.0.2 Golden eagle (DNS); Reptiles - 0.0.4 Leopard gecko, 0.0.3 Western collard lizard, 0.0.2 Twin-spotted rattlesnake; Fish - 0.0.25 Sonoran chub and 0.0.25 Mexican Chinchlid.

CENTRAL FLORIDA ZOOLOGICAL PARK.....*Kathy Speckman*

November 1984 through May 1985 B&H include: Mammals 1.2 African pygmy goat, 0.1 Guinea baboon, 1.0 Black howler monkey, 0.1 Llama; Birds - 0.0.1 Medium sulphur-crested cockatoo, 0.0.1 Fischer's lovebird (DNS), 0.0.4 Rhea (DNS), 0.0.6 Ringneck parakeet, 0.0.2 African gray parrot, 0.0.2 Scarlet macaw, 0.0.14 Peafowl (Judian?), 0.0.3 Wood duck; Reptiles - 0.0.24 Monocellate cobra and 0.0.10 Broad-head skink.

BRONX ZOO.....*Bronx Zoo Chapter*

B&H for 27 May through 16 June 1985 include: Mammals - 1 Phyllostomus bat, 1 Lion-tailed macaque, 1 Common shrew, 1 Wisent, 2 Wild cavy, 1 Accouchi, 1 Large Malayan mouse deer, 1 Pudú, 2 Pere David's deer, 1 Mouflon, 1 Blackbuck, 9 Himalayan tahr, 1 Yak, 2 Guanaco, 2 Mongolian wild horse, 4 Snow leopard; Birds - 2 White-naped crane, 3 Dhyal thrush, 3 Temminicks tragopan, 1 White-browed robin chat, 1 Pale-legged oven bird, 1 African pygmy goose, 1 White-quilled black bustard, 3 Hooded crane, 1 Red bishop, 1 Andean quill, 1 Scarlet ibis, 2 Mandarin duck, 2 Guam kingfisher, 3 European hoopoe; Reptiles - 2 South American big-headed turtle, 1 Reticulated python, 2 Indian python, 10 Marbled newt and 1 Travancore tortoise.

BIRTHS AND HATCHINGS, Continued

TAMPA/BUSCH GARDENS.....Susan Rackley

B&H for June 1985 include: Mammals - 7.8 Impala, 6.1 Thomson's gazelle, 1.0 Gerenuk, 2.0 Grant's gazelle, 3.1 Scimitar-horned oryx, 1.0 Sitatunga, 0.1 Myala, 0.0.1 Chimpanzee, 1.1 Dorcas gazelle, 1.0 Blesbok, 2.0 Grevy zebra, 1.0 Sable antelope, 0.1 Reticulated giraffe; Birds - 0.0.2 Cockatiel, 0.0.1 Stone curlew, 0.0.3 Mandarin duck, 0.0.6 Indian peafowl (Blue Phase), 0.0.2 Abdim's (white-bellied) stork, 0.0.7 Mexican military macaw, 0.0.7 Ringed teal, 0.0.5 Crested tinamou, 0.0.8 Scarlet ibis, 0.0.1 Red-rumped parrot, 0.0.2 Hahn's macaw, 0.0.3 Black-necked swan, 0.0.4 Green-cheeked conure, 0.0.1 Scarlet macaw, 0.0.2 White-cheeked touraco, 0.0.2 Lesser snow goose, 0.0.1 Blue & gold macaw; Reptiles - 0.0.58 Nile Crocodile.

DALLAS ZOO.....Tamara A. Jones

B&H for June 1985 include: Mammals - 1.0 Dusky leaf monkey, 0.1 Suni, 0.0.1 Red panda, 1.0 Yellow-backed duiker; Birds - 0.0.3 Spur-winged lapwing, 0.0.1 Double-striped thick-knee, 0.0.3 Palawan peacock pheasant, 0.0.2 Himalayan impeyan pheasant, 0.0.3 Jandaya conure, 0.0.1 Roseate spoonbill, 0.0.6 White-headed piping guan, 0.0.2 Society finch, 0.0.1 Nicobar pigeon, 0.0.5 Fulvous whistling duck, 0.0.1 Sacred x black-headed ibis, 0.0.1 Bar-headed goose; Reptiles - 0.0.15 San Francisco garter snake, 0.0.8 Poison arrow frog (*Dendrobates auratus*), 0.0.3 Philippine sail-fin lizard, 0.0.4 Plumed basilisk lizard, 0.0.1 Double-crested basilisk, 0.0.2 Honduran milksnake, 0.0.2 Arizona mountain kingsnake.

SAN ANTONIO ZOO.....Debi Reed

June 1985 B&H include: Mammals - 0.0.4 Pygmy hedgehog tenrec (3 DNS), 0.0.2 Goeldi's monkey, 0.0.4 Spiny mouse, 0.1 Chapman's zebra, 0.1 White rhinoceros, 0.0.2 Kusimanse (DNS), 0.1 Addax, 1.0 Schimtar-horned oryx, 1.0 Dama gazelle, 1.0 Greater kudu; Birds - 0.0.1 White ibis (DNS), 0.0.2 Scarlet ibis (1 DNS), 0.0.10 American flamingo (2 DNS), 0.0.4 Moluccan radjah shelduck, 0.0.12 Rosy-billed pochard, 0.0.11 Red-billed tree duck, 0.0.9 White-faced tree duck, 0.0.5 Hooded merganser (2 DNS), 0.0.6 North American ruddy duck (DNS), 0.1 Andean condor, 0.0.1 Greater curassow (1st time in collection), 0.0.2 Roul-roul, 0.0.1 Elliot's pheasant, 0.0.1 Palawan peacock pheasant, 0.0.4 Ocellated turkey, 0.0.2 Inca tern, 0.0.1 Galah, 0.0.1 Sun conure (DNS), 0.0.4 Painted conure, 0.0.1 Red-crested touraco, 0.0.1 Speckled mousebird (DNS), 0.0.6 Pygmy kingfisher (4 DNS), 0.0.3 Lilac-breasted roller, 0.0.? Jackson's hornbill, 0.0.2 Toco toucan, 0.0.2 Dyahl thrush (DNS), 0.0.2 Common shama thrush, 0.0.2 Picathartes (DNS), 0.0.2 Diamond firetail finch (1 DNS), 0.0.1 Owl finch, 0.0.1 Red-billed buffalo weaver (DNS), 0.0.1 Superb starling; Reptiles - 0.0.2 Fan-footed gecko, 0.0.6 Honduran night lizard (2 DNS); Aquarium - 0.0.? Glass shrimp, ±65 Seahorses (2nd generation) and ±15 Lyretail cichlid.

MIAMI METROZOO.....Lori Bruckheim

B&H for May and June 1985 include: Mammals - 0.2 Himalayan tahr, 0.1 Grant's zebra (DNS), 3.3 Impala, 0.1 Chamois (DNS), 1.0 Scimitar-horned oryx, 1.1 Dromedary camel (1.0 DNS), 1.0 Kirk's dik dik, 1.3 Blackbuck, 1.2 Black & white ruffed lemur, 0.1 Addax, 2.1 Chinese water deer, 1.0 Slender-horned gazelle; Birds - 0.0.2 Yellow-billed stork (DNS), 0.0.2 Yellow-vented bulbul, 0.0.3 Stanley crane, 0.0.9 Mandarin duck, 0.0.3 Black-headed sibia (DNS), 0.0.2 Green wing dove, 0.0.3 Edward's fig parrot, 0.0.6 Java tree duck, 0.0.1 Common hoopoe, 0.0.4 Bamboo partridge, 0.0.1 Wattled crane, 0.0.1 Racket-tailed tree pie, 0.0.2 Demoiselle crane, 0.0.7 Red-crested pochard, 0.0.1 Chestnut-capped laughing thrush; Reptiles - 0.0.3 Spiny-tailed monitors.

BIRTHS AND HATCHINGS, *Continued*

ASSINIBOINE PARK ZOO.....*Phil King*

B&H for May and June 1985 include: Mammals - 2.0 Pronghorn (1 DNS), 4.1 California bighorn sheep (+1 aborted), 4.1 Stone's sheep, 1 Parma wallaby, 3.3 Eurasian reindeer (1 DNS), 0.1 Pere David's deer, 0.1 Arabian camel, 4 American bison, 4.5.6 Chinese water deer (1.4.2 DNS), 5.3 Woodland caribou (1.1 DNS), 2.0 Musk ox (1.0 DNS), 4.1.2 White-tailed deer, 2.0 Llama, 2.2 Elk, 3.1 Afghanistan markhor, 1.1 Mule deer, 1.0 Guanaco, 4.3 Alpine ibex, 0.0.1 Lion-tailed macaque, 1.0.1 Squirrel monkey (0.0.1 DNS); Birds - 4 Raven (1 DNS), 1 Barn owl, 15 Indian peafowl, 1 Triangular-spotted pigeon, 2 Bald eagle, 2 Golden pheasant, 13 Ringnecked pheasant (1 DNS), 4 Silver pheasant (3 DNS), 3 Fulvous tree duck (2 DNS), 1 Screech owl, 3 Barnacle goose (1 DNS), 3 Wild turkey, 2 Snowy owl (1 DNS), 2 African spur-winged plover (DNS), 1 Emperor goose (DNS), 2 Mandarin duck (1 DNS); Reptiles - 2 Girdled (*Cordylus*) lizard.

BROOKFIELD ZOO.....*John S. Stoddard*

June 1985 B&H include: Mammals - 0.0.3 Spiny mouse, 0.0.3 Degu, 0.0.4 White-toothed shrew, 1.1 Siberian ibex; Birds (Fledged) - 0.0.5 Hooded merganser, 0.0.4 Red-crested cardinal, 0.0.4 Grey-headed kingfisher, 0.0.3 Trumpeter swan, 0.0.1 Inca tern; Reptiles - 0.0.2 Hing-back tortoise.

PHILADELPHIA ZOO.....*Beth Bahner*

B&H for June 1985 include: Mammals - 1.0 Western lowland gorilla, 0.0.2 Lesser panda, 1.0 Guanaco, 2.0 Springbok, 1.0 Himalayan tahr; Birds - 1 Hermit ibis, 3 Caribbean flamingo (1 DNS), 5 Trumpeter swan, 1 Common white-eye, 9 Mandarin duck (4 DNS), 2 Hooded merganser (1 DNS), 2 Red & white crane, 2 Scarlet-chested parakeet, 1 Hooded pitta, 1 Scarlet tanager, 1 Emerald starling; Reptiles - 11 Uracoan rattlesnake (1 DNS).

MILWAUKEE COUNTY ZOO.....*Carol J. Boyd*

June 1985 B&H include: Mammals - 10.2 Piglets, 3.0 Dall sheep, 0.0.2 Zebra mouse, 0.0.1 Tree shrew, 1.0 Miniature horse, 0.0.1 Hoffman's sloth, 0.1 Waterbuck, 0.0.1 Vampire bat, 0.0.1 Mountain fruit bat, 1.0 South American tapir; Birds - 0.0.1 Laughing gull.

HONOLULU ZOO.....*Pete McLane & Margo Legen*

B&H for 13 April through 11 June 1985 include: Mammals - 1.1 Hawaiian sheep, 0.1 Toggenburg goat, 0.1 Water buffalo (DNS); Birds - 0.0.1 Grand eclectus parrot, 0.0.1 Glossy starling, 0.0.1 Burrowing owl, 0.0.2 Crested pigeon, 0.0.2 Jackass penguin, 0.0.2 Green-winged king parrot; Reptiles - 0.0.5 Day gecko (*Phelsuma g. guimbeaui*).

AFRICAN LION SAFARI (Cambridge, Ont. Canada).....*Ron Camron*

B&H for April through June 1985 include: Mammals - 2.2.10 Spotted fallow, 1.0.1 Elk, 3.3 Bison, 1.3 Eland, 0.1 Grant's zebra, 1.5.3 Japanese sika, 1.1 Yak, 0.0.4 Mouflon, 1.4 Black fallow, 0.1 Bengal tiger; Birds - 0.0.3 Whooper swan, 0.0.2 Military macaw, 0.0.8 Lanner falcon, 0.0.6 Prairie falcon, 0.0.1 Peregrine falcon, 0.0.2 Ferruginous hawk and 0.0.1 Harris hawk.

WOODLAND PARK ZOOLOGICAL GARDENS.....*Harmony Frazier-Taylor*

June 1985 B&H include: Mammals - 0.0.1 Vampire bat, 1.0 Straw-colored fruit bat (being hand-raised), 0.0.1 African crested porcupine, 0.1 Hof-fman's sloth (DNS), 2.1 Red panda (0.1 DNS), 1.1 Snow leopard (DNS), 0.0.1 Reeve's muntjac, 1.1 Pronghorn (being hand-raised), 1.2 Olympic elk, 0.1 Springbok, 0.0.2 Golden lion tamarin, 1.0 Patas monkey (DNS after being taken caesarean section); Birds - 0.0.6 Hooded merganser (0.0.3 DNS), 0.0.1 Snowy owl, 0.0.4 Black-necked stilt, 0.0.3 Common shoveler, 0.0.3 Northern pintail, 0.0.2 Patagonian crested duck (DNS), 0.0.2 Cardinal (DNS), 0.0.2 Common trumpeter, 0.0.3 Half-masked weaver, 0.0.4 Blue-crowned Mot-Mot; Reptiles/Amphibians - 0.0.3 Leopard gecko (0.0.1 DNS), 0.0.4 Florida Indigo snake (0.0.2 DNS).

The Florida Indigo Snakes, sexed as 1.1, have been sent to Dr. Dan Speakes of the Alabama Cooperative Research Unit, Auburn University. They will be part of a release project to take place in Georgia. There are plans to feed them tiny radio transmitters and follow their behavior.

By the way, I'm sure you're all wondering about the Prairie GODS, they are doing quite well.



Information Please

For a field study of leopards (*Panthera pardus*) in Sri Lanka, photographs of captive leopards are needed. Comparisons of such photos will allow us to determine if leopards can be individually identified via pelage or vibrissa spot patterns. We would appreciate photo/slides of spotted leopards in Zoo collections: photos of both the face (frontal and side views) and the entire animal (side view) are preferred. We will reimburse for mailing costs. Please send photos/slides to: Ms. Sri Miththapala or Dr. John Seidensticker, Department of Mammology, National Zoological Park, Smithsonian Institution, Washington, D.C. 20008.

The Pheonix Zoo is getting ready to open their first major multi-species exhibit in the form of an African veldt. The keepers, in an attempt to head off any problems that might develop, are trying to research many of the problems they forsee and would appreciate your help. We would like any information or suggestions concerning the exhibition of similar species, i.e. Thompson's gazelle and Slender-horned gazelle. We would like to research shade structures, hides and feeding techniques, introduction times and methods. In addition to the gazelles, we will be exhibiting giraffe, waterbuck and seven species of birds, the largest bird being the ostrich. Any problems and procedures with multi-species exhibits would be appreciated. Please send to: Joanie Stinson, c/o Phoenix Zoo, P.O. Box 5155, Phoenix, AZ 85010.

I am interested in longevity of Polar Bears in captivity and would like to hear from zoos with Polar Bears over 20 years of age. Send information to: Tim Kurkowski, Lead Keeper Carnivores, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.



Coming Events.

1985 ANNUAL CONFERENCE OF THE CANADIAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

September 4-6, 1985

Toronto, Canada

The Toronto AAZK Chapter will be taking an active part in this conference. For more information, contact Toby Styles, Manager, Public Relations, Metro Toronto Zoo, P.O. Box 280, West Hill, Ontario, Canada M1E 4R5.

1985 AAZPA ANNUAL CONFERENCE

September 8-12, 1985

Columbus, OH

The Columbus Chapter of the AAZK would like to cordially invite you to attend this conference. Our Chapter will be hosting a variety of activities. We would also like to invite any national AAZK member who cannot afford accommodations to contact Joe Ridler, accommodations coordinator, or Andy Lodge, Chapter President. Our Chapter can help arrange housing to ease your financial burden. Both can be reached at the Columbus Zoo (614) 889-9471.

THE FIRST INTERNATIONAL ZOO DOCENT CONFERENCE

October 3-5, 1985

Houston, TX

Hosted by the Houston Zoological Gardens Docent Council. The theme will be "Space-Age Education". For more information, contact Gwen VanSickle, 14522 Broad Green, Houston, TX 77079.

THE SIXTH ANNUAL ELEPHANT MANAGEMENT WORKSHOP

October 6-8, 1985

Fort Worth, TX

Held at Fort Worth Zoological Park. The theme will be "Conservation Through Management" and representatives from the Asian Elephant SSP Group will meet. For further information, contact Elephant Workshop, Fort Worth Zoological Park, 2727 Zoological Park Dr., Fort Worth, TX 76110.

THE 1985 AAZK NATIONAL CONFERENCE

October 20-24, 1985

Miami, FL

Hosted by the South Florida AAZK Chapter at the Metrozoo-Miami. For more information contact Rachel Rogers, AAZK Conference, South Florida Chapter, 12400 SW 152nd St., Miami, FL 33177.

1985 INTERNATIONAL MARINE ANIMAL TRAINERS ASSOCIATION (IMATA) ANNUAL CONFERENCE

Oct. 27-Nov. 1, 1985

Orlando, FL

Hosted by Sea World of Florida. For more information, contact Thad Lacinak, Vice President, IMATA, Sea World of Florida, 7007 Sea World Dr., Orlando, FL 32821.

COMING EVENTS, Continued

THE RAPTOR RESEARCH FOUNDATION SYMPOSIUM ON
THE MANAGEMENT OF BIRDS OF PREY

November 1-11, 1985

Sacramento, CA

For further information, contact Nancy Venizelos, Raptor Conservation Office, San Francisco Zoological Society, Zoo Rd. & Skyline Blvd., San Francisco, CA 94132 (415) 661-2023.

PA WILDLIFE ART FESTIVAL AND
NORTH AMERICAN SONGBIRD CARVING CHAMPIONSHIP

November 16-17, 1985

York, PA

Includes display of wildlife artists, carvers and photographers. A wildlife art auction will be held on Sunday afternoon. Sponsored by the York Chapter of Ducks Unlimited. For more information, please write to: Bill Wright, Chairman, P.O. Box 54, Glen Rock, PA 17327.

1986 AAZPA REGIONAL CONFERENCES

Southern Regional - Greater Baton Rouge Zoo, 16-18 March, 1985: for more information contact: Barbara Gorman, Greater Baton Rouge Zoo, Box 60, Baker, LA 70714 (504) 775-3877.

Western Regional - Point Defiance Zoo, 13-15 April, 1985: for more information contact: Tom Otten, Director, Point Defiance Zoo & Aquarium, Point Defiance Park, Tacoma, WA 98407 (206) 591-5337.

Great Lakes Regional - Milwaukee County Zoological Gardens, 27-29 April, 1985 (note date change from that previously announced): for more information contact: Mary Beth Carr, Milwaukee County Zoological Gardens, 1001 W. Bluemound Rd., Milwaukee, WI 53226 (414) 771-3040.

Northeastern Regional - Mystic Marine Aquarium, 4-6 May, 1985: for more information contact: Laura Kezer, Mystic Marineline Aquarium, Sea Research Foundation, Inc., Mystic, CT 06355 (203) 536-9631.

Central Regional - Fort Worth Zoological Park, 18-20 May, 1985: for more information contact: Dudley Brown, Fort Worth Zoological Park, 2727 Zoological Park Dr., Fort Worth, TX 76110 (817) 870-7050.



Keeper's Alert

OUR APOLOGIES -- The Riverbanks Zoo AAZK Chapter apologizes to the Tucson AAZK Chapter for duplicating their idea of a 1986 calendar. Instead, Chapter members voted to use the photographs to have greeting cards printed. We would again like to ask all members to submit black and white or color prints. Size is not important as we can handle reductions and enlargements. Those wishing to have their prints returned should send a self-addressed, stamped envelope. Deadline for submission of photographs is 15 September 1985. Please mail your prints to: Pat Hook, Riverbanks Zoo, 500 Wildlife Parkway, Columbia, SC 29210.



Primatologists Conference Underscores Importance of Member Participation

*Submitted By Pat Sammarco
Coordinator for AAZK
Continuing Keeper Education*

In June, in Niagra Falls, NY, the American Society of Primatologists met for their annual conference. This is a multi-disciplinary group of scientists and primate enthusiasts who offer an amazing array of experiences in every aspect of primate study. Wild and captive, anthropology, behavior and physiology, primate studies are presented in papers and discussions.

Abstracts from these sessions are available in the AMERICAN JOURNAL OF PRIMATOLOGY.

The value of attendance and participation in conferences cannot be stressed enough. We all can learn and share our thoughts and experiences with each other for the good of our animals and for our continuing education. Many Keepers are becoming specialists, and I highly recommend contact with specialist groups. Sharing with other zoo professionals is satisfying and productive, but adding the scope of other studies opens us to new awareness of our animals. As with any conference, these meetings also allow us to establish contact with others who share our interests.

This is where I again ask for your help. If you are a member of a specialist group, ask the secretary of the organization to make the AKF editors aware of conference dates. Going beyond this, please send me a description of the group, and its goals, for publication in this column and as information to our fellow Keepers. Help us all continue our professional educations.

Manual Review Project Changes --- *Submitted by Beth Poff Project Coordinator*

The Manual Review Project has been renamed Keeper Training Materials Identification Project. This change is to reflect the new direction this project is going in now. The purpose of the project is to identify any type of training material and to let keepers know of the availability of the materials. Right now the committee is focusing on training manuals and videotapes/films. There will soon be a listing of training manuals out informing you of each manual's contents, availability and in some cases, price. In the near future there will be a list of videotapes/films with the same information. If you know of any good training materials, please let me know by writing to me at Mill Mountain Zoo, P.O. Box 13484, Roanoke, VA 24034.

The following are the results from the questionnaire which was printed in the January 1985 Forum. After receiving only 10 responses; the committee sent out questionnaires to 87 zoos directly, we have received 41

CONTINUING KEEPER EDUCATION, *Continued*

responses from the mailing, for a total of 51 responses from 49 different zoos.

- 35 zoos have no formal keeper training program
- 14 zoos do have a formal keeper training program
- 11 zoos have their own manual or guideline/procedure booklet
- 20 zoos use the AAZPA Training Manual for reference or as a guideline
- 19 zoos conduct lectures (not always required attendance)
- 22 zoos have books or articles available to keepers
- 11 zoos have videotapes or films available

In addition six zoos commented that they use the AAZK videotape, other tapes mentioned were Fowler's Restraint and Capture and the Research Methods tape put out by the Minnesota Zoo. Five of the zoos made a point that only on-the-job training is used and that they felt more was needed. Four zoos are in the process of writing their own manual/guideline booklet. Training programs ranged from one to two-hour sessions, once a month to once a week. Some zoos only had training for entry level keepers, while other zoos would also have advance training for those who wanted to attend. Anyone who would like more details from the survey may get in touch with me.



Chapter

The Fresno Zoo AAZK Chapter would like to introduce their newly elected officers:

President.....Alan Baker
Vice President.....Sally Becker
Treasurer.....Lorraine LoStracco
Secretary.....Betty Barkman

News

The Fresno Chapter has taken on the project of making and posting signs for the zoo. Included are 'No Feeding', 'Zoo Hours Are', and 'Do Not Tap On The Glass' signs. One very individual sign we are creating is our 'Senior Citizen' sign. These signs will be displayed on or about the enclosures of our oldest zoo residents. This will aid the public in recognizing why some animals do look rather old as well as, hopefully, create a bond between some of our older visitors and older animals within our perimeter. Visitors may even go so far as to adopt such an animal through our Adoption Program.

In our desire to increase interest and enthusiasm in our organization, we have been enlisting a speaker for every meeting. Our speakers come from every animal walk of life and have helped in our meeting attendance.

On 31 July, 1985, the Fresno Zoo Society held their annual Meeting Picnic at the Zoo. Keepers opened up their sections to these Zoo Society members and guests for one and one half hours. Keepers stood by to meet people and answer questions about their sections and their animals. To close out the evening, our Elephant Keepers/Trainers gave an Elephant Logging Demonstration. These types of programs help to enrich the working relationship between the Zoo Society and the AAZK organization.

---Submitted by Betty Barkman





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An Encouraging Word.....

TOPEKA-BORN ASIAN WILD HORSE GOES TO CHINA

Marco, an Asian wild horse born at the Topeka Zoological Park's Conservation/Propagation Center at Forbes Field, was shipped by the Zoological Society of San Diego to the Beijing Zoo in the People's Republic of China on 7 July 1985.

Shipping Marco to China will enable the Beijing Zoo to introduce a new gene pool to their herd. The Beijing Zoo has the only captive herd in China at this time.

Marco was born in Topeka on 8 May 1980. In 1983 he was placed on breeding loan to the San Diego Zoo as part of the Species Survival Plan of the American Association of Zoological Parks and Aquariums. He is a proven breeder and sired a filly in April 1985.

To expedite the paperwork involved in shipping him to China, the Topeka Zoo has relinquished ownership of the horse. Arrangements for his travel were made by the San Diego Zoo with the approval of Topeka Zoo officials.

The Asian wild horse was thought to be extinct until 1874 when it was re-discovered by the Polish-Russian explorer, Przewalski. As of 1 January 1985, the total world population of this rare and endangered animal had risen to 600 specimens, all through captive propagation programs.

On an additional note, another Asian wild horse born at Topeka's off-exhibit breeding facility resides at the Nature Park Lelystad in the Netherlands. Topeka officials were recently informed by Jan and Inge Bouman of the Foundation for the Preservation and Protection of the Przewalski Horse in the Netherlands that this individual, a mare named Lory, had given birth to her first foal. The colt is called Lhagva, his Mongolian name which means Wednesday, the day of his birth.

The arrival of 1.1 Asian wild horses (noted in last month's B&H section) brings to 10 the number of foals born at the Topeka Zoo's Conservation and Propagation Center since May 1980.



Publications Available

The 1985 AAZPA Regional Conference Proceedings are now available for \$20 member rate, \$25 educational rate and \$40 nonmember rate. Also, a few copies of the 1984 Regional and Annual Conference Proceedings are still available at the same cost. To order, write: AAZPA, Oglebay Park, Wheeling, WV 26003. AAZPA pays postage and handling on all prepaid orders except foreign. Checks should be made payable to "AAZPA". Be sure to include complete name and mailing address when ordering.

The first edition of the Geoffroy's Tamarin Studbook was recently published by the Cleveland Metroparks Zoo. This work contains much new information on the species not readily available elsewhere. The studbook is North American in scope, but inventory information on British collections is included. Data is current through 31 December 1984 and includes pedigree information on 150 animals. For further information, contact Mike Vitantonio, Cleveland Metroparks Zoological Park, 3900 Brookside Park Drive, Cleveland, OH 44109.



Conference..... '85

AUCTIONS!

AUCTIONS!

AUCTIONS!

AUCTIONS!!!!!!!!!!!!!!

HAVE YOU EVER PARTICIPATED IN A CHINESE AUCTION?

This year at the Conference, we are offering not one, but two auctions. The first auction will take place Monday, 21 October, 1985, and is a Chinese Auction. What is a Chinese Auction you say? It is a silent auction. The items to be auctioned will be on display all day Monday and there will be boxes for your bids. You make your bid on a slip of paper, which will be provided, and you put your name, the item number, size (if applicable), and the amount you want to pay. The highest bid wins. You can bid all day Monday and that evening you can pick up your winnings in the Hospitality Room. We think you will have fun with this, because competition can be fierce, and you will have to think of ways to outsmart the competition.

The second auction will be the night of the banquet and will be the regular auction with which you are all familiar. We hope to have a good selection of quality items for this auction. We have already received from Seattle a hand-tooled, leather painting of a rhinoceros, mounted on wood. This is a beautiful piece and a real collector's item.

So please send in either the items you want to contribute to the auctions, or send the forms which were a part of the registration packets, or just put on a piece of paper a description of the item, the quantity (if more than one), sizes (if applicable), the value of the item, and your name and address. We need either the item or the written descriptions by 15 September, 1985, so we can get these auctions set up. We hope to have the best auctions to date, and we need you to do it. Thanks and we are looking forward to seeing you in Miami in October!

Hertz has been appointed the official car rental suppliers for our upcoming conference. Special low rates have been negotiated for this event, to help economize on travel costs. The special rates will be available one week before and one week after the Conference dates if you are planning on building in a vacation around the meeting. Rates include unlimited mileage, no drop charges if vehicle is turned in at Florida location other than pick-up point. No advance reservations are required, but reservations made at least two weeks in advance will help assure your choice of vehicle size. For reservations and information call the Hertz Convention Control Center: 1-800-654-2240 and make sure and identify yourself with the AAZK National Conference. Convention Discount rates are as follows:

<u>CAR CLASS</u>	<u>1-4 DAY RENTALS</u>	<u>5-7 DAY RENTALS</u>
Subcompact (A)	\$22.80/day	\$69.00/week
Compact (B)	\$25.80/day	\$89.00/week
Midsize (C)	\$27.80/day	\$99.00/week
Full-size (2-door/D)	\$30.80/day	\$129.00/week
Full-size (4-door/F)	\$33.80/day	\$159.00/week



Viewpoint

CULTIVATING A PROFESSIONAL STAFF

By
Tom Rudolph
Animal Exhibits Engineer
North Carolina Museum of Life & Science
Hillsboro, NC

Zookeeping is a high profession similar in many respects to nursing. Quality performance involves consistently taking care of thousands of tiny details everyday. An ordinary day for a keeper is very undramatic and yet the life, happiness and security of many animals rests most directly on the Keeper. In fact, the less dramatic a keeper's day is the better the job he or she is doing.

The smiling keeper who is lolling in front of his exhibit may appear to be doing nothing, yet if he is a real keeper he is doing more than watching the girls. He is observing his animals, acting as a guard, and talking to the public.

The best public relations is the one to one contact each zoo employee has with the public. This is why the director tours dignitaries through the zoo, and this is also why the keeper should be taught to treat each person as if he were the mayor.

When the keeper's enthusiasm rubs off on the general public, revenue and support flows. The keeper both earns respect and insures his position when he explains the intricacies of his job and the personalities of his animals to the public.

Morale is extremely important in zoo work, even the newest volunteer must be impressed that he is the first line of defense for the animals. The most menial jobs of the zoo are the most important. Training is necessary even for the jobs that appear childishly simple, so that the details and order of events can be consistently repeated.

When training new employees it is important that the supervisor takes extra time to go beyond just showing them the mechanics of their job. Explaining the theory behind diet, cleaning, and observation techniques helps promote the necessary understanding and respect for procedures. It should also encourage the new keeper to ask many questions, and answering the questions helps to polish the supervisor's act.

Slowing down and telling the new keeper anecdotes about his savage charges can help to promote genuine friendship and help to allay the fears any person has towards wild animals. Constant watching, sharing stories and observations helps to preserve a good attitude toward activities that on the surface appear boring and menial.

The new keeper must be impressed that regardless of what activity he is involved in, his first priority is observing the animals. New keepers must be closely watched because the glamour wears off quickly. After he or she has been bitten, snapped at and nipped, the new keeper might discover that he doesn't have the undying interest it takes to tackle boring, dangerous or dirty jobs.

It is hard enough to attract good people. It is impossible to keep them

CULTIVATING A PROFESSIONAL STAFF, Continued

unless a happy atmosphere of respect and morale is maintained. And by good people I do not necessarily mean people of high intelligence. A person who is so smart that he or she doesn't need to follow instructions or ask questions is a danger to his or her animals.

The person who is cautious, follows instructions and asks questions will always be a superior person. This keeper is the backbone of animal keeping.

The Keeper I is the most precious resource of any zoo. The day when the keeper was a menial slave badgered into doing the dirty work is passing - just as the roadside menagerie and the cramped municipal zoo is passing.

The modern keeper is a person who has a sense of purpose and frequently is highly educated. Such a person, cultivated, with careful training, encouraged to question his superiors, and share observations, will work like a dog for very little money and no recognition.

It is a sad fact that often just as a keeper begins to mature in his trade, he or she is forced to leave the profession for economic reasons. Any person who wants to own his own home or pursue the American Dream will find this extremely difficult on a keeper's salary.

Many zoos cannot pay well, and often the city council, board of directors, or even the zoo director fail to recognize the value of professional staff.



AAZK REGIONAL COORDINATORS

Linda Rohr, W.D. Stone Memorial Zoo	- ME, VT, NH, MA, RI, CT
Vacancy	- NY
Gene Pfeffer, Philadelphia Zoo	- PA, NJ, MD, DE
Angela Keppel, National Zoo	- VA, W. VA, D.C.
Lee Payne, Detroit Zoo	- MI
Lynne Villers, Indianapolis Zoo	- IN, OH, KY
Larry Sammarco, Lincoln Park Zoo	- WI, IL, MO, MN, IA
Diane Krug, Riverbanks Zoo	- TN, NC, SC
Alan Sharples, Atlanta Zoo	- FL, AL, GA, AR, MS, LA
Candy Croft, Rio Grande Zoo	- TX, NM, CO, OK, KS, NE, SD, ND
Laurence Gledhill, Woodland Park Zoo	- WA, OR, ID, MT, WY, AK
Joanie Stinson, Phoenix Zoo	- CA, NV, AZ, UT, HI
Vacancy	- Canada



THE ANIMAL DATA TRANSFER FORM PROJECT

By
Bernard Feldman, Project Coordinator
Burnet Park Zoo, Liverpool, NY

In the fall of 1977, some of the keepers at the Lincoln Park Zoo in Chicago held a "rap session" with several other invited keepers from the Midwest to talk about a Data Sheet that could be included with the shipment of animals. From that "rap session" was spawned a very successful Animal Data Transfer Form project (ADT-Form).

Throughout its history, during which time I have served as coordinator, the ADTForm has been modified in various ways according to the input from keepers via the AAZK Board of Directors and through two surveys, one of which was published in the Animal Keepers' Forum. It is a project that is totally funded by AAZK; given to whomever requests it and is sent FREE, a professional courtesy of AAZK. However, anyone who desires to support this worthwhile project, please send contributions to the National Headquarters in Topeka, KS.

The ADTForm is sent in the shipping process to the receiving institution from the sending institution. The explicit purpose of the ADTForm is to supply information about shipped animals to keepers, administrative staff and veterinarians that is not normally found on health certificates or in other papers required during the shipping process. The ADTForm is best used when it is not duplicated on a copy machine which costs the user money. It is a document that is made in a triplicate format on pressure sensitive paper. Requests for shipment of a supply of ADTForms are made as soon as the communication is received by me with delays held to a minimum.

It is hoped that all zoos, aquaria, animal parks and animal dealers use the ADTForm as the standard data shipping form that accompanies health certificates and other documents necessary for intra- and interstate travel. This can be done by simply contacting me by postcard, letter, telephone or telegram for a FREE supply of ADTForms. The most common request of ADTForms is for 50 forms, with an occasional 25 or 100 to smaller or larger institutions.

Anyone who uses the ADTForm has an opportunity to contact me directly for any changes they may want to see incorporated in the Form pending the AAZK Board of Directors' approval. I feel this offers a great chance for participation in one of AAZK's projects.

This is one of those projects that an organization finds is beneficial to so many people and animals that the organization wants to share it with every institution that has a potential use for it. When it is not considered or used, all that usually remains is an animal shipped with many questions about the animal on the receiving end unless private data shipping forms are used.

The ADTForm project is now about 8 years old. During that span of time, I've witnessed a professional development in the Form and a gaining acceptance of it on both national and international levels. Presently about 120 Zoological Parks, Aquaria and other animal parks are currently using or have requested the ADTForm.

For an order of ADTForms please contact: Bernard Feldman, Burnet Park Zoo, Box 146, Liverpool, NY 13088. Note: I have just moved from the Topeka Zoo, Topeka, KS to the Burnet Park Zoo in Liverpool, NY.



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

PRELIMINARY PHYSICAL EXAMINATION

Early diagnosis is essential for successful treatment of a debilitated animal. Below is a checklist of some diagnostic considerations important in evaluating the health status of a reptile, and Table I lists some frequent complaints of reptile owners with comments on possible causes. A more in-depth discussion about reptilian health problems will follow in this series.

LACK OF COORDINATION - may indicate a central nervous system disorder. Also, Streptomycin is toxic to reptiles, and can cause incoordination if used in their treatment.

LAMENESS - can be attributed to such conditions as calcium deficiency, a birth deformity, gout (Part 12), metabolic bone disease, or trauma injury.

EYES - requires careful examination. Cataracts may indicate that a reptile is suffering from vitamin D and calcium deficiencies. Cataracts are common in aged animals. This problem may also be observed in young monitor lizards; however, the cause is unknown. Swelling of the eyes (palpebral edema) in chelonians indicates vitamin A deficiency or toxicity in these animals (Part 11). However, tearing is normal in chelonians: tearing cleanses their eyes. Sunken eyes in any animal may indicate starvation, dehydration, or disease.

NASAL PROBLEMS - such as discharge, blockages, audible breathing, and shortness of breath (dyspnea) may indicate bacterial, fungal, or parasitic respiratory problems.

MOUTH - discharge may indicate pneumonia or mouth rot in reptiles. A continually gaping mouth could mean the animal has pneumonia or parasites within its mouth. Also, snakes will gape if an old shed has been retained. Loosening or loss of teeth is normal in snakes, lizards, and crocodylians unless nutritional deficiencies of vitamin D and calcium can be demonstrated. Ulcerations in the mouth is most probably attributed to mouth rot.

SKIN DISORDERS - may manifest as cutaneous and/or subcutaneous swellings or nodules in reptiles. For example, this integumental problem may involve parasitism, tumors, bacterial or fungal disorders, or blister disease in snakes. Furthermore, food animal wounds occur when the novice feeds live prey to his pet reptile; therefore, it is important that reptiles be offered only dead food animals. Minute, rounded spots of hemorrhage (petechiae) or varying sizes of red patches of the skin (erythema) indicate septicemia. Resilience of a reptile's skin indicates the state of hydration/dehydration of the animal. Shedding difficulties are primarily a concern in snakes and will be discussed under commonly encountered disorders. Several shell disorders occur in chelonians such as fractures due

Table 1. Frequent Complaints of Reptile Owners

Complaint	Possible Causes
Snake off feed	<p data-bbox="184 631 205 1246">Ambient or water temperature too low or too high</p> <p data-bbox="236 197 308 1246">No thermoregulatory provisions (entire cage at one temperature, or one temperature provided on a 24 hour basis)</p> <p data-bbox="339 788 360 1246">Improper light source or photoperiod</p> <p data-bbox="391 718 412 1246">Improper water supply for aquatic animals</p> <p data-bbox="443 944 464 1246">Hiding area not provided</p> <p data-bbox="495 423 515 1246">Housing too small (animal cramped) or too large (animal insecure)</p> <p data-bbox="547 892 567 1246">Sudden change in environment</p> <p data-bbox="598 145 619 1246">Feeding during wrong time of day (consider: diurnal, crepuscular, or nocturnal animal)</p> <p data-bbox="650 145 671 1246">Feeding during wrong time of year (may discontinue feeding from October through April)</p> <p data-bbox="712 1031 733 1246">Wrong food source</p> <p data-bbox="764 951 785 1246">Inappropriate food size</p> <p data-bbox="816 197 888 1246">Improper presentation of food (offering from over animal's head, wiggling food too rapidly or not rapidly enough, food too cold, etc.)</p> <p data-bbox="919 302 940 1246">Threatened by live food animal (pre-kill, and feed only dead food animals)</p> <p data-bbox="971 944 992 1246">Animal preparing to shed</p>

Table 1. (cont'd)

Complaint	Possible Causes
Animal regurgitating	Ambient or water temperature too low Overcrowding Food animal too large Handling too soon after feeding Lighted cage 24 hours per day (no photoperiod) Parasitism; other systemic disorders
Animal not shedding properly	Ambient temperature too high Humidity too low Stress such as excessive handling, loud noises, vibrations, or overcrowding Malnutrition Skin problems such as trauma or dermatitis Systemic disorders No shedding implement provided (log, rock, etc.)

to trauma, necrosis from an accumulation of algae (some experts disagree that algae causes shell problems), softness which occurs with malnutrition, and ulcerations which may be due to Septicemic Cutaneous Ulcerative Disease (SCUD) or mycobacterial dermatitis (gram-positive, rod-shaped, aerobic bacteria that affects the skin).

SKELETAL DEFORMITIES - can be attributed to birth defects, malnutrition, or improperly healed bones. Soft or fractured bones may be caused by trauma, osteomyelitis (inflammation of the bone and marrow), and malnutrition.

GASTROINTESTINAL PROBLEMS - are numerous! Constipation or intestinal obstruction could indicate parasitism, dehydration, a fur mass, or mycobacterial induced nodules. Causes of diarrhea and black stools can include parasitism, bacterial infections, or poisoning. And lastly, regurgitation of food or blood may also be caused by parasitism or poisoning. Other causes of regurgitation may be from behavioral anorexia, septicemia, a tumor, improper food, temperature, and/or handling.

EXCESSIVE WEIGHT LOSS - may be caused by nutritional deficiencies, malabsorption syndrome, mycobacteriosis, nutritional goiter, parasitism, pneumonia, or mouth rot. Also, novices who are not familiar with a reptile's housing and dietary needs may allow their pet to suffer retarded growth.

It is important that the preliminary examination also include sequential fecal examinations. When no stool is available, the veterinarian should administer a tepid water enema to aid in the collection of parasite eggs. Expelled fluid can then be centrifuged and sedimented for microscopic examination.



KEEPER TO KEEPER - A Forum for Husbandry Problems and Solutions

(Editor's note: At the suggestion of Wildlife Biologist Steve Miller of Grandfather Mountain, Linville, NC, we are initiating this column in the hope of further sharing the vast amount of knowledge contained within the AAZK membership. Members are encouraged to write responses to questions/problems printed in this column. The following month, the original question will be restated along with answers/solutions submitted. If you have a question on husbandry problems you have encountered and would like to hear from your fellow keepers on possible solutions, submit it to: Keeper to Keeper, AKF Office, 635 Gage Blvd., Topeka, KS 66606.)

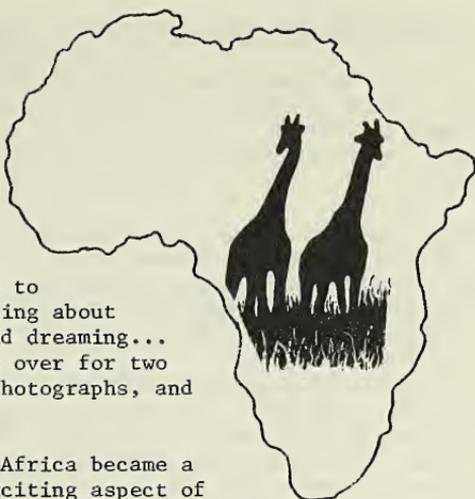
This month's question is from Steve Miller, Wildlife Biologist at Grandfather Mountain in Linville, NC:

"Has anyone had experience with a malady commonly called "Limberneck" in the larger cats? The symptoms usually are a weak neck, low-held head, abnormal gait and somewhat depressed appetite. The symptoms usually appear in young or subadults. Vets I have consulted give differing causes and treatment."



ARE YOU GOING BACK TO AFRICA AGAIN?

By
Gary K. Clarke, Director
World Famous Topeka Zoo
Topeka, KS



Like many people I had always wanted to go to Africa". After years of reading about it, attending films and lectures, and dreaming... I thought it would be exciting to go over for two weeks, view the animals, take some photographs, and get my fill.

Well, after the first trip in 1974, Africa became a part of me--and it became such an exciting aspect of my life that I wanted to return. As it happened, a second safari developed, and then a third, and now I've been more than a dozen times. And I am ready to embark again in November--to Kenya with the AZK.

Some people have asked: "Why don't you go to South America, or Australia, or the Galapagos? Why go back to East Africa again?"

Even though I have gone to many of the same areas of East Africa (sometimes at the same time of the year) for more than a decade, it is not the same Africa. Things change: weather, people, animals, conditions. I have seen new things on each trip, even at the same places.

You can read all the books, see all the films, hear all the stories, and talk to all of your safari-going friends, but you cannot comprehend Africa until you personally have been there--you have to experience Africa to understand it. Once you have it is virtually impossible to convey to someone else what Africa is all about. But, to use a meager form of communication (words--especially in my limited vocabulary), let me say that when I think of Africa, I think of the big expanse of African sky. I have never seen sky so wide anywhere in the world, even on the western plains of Kansas. Africa is...well, you can't get it all in, even with a wide-angle lens. The cloud formations are ever-changing and the sunsets are glorious, as are the sunrises. Africa is a beautiful, vast, natural area.

The rivers--such character to the rivers, twisting and winding, with giant boulders in the center and steep banks rimming the edge. The mountains, from the roof of Africa--the top of Kilimanjaro--down into the Great Rift Valley, that huge natural gash in the earth that runs from the Red Sea to Zimbabwe (and could be seen from the moon by astronauts) to the alkaline lakes; the forests (particularly the mountain rain forest); the open plains and savannahs--all are fantastic surprises.

The routine, the biological rhythm of the day. The sun comes up at 6:30 a.m. and goes down at 6:30 p.m., every day. You're up with the sun, and the birds in full song--Africa is alive and smiling and you don't want to miss out. You breathe clean air, you eat well, you sleep well, you feel good, you are living close to nature and sharing with a group an experience that is unique and unlike any other in the world.

The people of Africa. I initially went over to Africa to see the animals, but it quickly became intrigued with the people. In fact, I was so impressed on the first trip that I now have as much interest in the people as I do in the animals. They are as much a part of Africa as the animals.

ARE YOU GOING BACK TO AFRICA AGAIN?, Continued

To see the various tribes, to learn a little Swahili, to communicate with these people in their language; to learn something about their way of life, to have them teach you (and they are anxious to teach you)--all of these things are so significant, and so meaningful--things you will treasure forever.

Revisiting some of the more familiar settings has its own special reward. To go half way around the world and see an individual of a particular tribe whom you first met years ago, and for their eyes to light up and break into a big smile and remember you from previous safaris is an experience unlike any other.

If you are a photographer, Africa is a dream come true for both the professional and amateur. I don't care how inexperienced you may be or how basic and limited your equipment may seem to you, you can't help getting fantastic pictures. Africa is Africa, the animals are close to you, the scenery is spectacular--the lodges, the trees--even the people in your group will be excellent subjects for photography.

A tape recorder also can be an important part of the trip. You can capture the mood and the spirit of the moment--sometimes silence, sometimes laughter, and always the excitement when an animal is first spotted, and everyone is whispering excitedly ("Look at that!"), with cameras clicking and whirring.

There is so much excitement each day. So many activities and events fill your mind and your heart and your soul--to the point that each evening you feel like a bottle of cola that is overflowing with effervescence. It simply overwhelms you with sights and sounds, majesty and splendor.

By the time you have finished the safari your brain feels like scrambled eggs because so many thousands of impressions have gone through your eyes and into your mind and have become part of your system.

When you are in Africa your whole lifestyle changes. Your entire perspective on life undergoes a great transformation and when you return home you will find that unconsciously you have undergone some permanent, positive changes. You will view things differently and approach life with a new awareness. Africa has a magical effect on you and your life.

Certainly there are many other fantastic areas on earth but...nothing can compare with Africa, I don't care what it is.

(Editor's note: This year's AAZK East African Safari, led by Gary K. Clarke, will depart from New York City on 23 November and return on 6 December 1985. Cost from New York is \$2285 and includes travel, lodging, meals, etc. Check the exciting itinerary in the AAZK Safari brochure. If you do not have a brochure, call National Headquarters (913) 272-5821 and one will be sent to you. Time is running out to participate in this two-week African adventure, especially designed for AAZK by Park East Tours so make your reservation NOW!)



THE USAGE OF A FEEDER IN THE CARE OF
CENTRAL AMERICAN RIVER TURTLES
AT THE FORT WORTH ZOO

By
Kellye Snyder and Kelly Hightower
Aquarists, Fort Worth Zoological Park
Fort Worth, TX

proper care of the Central American River Turtle (*Dermatemys mawii*) can be difficult and often requires special feeding techniques. The Fort Worth Zoo Aquarium has acquired a pair of these threatened turtles and the male of the pair has lived up to the finicky reputation of this species.

Our female *D. mawii* was obtained from the U.S. government. The turtles were the subjects of tests comparing biopsies of their muscular tissue with those of sea turtles used in turtle soup. The goal was to be able to recognize the type of turtle meat in the soup in order to keep *D. mawii* off the dinner table. Unfortunately for *D. mawii*, its meat was described as "quite good". When the female arrived, she was placed in a 2000-gallon display tank housing a variety of fish and turtles. After familiarizing herself with her new home, she settled down and quickly learned to accept the assortment of fruits and vegetables. She not only ate from the bottom of the tank (Campbell, 1972), but would also readily feed at the surface. In time, she learned to accept horse heart strips fed by hand. She was by no means hard to please from a dietary standpoint. When our male *Dermatemys mawii* arrived, our problems began.

The male was acquired from Houston. He was reported as having little or no appetite. He had some abrasions on his carapace and it was felt that a period of rehabilitation might bring back his desire for food. When he arrived, he was placed in the tank with the female and promptly went into hiding. He found a fortified position on a rock ledge and seemed to be somewhat stressed. All efforts to persuade him to eat failed. The items that the female was accepting were offered -- and more. There was no positive response.

Aggressive behavior on the part of the Giant Gourami (*Osphronemus goramy*) was noted. The offender was removed and the male *D. mawii* began to venture forth from his hiding place. At that point, the female became the oppressor. She would chase him around the tank with her jaws agape and nip at his head and tail. Although her displays resulted in no damage to the male, it was decided to remove her from the tank. The grounds were incompatibility.

At this point all aggressive tankmates had been removed, but the male still refused to accept the food offered. Using information obtained by Rick Hudson of the Fort Worth Zoo Herpetarium, a feeder (Fig. 1) was constructed to allow food to be dropped to the bottom of the tank. The feeder was made of a plastic container measuring 3½" diameter by 5¼" high. A 3" by 4" opening was cut in the side. A weight was attached to the underside of the feeder, and a length of nylon string was tied across the opening to prevent food from floating out while still allowing easy access. Materials used in the construction of the feeder had to be soft enough to prevent the turtle from injuring himself while eating.

Fruits and vegetables were placed in the feeder and dropped to the bottom of the tank. He began to investigate immediately and to munch leisurely

THE USAGE OF A FEEDER IN THE CARE OF A CENTRAL AMERICAN RIVER TURTLE AT THE FORT WORTH ZOO, Continued

on the food, much to our relief! He has continued to eat from the feeder and has also accepted floating food.

In summary, we have found that often *D. mawi* requires special feeding techniques. Our experience and the literature points out the importance of getting the food to go to the bottom of the tank, at least initially. We also believe that a submersible feeder is a safe, easy way to "put the food where the turtle's mouth is". The feeder which we designed is very functional and has proven a success. It is also recommended that a large variety of food stuffs be offered. Foods that we have offered and that have been accepted include: lettuce, cooked sweet potato, apples, bananas, and turnip greens. In the time since, he has also been observed nibbling algae off the rocks in the tank.

Once the crucial problem of diet is solved, other aspects of turtle culture can be explored. If you are having trouble getting your *Dermatemys mawi* (or other turtles) to eat, consider building a feeder. It has certainly relieved one of our big problems and possibly can for you as well. Good luck!

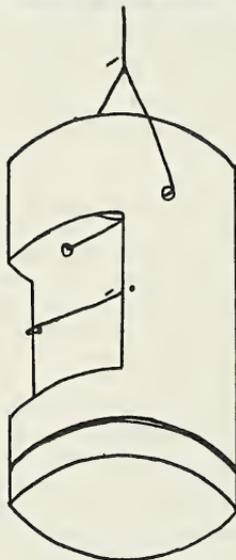


Fig. 1

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Acknowledgements

We wish to thank Rick Hudson for all of his help in gathering useful information and to the Oklahoma City Zoo for giving us the suggestion which led to the development of the feeder.



ONE OPINION ON ANIMAL TRAINING

By

Dora M. Jacobs, Senior Herpetarium Keeper
Rio Grande Zoo, Albuquerque, NM

Part II: What to Do

Training an animal, any animal, including a child, consists of the following procedure:

1. Get the animal's attention. The method varies with the species and the individual. You can give a social signal common to the species or put the animal under physical control. Collars work for carnivorous mammals, halters for hoofstock. Addressing some animals by name is sufficient. A two-by-four applied to the cranium, contrary to popular belief, usually prevents learning. Restraint devices must not hurt unless deliberate pressure is applied. They must be escape-proof and do no physical damage. Training is much easier if started in babyhood when the handler is bigger than the animal.

2. Define the command. Physical demonstrations must be given for anything that does not understand speech, and a physical demonstration in addition to or even instead of speech also works best for humans. Leverage and gravity can control an animal stronger than you are. Flight distance can be effectively used to control the movement of an animal if you are careful not to crowd it into a panic. This is the principle used for herding. For the most part, however, fear only paralyzes an animal and makes it incapable of thinking or responding.

3. Reward a correct response. The reward must be consistent with the species' culture in order to be recognized as such. A smack on the rump would scare a horse half to death while a low word of praise would reassure it. Leaving some animals alone is the best praise. Food works for some, but only if they're hungry and emotionally secure.

4. Correct a wrong response. "Correct" means to cause the animal to revise its action until it makes a correct response. It does not mean hurting it without explanation or terrifying it. Punishment just plain doesn't work; it only makes the animal afraid of you. Leverage and psychology can be used to modify an animal's actions. Never give a command you can't enforce during the training period. The animal must be convinced that it is physically impossible to disobey you. Although corrections need to vary with the command, a general negative word such as "no" or "quit" can often be used in an emergency situation. Some animals are influenced by verbal correction and some don't care whether you approve or not. Deaf animals are not influenced by verbal correction, or commands for that matter. Some animals are influenced by personal correction, but some must experience a direct consequence of their own acts in order to be impressed. We must gain personal dominance over some animals. The elephant ankus is our patriarchal trunk. Pinning a dog to the ground by its throat gives us much more control than bellowing obscenities at it. A jerk on the halter rope of a camel can back up a harsh word effectively until only the word is needed. Solitary animals such as many cats need a physical incentive to do anything. Bribery works to condition solitary species of felines.

5. Drill a command with immediate enforced response until the animal's response is a conditioned reflex rather than a conscious choice. At this

point the animal obeys before it thinks. Deciding what to do next can only be considered a form of thinking.

Once an animal clearly understands a command, it should be set up and tempted to disobey, so that the correction can be taught. Even more important, it will learn that obedience is always necessary. No temptation is unfair so long as the animal understands the command and is given no conflicting commands by the handler. Male show dogs are often required to be in the same ring as in-season females, and they learn to keep their minds on their work. In an emergency is when you most need to be able to count on obedience. Train for emergencies by drilling among distractions in varied locations once the commands have been learned.

In a zoo, an animal is often required to obey several handlers, and to transfer its obedience to new handlers periodically. For this reason it is imperative to have a rigid training schedule and insist that all handlers stick to it. Commands, routines, and enforcement must always be the same no matter who the handler is. Authority must be transferred to a new handler by having them watch an experienced one to get the formula down, then work the animal in the presence of the experienced one, with the experienced handler backing up corrections at first if need be. Any animal will test the limits of a handler, and push its luck further every time if allowed to get away with an infraction, until it establishes its dominance over the handler or just plain disregards the handler's presence and does its own thing. Maintain human control.

Untraining is always more difficult than proper training in the first place. No animal should be allowed to practice improper responses. If there is not an effective correction available the animal should be physically prevented from making the undesirable action or the routine should be changed, omitting the command until a sabotage is devised or the animal forgets and retraining can be started at the beginning. Reliability of response is built up with repetition and effective control.

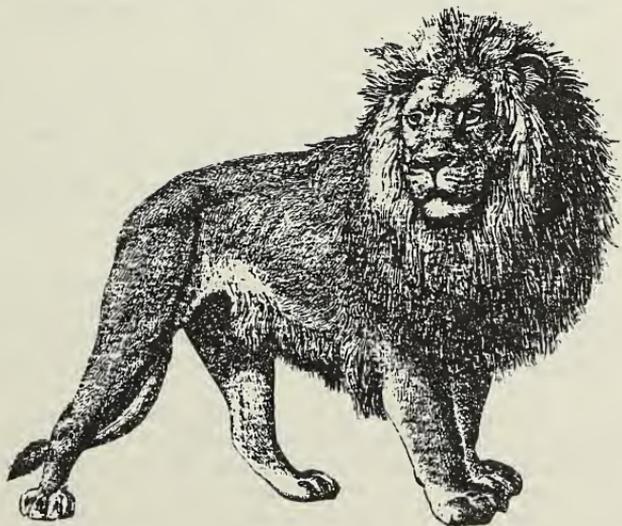
Species differences must be kept in mind during training. Horses and dogs hear much better than we do. Yelling at close range can cause pain in their ears. They can hear a clearly articulated quiet command much more clearly than a loud one. A chain clanking near their ear will make them deaf to our commands. Hoofstock all spook easily if we fidget around. Visual static can also befuddle anything working at a distance on hand signals. Snakes are deaf and can't learn commands. Parrots don't smell so can't be taught scent discrimination. Hoofstock don't see at all behind right in front of, or above them where they have blind spots. Old animals often go blind and deaf. Many solitary wild animals hate to be touched. Petting will only insult or frighten them. Staring many animals in the eye frightens them. For others it is necessary in order to dominate them. Dogs can be conditioned to tolerate a direct gaze from a handler once they accept dominance. Figuring out the proper correction for a particular command for a particular animal can be tricky. It takes planning and foresight, not to mention understanding and insight. Also patience.

As an example of the technique, suppose we want to teach a llama to lead. We put a halter on it with a lead rope long enough to run a big loop over its back and behind its haunches. We pet it and speak to it to reassure it. Then we give the command, say "Lead", in a clear voice all by itself. That instant, we look forward and step out briskly, holding the lead a ways beneath the llama's chin. If the llama keeps right with us, we praise it softly. If the llamas doesn't follow, the lead rope will tug on its

head and then its rear end. It will likely surge forward to get away from the unseen pressure at its rear. As it comes forward, we praise it softly. If the llama braces its four feet and puts on the brakes, we let up on the pressure long enough for it to lose its balance, then head off to the side. Physics says it will have to follow. We move fast enough to prevent its getting another grip on the ground, and when it is in the proper position, praise it softly. We do not repeat the command in any case, but once the command has been executed in a reasonable facsimile of correctly, we stop and start over with a new command. If there was resistance the first time, we prevent the repetition by casting directly off to the side rather than straight ahead. We do not watch the animal so as to prevent adjusting our actions to those of the animal. The animal is supposed to adjust its actions to ours.

If the animal gets into trouble, say by going the wrong way around a post, we won't notice until it trips itself emphatically, and then we can quietly stop and wait until it untangles itself for a new start. In that case, it would be a very good idea to make several trips past that very same post in the course of the training session so that the animal can learn to pass on the same side of it as we do and thereby avoid jerking on its head. Praise heavily when it responds properly, and pay as little attention as possible when it trips itself. We can't be blamed if we're not even watching. The animal will learn to take responsibility for its own actions. Timid animals gain self-confidence that way, and dominant animals learn respect. If our llama is a biter, it would pay to deal with that problem separately by muzzling the animal for lead breaking. Notice that at no point in the procedure did we beat, browbeat, or bully the animal. Notice that we also never gave it any choice in whether or not it obeyed a command. We made obedience necessary and not unpleasant. In fact, disobedience was rather uncomfortable. As long as we hold the lead so that it will pull on the head before it is choked up enough to put pressure on the rear (this may require two hands on the rope), the animal will learn that the most comfortable and untraumatic thing to do when we say "Lead" is to follow swiftly wherever we go. As a bonus, there will be praise.

(Editor's note: Part 3 of this subjective series on Animal Training is entitled "What Not To Do" and will be published in the September issue of AKF.)





Introducing

JUNGLEWORLD

By
Marilynn LaVine, Press Representative
The New York Zoological Society
Bronx, NY

JungleWorld, one the most ambitious indoor zoological exhibitions ever created, officially opened to the public at the Bronx Zoo on 22 June, 1985.

On a grand scale and in minute detail, JungleWorld re-creates a Southeast Asian rainforest, mangrove swamp, and scrub forest. These habitats are home to a comprehensive cross-section of tropical Asian plants, animals, terrains, and climates -- ecotones that contain a huge diversity of flora and fauna. Animals ranging from the rare proboscis monkey, the 750-pound Malayan tapir, and the black leopard, to the tiniest insects and aquatic life forms may be viewed up close and in remarkably natural settings. JungleWorld's habitats occupy 37,000 square feet with an interior height of up to 55 feet and an interior space of one million cubic feet.

JungleWorld is a unique blend of organic life and meticulously reproduced man-made landscapes. More than thirty species of living tropical trees, and scores of shrubs, flowering orchids, vines, and tropical ferns have been planted in these lush environments. The man-made aspects of the exhibition include over 17,000 square feet of limestone, sandstone, lava and granite formations, 23 major trees (some up to 50 feet in height and eight feet in diameter) and more than 17,500 square feet of naturalistic murals merged carefully with the terrain. These elements have been crafted by an extraordinary group of specially skilled artists and artisans. Cloud machines, five waterfalls, a complex of pools and streams that recirculates over 2,000 gallons on water a minute, almost 4,500 square feet of tropical mudbank, and 27,000 square feet of skylights are also included in the exhibit space.

Entering JungleWorld, the visitor walks through an introductory gallery filled with giant Asian bamboo and colorful Indian and Balinese banners. Beyond this gallery is the Scrub Forest, where giant "dragon lizards" (monitors) sun themselves and dig burrows in grassy lava outcrops.

The Mangrove Gallery introduces a unique habitat where trees grow into the salt water and fish (mudskippers) live on land. Proboscis monkeys (a species noted for its fondness for swimming and also for the adult male's large pendulant nose) make their home on the rocky outcrops of man-made granite in the Mangrove Forest, which includes hand-sculptured mangrove trees and many species of lithophytes.

INTRODUCING JungleWorld, Continued

The Rain Forest Introductory Gallery, stressing the great value and potential of these areas for human society in terms of medicines, foods, and the study of evolution, is followed by the largest exhibit in JungleWorld. Three-hundred feet long, the rainforest is reproduced with incredible versimilitude, aided by one of the largest naturalistic murals in the world, and huge buttress-root trees that soar out of sight. Here, silvered leaf monkeys, crested gibbons, white-handed gibbons, black panthers (leopards), Malayan tapirs, giant turtles, great hornbills, and Asian leafbirds live among natural mosses, vines and Asian plants - many in bloom. Along the way, another gallery is devoted to the tremendous diversity of rainforest life, including specially adapted rainforest reptiles - vine snakes and flying geckos - amphibians, flying frogs, leap frogs, insects and such phenomena as giant walking sticks.

The final exhibition area is a view of the Lower Mountain Rain Forest -- actually the 300-foot-long Rain Forest Exhibit from a new angle. A river tumbles down the rocks, interrupted by a series of pools filled with gharials - a strange, rare, narrow-snouted crocodilian from India. Visitors may walk down a short staircase to get a close-up look at the gharials and clear glass makes it possible to see them underwater. A fossil skull protruding from nearby rocks shows a 40-million-year-old gharial relative.

Throughout JungleWorld are reminders that the world's rainforests are disappearing at an alarming rate. As the visitor exits JungleWorld, he is confronted by a "jungle countdown" sign. It is a digital counter which was started on opening day with the approximate number of acres of jungle still remaining...and the number will be decreasing at the rate of 50 acres per minute thereafter; an enormously powerful conservation message to which JungleWorld is the build-up. The next sign is a "population count-up". This one began with the opening day's human population and increases at the rate of 125 each minute...the current figure of human population increase after subtracting all deaths. The sign makes the point that over-population is the fuel for the fire of wildlife extinction.

The final JungleWorld sign reads:

"In the end, we will conserve only what we love. We will love only what we understand. We will understand only what we are taught."

Baba Dioum

JungleWorld is the product of an intensely collaborative effort by a large team of zoologists, designers, artists, horticulturists, and audiovisual experts, mostly from the New York Zoological Society's own staff. It was supervised by Dr. William Conway, Zoological Society General Director. The Larson Company of Tucson executed all the permanent elements of the vast habitats.

Funding for the interior work and the exhibitions in JungleWorld was provided primarily by Mrs. Enid A. Haupt, a strong supporter of the Zoological Society since 1977, and a Trustee since 1982. The Nicholas Foundation, The Chase Manhattan Bank, The Griffis Foundation, The General Foods Fund, The Vincent Astor Foundation, The Charles A. Dana Foundation, The Cleveland H. Dodge Foundation, The Starr Foundation, The J.I. Foundation, Mrs. James Walter Carter, Frederick M. Alger, Shirley S. Katzenbach, The Lexaco Philanthropic Foundation, and Mrs. Landon K. Thorne also made significant contributions.



Legislative News

INTERIOR LEAST TERN, THREE GULF COAST BEACH MICE ADDED TO ESL

The interior population of the least tern, a Midwestern bird whose historic abundance impressed explorers Lewis and Clark on their westward explorations, and three subspecies of beach mice found along the wind-swept barrier island sand dunes of the Gulf Coast have been added to the U.S. list of endangered and threatened species.

The actions, announced recently by the Interior Department's U.S. Fish and Wildlife Service, expand the list of imperiled species to 854, of which 356 are found in this country and 498 are found only in foreign countries. One of these newly-added species -- the small, secretive Perdido Key beach mouse -- is considered the Nation's most critically endangered small mammal, with an estimated population of only 26 individual mice.

The interior tern joins its relative, the California least tern, as a species receiving the protections of the Federal Endangered Species Act. (A third variety of least tern, the eastern or coastal least tern, found along the Atlantic and Gulf Coasts of the U.S., is not endangered at this time.)

An estimated 1,400 to 1,800 least terns are believed to exist within the bird's historic breeding range, which includes Arkansas, Colorado, Iowa, Illinois, Indiana, Kansas, Kentucky, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, and Tennessee and inland portions of Louisiana, Mississippi and Texas. In many of these States, however, the least tern is virtually absent; in Louisiana, for instance, where it was a common breeding bird, it is now absent, as it is in Mississippi, and only 30 terns have been counted in Arkansas and Illinois, respectively.

The least tern's decline has been attributed to the flooding and destruction of its nesting islands by channelization projects and reservoir construction along the Mississippi River and many of its tributaries. On many of the remaining nesting islands, alteration of river flows has caused unfavorable growth of trees and other vegetation, curtailing use of these sites by nesting terns.

The Perdido, Alabama, and Choctawhatchee beach mice have been declared endangered species and the recent addition by the USFWS also designates 31 miles of Gulf coast sand dunes in Baldwin County, AL, and Escambia, Walton, and Bay Counties in Florida, as critical habitat for these species. "Critical Habitat" for any species is that area considered essential for its continued survival.

This section of the Gulf Coast is rapidly being developed as recreational and commercial property, and the major threat to beach mice habitat continues to be destruction of coastal sand dunes. Loss of dune vegetation has led to extensive wind and water erosion, further destroying beach mouse habitat.

---Dept. of Interior News Release

NEW EFFORTS TO HALT ILLEGAL WILDLIFE TRADE ANNOUNCED

As part of a new "get tough" stance on illegal wildlife trade, the World Wildlife Fund-U.S. has announced new efforts are being taken to help curb the increasing numbers of endangered wildlife products being brought

into the U.S. Products made from sea turtle shell, crocodile leather, and skins of spotted cats such as jaguars are still coming into the country illegally in considerable quantities in spite of U.S. legislation prohibiting such imports.

The USFWS will increase by 50 percent the number of inspectors at designated ports of entry to help intercept illegal shipments of wild animals and plants and their parts and products. Commenting on the hiring of additional inspectors, Clark Bavin, Chief of Fish and Wildlife's Enforcement Agency, said, "In 1982 alone, there were over 55,000 shipments of wildlife imported into and exported from the U.S. with a declared value of over \$760 million. Our investigations have determined that many shipments have been imported with fraudulent documents, and we are concerned that others may have cleared without detection. Smuggled wildlife continues to be a problem. By increasing the number of inspectors, the Service is enhancing its ability to inspect wildlife shipments. This added impetus will benefit our enforcement efforts and provide a deterrent that will serve to protect many species."

Increased appropriations by Congress which led to the hiring were supported by World Wildlife Fund-U.S., the largest international conservation group committed to the preservation of species and habitats. Said Russell Train, President of WWF-U.S., "As the world's largest consumer of wildlife, the U.S. has recognized its responsibility to have strong wildlife import laws. We have both a legal and moral obligation to help curb international illegal wildlife trade. As the recognized international leader in conservation, our efforts can favorably influence activities by other nations and, thus, have enormous significance around the world."

In another "get tough" move, World Wildlife Fund, whose TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce) network monitors trade in threatened and endangered wildlife all over the world, announced the opening of TRAFFIC (South America) to be based in Montevideo, Uruguay and the only other office in this hemisphere outside of TRAFFIC (U.S.A.). The newly created office in Latin America joins a network of TRAFFIC offices in Japan, Germany, Australia, Belgium, the U.K., and the Netherlands.

According to Kathryn Fuller, head of TRAFFIC (U.S.A.), "The South American initiative has special significance because an estimated 35 percent of world trade in endangered wildlife and wildlife products originates in South America - over 33 percent of it illegally. TRAFFIC (South America) should be of considerable help to countries like Brazil who have seen their wildlife resources steadily diminish due to rampant poaching."

The measures taken by the World Wildlife Fund and the USFWS follow in the wake of heated discussion on the global illegal trade problem at the recent meeting in Argentina of 88 countries party to CITES, the Convention on International Trade on Endangered Species of Wild Fauna and Flora. Both TRAFFIC and the USFWS had the opportunity to express their shared concern about the problem at the meeting.

---World Wildlife Fund-U.S.
News Release



Exhibit Options

CARE OF LEAF-CUTTING ANTS (*Atta* sp.)



By
Milan K. Busching
Curator of Invertebrates
Cincinnati Zoo, Cincinnati, OH

A display leaf-cutting ant colony consists of three main parts: the foraging chamber (the above ground area), the fungus garden chambers (below ground), and the debris pile.

Foraging Chamber

Generally, the larger the foraging chamber, the faster the colony will grow. A convenient size in use at the Cincinnati Zoo is a cubical plexiglas box measuring 24 inches on each side. The display colony at the Cincinnati Zoo is approximately pentagonal in shape, 6 feet x 5 feet by 4 feet high, and is made of plywood and glass with a plexiglas top.

The foraging chamber should have at least two ventilation panels. The screen in the panels should be tight enough to prevent the escape of the ants (some workers are very tiny). The useful size is 40 x 40 mesh brass or stainless steel strainer cloth. The use of ventilation panels will help prevent fogging (moisture condensation) which would interfere with viewing of the ants by visitors. The size of the ventilation panels will depend on the movement of air in the building where the ants are housed. If fogging still is a problem, two small, low velocity fans can be used over the ventilation panels, one fan blowing in and one blowing out. The fans might be set, using a timer, to run for only part of each day to avoid drying out the foraging chamber too much.

The foraging chamber should have a door of a convenient size because leafy branches and other vegetation must be added and defoliated stems must be removed from the chamber daily. Ants can be prevented from escaping through the door while adding leaves by wiping a light barrier of oil (a medium weight household oil is satisfactory) or talcum powder around the inside edge of the door frame. These barriers need to be renewed periodically. A more permanent barrier, although more expensive, can be made by painting liquid teflon or fluron around the door frame.

The foraging chamber can be decorated with appropriate rocks, vines, tree stumps, etc.

Fungus Garden Chambers

Garden chambers used at the Cincinnati Zoo are approximately 6 inches x 7 inches x 4 inches high and have proven to be a convenient size (see diagram). These dimensions can be modified to fit particular exhibit design criteria. Plastic boxes with tight-fitting lids are useful because holes can be easily drilled in these to accommodate ventilators and plastic connecting pipes. One inch (outside diameter) plastic pipes (7/8 inch inside diameter) are a useful size to accommodate ant traffic between chambers and to build ventilators for garden chamber lids. Plastic pipes can be built to accommodate any arrangement of fungus garden chambers. However, it is most efficient if no more than two or three garden chambers

CARE OF LEAF-CUTTING ANTS, Continued

lie in a series (where ants have to pass through several gardens to reach distant chambers). A branching pipe pattern (see diagram) is recommended. Intersections in plastic pipes can be glued using a plastic adhesive containing methyl-ethyl-ketone. Ventilators can be built by cutting pieces of the plastic pipe about one inch in length and gluing a disk of 40 x 40 mesh brass or stainless steel screen to one end of each piece of pipe. The ventilators can then be inserted into holes which have been drilled in the lid of the garden chamber. Two ventilators per garden chamber are usually adequate.

Garden chambers are added to the colony one at a time as necessary (as the existing chambers become filled with fungus gardens). It works well to furnish new garden chambers with a layer of moist sand on the floor of the container and one or two platforms made of $\frac{1}{4}$ " or $\frac{1}{2}$ " mesh hardware cloth at intervals above the sand. A platform of this type adds support to the fungus garden. In nature, tree roots, rocks etc. would extend through the garden chambers and add support to the gardens. Therefore, in a display colony, roots or twigs could substitute for hardware cloth.

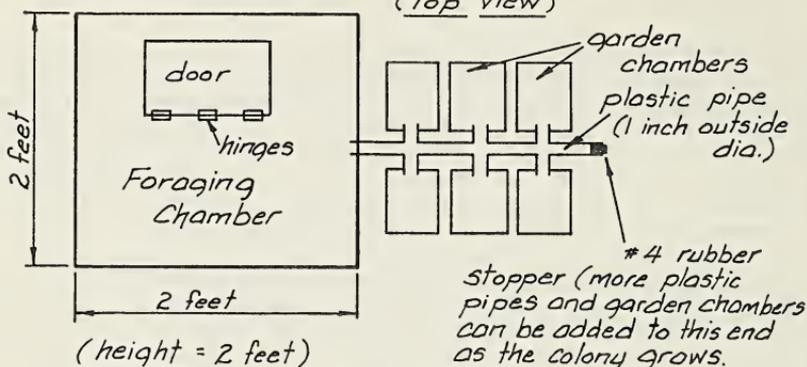
The optimum temperature for the growth of the fungus garden and the ants is about 78° to 80°F and it is useful to keep a thermometer near the garden chambers for reference. The humidity inside the garden chambers should be fairly high. The appearance of the fungus can be a good indicator as to whether the moisture level in the garden is too high or too low. A healthy fungus garden should be gray or dark gray in color in the upper portion of the garden and somewhat brownish in the lower portion. If the moisture level is too low the sand floor will obviously be dry and the fungus will appear dry and papery. To correct this several things can be done: add water to the sand under the garden; close one or both of the ventilators; or feed the ants leaves which have a high water level (like kale and lettuce). If the moisture level in the chamber is too high the sand will appear saturated and there may be puddles of water on the floor of the garden chamber. Also, the fungus will appear whitish in color and rather fuzzy. To correct this: ventilators should be uncovered and cleaned (the ants may have clogged the ventilators with sand or plant fibers); the feeding of high moisture plants to the colony should be discontinued; and in extreme cases, air can be gently blown into a ventilator (a small aquarium air pump with air tubing and valves works well). Care should be used when blowing air into a fungus garden and the chamber should be checked several times a day. One day is usually enough time to dry the garden chamber sufficiently.

A leaf-cutting ant colony must be fed every day, or several times a day if necessary. The leaves and branches are placed in the foraging chamber. The ants accept a wide variety of plant species (see Appendix). However, some plants are preferred over others and the preferences of the ants change from day to day. The change in preferences is most noticeable when a single species of plant has been given to the colony for several consecutive days. The ants will then slow down or stop cutting that species of plant. The method of feeding the ants at the Cincinnati Zoo which has been most successful is to offer three or four species of plants each day and to switch to other species on the two or three following days before repeating the sequence. There are obviously numerous sequences of plant species possible but the general plan is to avoid feeding the ant colony too heavily on any one plant species.

Febris Pile

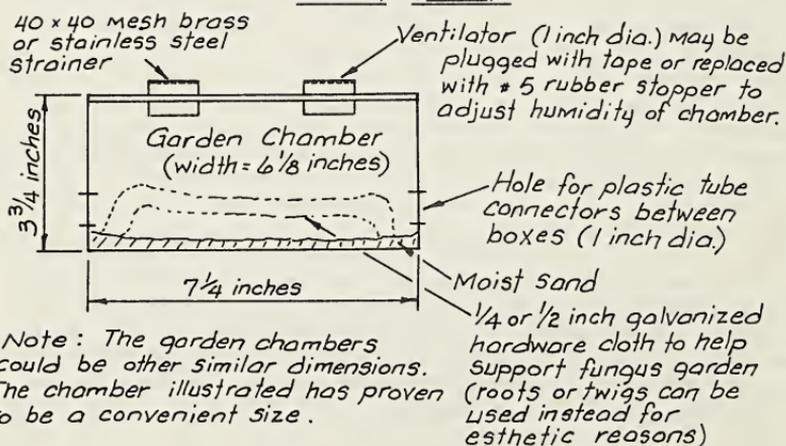
After the fungus has utilized the necessary nutrients in the leaf pieces,

A Possible Floor-plan for a Leaf-cutting Ant Colony
(Top View)



Note: The foraging chamber could be larger or some other shape. Also, the garden chambers could be arranged differently depending on convenience and esthetics.

Diagram of Leaf-cutting Ant Colony (Atta)



CARE OF LEAF-CUTTING ANTS, *Continued*

certain ants clean the gardens, removing the leaf debris and carrying it out of the garden chambers, This is a continuous process as is the cutting of leaves. The debris, which resembles brown sawdust, is often piled in the foraging chamber. Occasionally one or more of the garden chambers are used by the ants to dispose of debris. In either case, the debris must periodically be removed from the colony. If the debris pile is in the foraging chamber, it can be removed with a scoop or an industrial shop vacuum cleaner (preferred method at the Cincinnati Zoo). Removal of the debris is easier if the ants have piled it in what was intended to be a garden chamber. Simply remove the chamber, dump it, and replace it. It is sometimes useful to plug the plastic ant tube with a #4 rubber stopper during this operation. In either method of debris removal a number of ants are lost. This does not appear to be a problem because new ants are continuously being reared.

Appendix: Accepted plant foods of Leaf-cutting ants (*Atta sp.*)

**Collected from Zoo grounds:

Rose (leaves and flowers)	Rhododendron flowers
Bramble	Boxelder
Crab apple (leaves and flowers)	Catalpa
Purple-leaf plum	Forsythia flowers
Crown vetch	Trumpet vine
Weeping willow	Sumac
Honeylocust	Smartweed
Privet	Lambquarters
Linden	Ailanthus
Cottonwood	Pyracantha
Leatherleaf Viburnum	Japanese Honeyeuckle
Manhattan Euonymus	English Ivy
Dandelion (leaves and flowers)	

Reared in the Greenhouse:

Banana leaves	Hibiscus leaves
Croton	Bouganvilla
Grapefruit leaves	

Obtained from the Supermarket:

Kale	Lettuce
* Spinach	
* Swiss chard	
* Parsley	* Possible; these have not been tried at the Cincinnati Zoo.

** Most of the plants collected from the zoo grounds can be kept frozen in plastic bags for use during the winter. However, crown vetch does not work well; it becomes mushy when thawed.



Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AFK, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings for positions which become available close to deadline are accepted.

ZOOKEEPER...society-operated facility. Diverse animal husbandry and zoo operations responsibilities. \$4.75/hour plus benefits. Send letter and resume by 26 August 1985 to: Binder Park Zoo, 7400 Division Drive, Battle Creek, MI 49017.

SENIOR KEEPER...required to care for a collection of animals in private zoo located in Northeastern Pennsylvania. Three years' hands-on experience required with zoo animals, not domestic livestock. Ability to help build and maintain animal enclosures a must. Some supervisory experience helpful. Salary based on education and background. Call or send resume to: Claws n' Paws Wild Animal Park, RD 1, Lake Ariel, PA 18436 (717) 698-6154.

ANIMAL KEEPER/Reptiles & Amphibians...requires one year's paid experience in the care of reptiles and amphibians. Related BS and additional experience desirable. Salary \$13,000-\$15,000. Contact: David Raboy, Director, Burnet Park Zoo, P.O. Box 146, Liverpool, NY 13088.

LARGE MAMMAL KEEPER...requires high school diploma and one year of paid zoo experience. Elephant handling experience preferred. Will be responsible for care and maintenance of large mammal collection and a variety of hoofed stock species. Send resume and references by 15 August to Michael Tucker, Curator of Mammals, Caldwell Zoo, P.O. Box 428, Tyler, TX 75710.

MAMMAL KEEPER...requires two years' experience as a keeper, with degree in zoology or related field preferred. Will be responsible for daily feeding, maintenance, health and behavioral observation of animals in mixed exhibits. Contact: Sam Winslow, Curator of Mammals, Audubon Zoological Garden, P.O. Box 4327, New Orleans, LA 70178 (504) 861-2537.

AQUARIST/ANIMAL TECHNICIAN 3...requires one year of experience with knowledge of aquarium management and maintenance. Will be responsible for supervising establishment and maintenance of exhibit tanks and off-exhibit holding tanks. Salary \$16,218. Submit resume to: Human Resources, Oklahoma City Zoo, 2101 N.E. 50th, Oklahoma City, OK 73111.

CURATOR/MANAGER...desire applicant with MS in zoology, ecology, wildlife management or similar area and two years' administrative experience. Will supervise capital improvements projects, personnel, facility/animal care, educational programs, exhibits and financial/budgetary programs. Salary \$22,889-\$34,334, plus benefits. Mail resume to: Forest Preserve District of DuPage County, Att: Personnel Dept., P.O. Box 2339, Glen Ellyn, IL 60138.

ANIMAL KEEPER II...assist Head Keeper as an animal keeper and supervisor. Requires high school diploma, some college courses, and experience with animal field. Applicants within and outside this city are being considered. Equal Opportunity Employer. Contact: Steve Matthews, Sunset Zoo, Manhattan, KS (913) 537-0063, Extension 278.

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Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

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INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

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Items in this publication may be reprinted. Credit to this publication is requested. Reprints may be ordered from the editor.

PRINTED IN U.S.A.

**American Association
of Zoo Keepers
Topoka Zoological Park
635 Gage Blvd.
Topoka, KS 66606**

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Animal Keepers' Forum

SEPTEMBER 1985

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Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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This month's cover art is of "Diamond Jim" a zebra at the NZP Conservation & Research Center in Front Royal, VA and was submitted for publication by Rebecca Conway, wife of AAZK President Kevin Conway. Zebras are classified in the order Perissodactyla, family Equidae, genus Equus. These relatives of the domestic horse are known for their distinctive black and white striping--no two alike, much like human fingerprints. These animals travel the African plains in groups of from ten to several hundred and often join herds of other animals, like gazelle or wildebeest. They can reach a speed of 40 mph on hard-packed ground, often attempting to escape their major predator, the lion. Zebras may live to be 28 years old and generally do well in captivity. Thanks, Rebecca!

Scoops and Scuttlebutt

CHANGE IN ADMINISTRATIVE PERSONNEL ANNOUNCED

It is with deep regret that the Association announces the resignation of Dolly Clark as Administrative Secretary for AAZK. Dolly is moving to Florida to pursue other career opportunities. She has been with AAZK since February of 1980 and has proven a great asset to AAZK in her handling of National Headquarters business matters. Her great enthusiasm for the Association and the extra effort she always put into her job promoting the goals of AAZK will be greatly missed. A heartfelt note of thanks to Dolly for a job well done. We will all miss you.

After 1 October, 1985, Dolly may be reached at the following address:
Dolly Clark, c/o Abraham, 11532 NW 23 St., Coral Springs, FL 33065 (305)
755-4563.

Replacing Dolly as Administrative Secretary for AAZK is Barbara Manspeaker. A native of Topeka, Barbara is married and has two children. Although new to the world of zoos and zookeeping, Barbara says she looks forward to the challenges of her new position and becoming better acquainted with the workings of AAZK. We welcome Barbara to AAZK and look forward to working with her to keep National Headquarters running smoothly.

NEW ASSOCIATE EDITOR NAMED FOR AKF

Following the departure of Bernie Feldman, the AAZK Board of Directors has approved the appointment of Ron Ringer to fill this position. Ron is Lead Elephant Keeper at the Topeka Zoo and active in the local AAZK Chapter. Ron will assist with advertising solicitation and conduct research into the reformatting of several regular AKF columns. We welcome Ron aboard!

1986 ZOO CALENDAR TO BE AVAILABLE AT MIAMI CONFERENCE

The Tucson Chapter of AAZK wishes to announce that the 1986 Zoo Calendar will be available for purchase at the National Conference along with order forms for additional copies. They would like to take this opportunity to thank all members and chapters who submitted photos and information for this project.

ELEPHANT ROUND-UP TRIP PLANNED TO THAILAND

Elephant keepers and other elephant-oriented people interested in seeing elephants in training, at work and on exhibit in their homeland may have

that opportunity this November. A small group is being assembled to see the Elephant Round-up in Surin, Thailand, the Lampang Elephant Training Center, the elephant work camp in Chiang Mai, and the Dusit Zoo in Bangkok. Other sites will also be visited. Departure will be from Portland, OR on 11 November 1985, and space will be limited. The tour is being arranged through Bergstrom Travel and escorted by a member of the Washington Park Zoo's elephant management team. Further details may be obtained from: Dottie Miner, (503) 292-8835, 6443 S.W. Beaverton Hillsdale Hwy., Suite 420, Portland, OR 97221.



FROM THE PRESIDENT

Notice is hereby given to the membership that the AAZK Board of Directors will meet to conduct business in Miami, FL on 20 October. Reports from all AAZK committees and projects will be received and discussed during the board meeting. Committee/project members are expected to be in attendance while their reports are being reviewed and members interested in particular AAZK activities are invited to sit in on the meetings if they so desire.

The Board will make every attempt to conclude all necessary business by Sunday evening or to establish study groups if further discussion is deemed necessary. Members wishing to address the board about a particular interest or concern are asked to notify me by 12 October so that their desire to address the board can be considered. Time restraints may otherwise limit the number of comments the board may be able to answer from members sitting in on the meeting.

The Board meeting will begin at 8:00 a.m. and continue throughout the day until completion of business. The proposed agenda will be posted on the door of the meeting room and will be updated as often as possible for those interested in participating. The following serves as a preliminary agenda:

8:00 a.m.

National Headquarters	Infant Development Notebook
Chapter Affairs	AAZK History
International Affairs	Keeper Data
Nomination and Election Committee	Professional Standards Committee
Regional Coordinator System	Research/Grants Committee
Keeper Education Committee	Awards Committee
Zoo University Project	Video Tape Project
Library Resources/Reference Search	Membership Brochure
Public Education	Legislative Advisor
AAZPA/AAZK Continuing Keeper	Annual Conferences (National/Regional)
Education Committee Liaison	KAL
Zoo Keeper Husbandry Fundamentals	ADT Forms
Program Library	Exhibit Design Form
Animal Keepers' Forum	Staff Exchange
Diet Notebook	Logo Stickers
Membership Directory	Logo T-Shirts
Book Reviews	Keeper Care Buttons
Zoonoses Notebook (AKF?)	Proposals

Kevin Conway

AAZK President



Births & Hatchings

JACKSONVILLE ZOO.....*Anne Wiggins*

Since March, the Jacksonville Zoo has been very busy with its many Births and Hatchings. In our Mammal Dept., we experienced the birth of a male Southern White Rhino that unfortunately did not survive. However, we were successful with the births of 4 Eland, 2 Sitatunga, 2 Grant's zebra, 1 Cape buffalo, 2 Cape hartebeest, 2 Guanaco, 2 Capybara, and 1 Thomson gazelle (our first in many years). We also has three North American river otter pups, which is another first. The Bird Dept. has been busy with its usual spring and summer madness which includes Bobwhite quail, barheaded geese, Golden pheasant, Wild turkey, Egyptian geese and several Kookaburra. We did hatch out a Lead beater's ground hornbill. This is our second parent-raised hatchling after three years of hand-raising. We've been real lucky in the Reptile Dept. with this being the second consecutive year we've hatched Aldabra tortoise (two so far this year) and our first Leopard tortoise hatchling.

SANTA BARBARA ZOOLOGICAL GARDENS.....*Peter Grim*

Recent B&H at Santa Barbara include: Mammals - 0.1 Long-nose rat kangaroo, 1.1 Black and white ruffed lemur, 0.0.1 Owl monkey, 0.0.1 White-handed gibbon, 0.1 Giant anteater; Birds - 0.0.2 Chilean flamingo (DNS), 0.0.4 Laysan teal (0.0.3 DNS), 0.0.2 Moluccan cockatoo (DNS), and 0.0.2 Toco toucan (0.0.1 DNS).

KANSAS CITY ZOO.....*Janelle Davis*

B&H for June and July of this year include: Mammals - 0.0.5 Meerkat, 0.1 Yak, 3.4 California sea lion, 1.1 Blesbok, 1.0 Himalayan tahr, 3.3 Eland, 0.0.1 Whitetail deer, 2.1 Gemsbok, 0.0.2 American elk, 4.1 Impala, 0.1 White-bearded gnu, 1.2 Kulan, 0.0.3 Red kangaroo, 0.1 Masai giraffe; Birds - 0.0.4 North American wood duck, 0.0.1 Hooded merganser, 0.0.3 Shama thrush, 0.0.8 Common pintail, 0.0.5 Canvasback, 0.0.1 Blue-winged teal, 1.0.4 Chiloe wigeon, 0.0.5 Dyhal thrush, 0.0.1 Silver-eared mesia, 0.0.2 Superb starling, 0.0.3 Bali mynah, 0.1.5 Gadwall, 3.3.3 Ring-necked duck, 0.0.3 Tawny frogmouth, 1.2 Ringed teal, 0.0.? White cockatoo.

MINNESOTA ZOOLOGICAL GARDEN.....*Brint Spencer*

May-July 1985 B&H include: Mammals - 0.3 Bison, 0.4 Miniature goat, 1.1 Goat, 0.1 Przewalski wild horse, 0.0.5 Ermine, 0.1.4 Japanese macaque, 2.1.1 Musk ox, 2.0 Grey fox, 0.0.6 Degu, 2.4.1 Elk, 0.0.2 Puma (DNS), 8.8 Pronghorn, 0.0.4 Beaver, 0.1 Chevrotain, 1.0 Nilgiri tahr, 0.0.1 Moose, 0.0.2 Sugar glider, 0.2 New Guinea wild dog (1 DNS), 0.0.2 Celebes ape, 0.0.2 Small tooth palm civet, 1.0 Bat (*Artibeus Jamaicensis*) (DNS); Birds - 0.0.4 Yellow-legged hemipode, 0.0.10 Blue-breasted button quail (1 DNS), 0.0.3 Grosbeak starling, 0.0.1 Red-eyed starling, 0.0.7 Chinese francolin, 0.0.5 White-crested laughing thrush (1 DNS), 0.0.4 Lady Amherst pheasant (3 DNS), 0.0.2 Red-billed leiothrix, 0.0.2 Victoria crowned pigeon (1 DNS), 0.0.2 Northern pintail, 0.0.7 Trumpeter swan, 0.0.30 North American wood duck, 0.0.2 Red spurfowl, 0.0.2 Red-head duck, 0.0.2 Red-vented bulbul, 0.0.1 Pied imperial pigeon, 0.0.1 Indian peafowl, 0.0.1 Hooded merganser, 0.0.6 Crested wood partridge, 0.0.3 Spurwing lapwing, 0.0.1 Morning dove, 0.0.1 Eastern bluebird, 0.0.5 Mandarin duck (1 DNS); Herps - 0.0.2 Elongated tortoise.

BIRTHS AND HATCHINGS, Continued

PHILADELPHIA ZOO.....Beth Bahner

B&H for July 1985 include: Mammals - 0.0.4 Pygmy hedgehog tenrec, 1.1.1 Binturong (1 DNS), 0.1 Guanaco (DNS), 1.0 Blesbok, 1.0 Gunther's dik-dik; Birds - 1 Hermit ibis, 2 Caribbean flamingo, 4.3 Aleutian Canada goose, 1 Palawan peacock pheasant (DNS), 1 Micronesian kingfisher, 4 Hooded pitta (DNS), 1 Scarlet tanager (DNS), 1 Fairy bluebird; Reptiles - 12 False water cobra (1 DNS), 12 Uracoan rattlesnake (DNS).

WOODLAND PARK ZOOLOGICAL GARDENS.....Harmony Frazier-Taylor

July 1985 B&H include: Mammals - 0.0.1 Vampire bat, 0.1 Damara zebra; Birds - 0.0.2 Golden tanager, 0.0.1 Half-masked weaver (DNS), 0.0.1 Black-necked stilt, 0.0.3 Blue-winged teal, 0.0.3 Ringed teal (1 DNS), 1.1 Egyptian goose (0.1 DNS), 0.0.1 Greater curassow, 0.0.6 Lesser scaup (2 DNS); Herps - 0.0.14 Leopard gecko.

TAMPA, BUSCH GARDENS.....Susan Rackley

B&H for July include : Mammals - 2.5 Grant's gazelle, 1.3 Impala, 0.1 Dromedary camel, 1.3 Thomson's gazelle, 1.0 Blesbok, 0.1 Chimpanzee, 1.0 Nyala, 0.6 Greater kudu, 1.1 Scimitar-horned oryx, 1.0 Gemsbok, 1.0 Muntjac deer, 0.1 Suni, 0.1 Grevy zebra, 0.1 Topi; Birds - 0.0.1 Scarlet ibis, 0.0.3 Mandarin duck, 0.0.10 American flamingo, 0.0.4 Scarlet macaw, 0.0.4 Jandaya conure, 0.0.9 Sun conure, 0.0.2 Mitred conure, 0.0.4 Blue & Gold macaw, 0.0.2 Goldie's lorikeet, 0.0.2 Violet-crested touraco, 0.0.9 Indian peafowl (blue phase), 0.0.2 Black-capped lory, 0.0.2 Red-fronted macaw, 0.0.2 Sacred ibis, 0.0.2 Scaly-breasted lorikeet, 0.0.1 Superb starling, 0.0.2 Crested tinamou, 0.0.3 Golden (Queen of Bavaria) conure and 0.0.2 Red-crested touraco.

BROOKFIELD ZOO.....John S. Stoddard

July 1985 B&H include: Mammals - 0.0.1 European harvet mouse, 0.0.1 Spiny mouse, 0.0.5 Degu, 0.0.13 White-toothed shrew; Birds (fledged) - 0.0.1 Scarlet ibis, 0.0.4 Red-crested cardinal, 0.0.2 Snowy owl, 0.0.3 Scarlet-crowned barbet.

MILWAUKEE COUNTY ZOO.....Carol J. Boyd

B&H for July include: Mammals - 0.0.3 Squirrel monkey, 1.0 Holstein calf, 0.0.2 Cotton-top marmoset, 0.0.4 Meerkat, 0.0.4 Zebra mouse, 0.0.1 Springhaas; Birds - 0.0.5 Peafowl; Reptiles - 0.0.2 Yellow anaconda.

MIAMI METROZOO.....Lori Bruckheim

July 1985 B&H include: Mammals - 1.0 Grevy's zebra; Birds - 0.0.1 Stanley crane, 0.0.2 Hartlaub's duck, 0.0.3 Green junglefowl, 0.0.2 Falcated teal, 0.0.1 Mandarin duck, 0.0.7 Java tree duck, 0.0.4 Ruddy duck (0.0.2 DNS), and 0.0.1 Sarus crane.

DALLAS ZOO.....Sandy Upchurch

July 1985 B&H include: Mammals - 0.1 East African oryx, 2.0 Greater kudu, 1.0 Slender-horn gazelle, 0.1 Addra gazelle, 1.0 Suni, 0.0.1 Grevy's zebra; Birds - 0.0.12 Fulvous whistling duck, 0.0.1 Scarlet ibis, 0.0.2 White-headed piping guan, 0.0.12 Roseate spoonbills were collected; Reptiles - 0.0.7 Honduran kingsnake, 0.0.1 Arizona Mtn. kingsnake, 0.0.7 Grey-banded kingsnake, 0.0.1 Double-crested basilisk, 0.0.3 Jalisco kingsnake, 0.0.6 Emerald tree boa, 0.0.1 Lower California speckled rattlesnake.

PITTSBURGH AVIARY.....Curt Robbins

Hatchings for April 1985 were: 0.0.2 Emu, 0.0.7 Elegant crested tinamou (2 DNS), 0.0.2 Red & white crane (1 DNS), 0.0.1 Double-striped thick-knee, 0.0.1 Speckled mousebird, 0.0.6 African gray hornbill, 0.0.2 Levalliant's barbet (1 DNS), 0.0.2 Many-colored chaco-finch (2 DNS), 0.0.2 Blue-gray tanager. May 1985 hatchings included: 0.0.5 Emu (1 DNS), 0.0.3 Elegant crested tinamou (1 DNS), 0.0.1 Scarlet ibis (DNS), 0.0.1 Ringed teal, 0.0.2 Northern bobwhite (DNS), 0.0.6 Japanese quail, 0.0.15 King quail - silver - (6 DNS), 0.0.2 Lady Amherst's pheasant, 0.0.2 Palawan peacock pheasant (2 DNS), 0.0.4 Red & white crane (2 DNS), 0.0.1 Double-striped thick-knee, 0.0.3 Tumbler pigeon (1 DNS), 0.0.1 Nicobar pigeon (DNS), 0.0.1 Blue crowned pigeon, 0.0.1 Pied imperial pigeon, 0.0.3 Goldie's lorikeet (1 DNS), 0.0.3 Princess parrot, 0.0.4 Blue-crowned motmot, 0.2 Magpie robin, 0.0.1 Blue-gray tanager, 0.0.2 Emerald starling, 0.0.2 Ruppell's long-tailed starling, 0.0.1 Superb starling.

June 1985 hatchings included: 0.0.8 King quail - silver - (2 DNS), 0.0.8 Lady Amherst's pheasant (5 DNS), 0.0.2 Palawan peacock pheasant (1 DNS), 0.0.2 Gray-necked wood-rail (DNS), 0.0.2 Red & white crane, 0.0.1 Double-striped thick-knee, 0.0.3 Southern lapwing, 0.0.3 Tumbler pigeon (1 DNS), 0.0.3 Lilac-breasted roller, 0.0.3 African gray hornbill, 0.0.6 Levalliant's barbet (1 DNS), 0.0.4 Magpie robin, 0.0.2 Many-colored chaco-finch - probable first successful hatching - (1 DNS), 0.0.2 Blue-gray tanager, 0.0.3 Emerald starling (2 DNS), 0.0.1 Superb starling (DNS). Hatchings for July 1985 were: 0.0.3 Elegant-crested tinamou (2 DNS), 0.0.2 Green-backed heron, 0.0.2 Sacred ibis, 0.0.1 Palawan peacock pheasant, 0.0.6 Common peafowl, 0.0.2 Gray-necked wood-rail (1 DNS), 0.0.2 Red & white crane (DNS), 0.0.3 Common moorhen (1 DNS), 0.0.5 Gray-headed gallinule - 2 silver phase - (2 DNS - 1 silver), 0.0.1 Southern lapwing (DNS), 0.0.8 Tumbler pigeon, 0.0.1 Citron-crested cockatoo, 0.0.2 Pale-mandibled aracari, 0.0.1 Magpie robin, 0.0.3 Many-colored chaco-finch (1 DNS) and 0.0.6 Society finch.

SAN ANTONIO ZOO.....Debi Reed

July 1985 B&H include: Mammals - 0.0.3 Lesser hedgehog tenrec (DNS), 1.1 Fennec fox (0.1 DNS), 0.1 Aardvark, 0.2 Greater kudu, 0.2 Common water-buck (0.1 DNS), 0.1 Scimitar-horned oryx, 1.1 Grants gazelle, 1.0 Arabian sand gazelle, 0.2 Springbok; Birds - 0.0.2 White ibis (DNS), 0.0.8 American flamingo (0.0.3 DNS), 0.0.4 Red-billed whistling duck, 0.0.3 Coscoroba swan, 0.0.16 Mandarin duck, 0.0.1 Great currasow, 0.0.1 Palawan peacock pheasant, 0.0.3 Ocellated turkey (0.0.2 DNS), 0.0.1 Inca tern (DNS), 0.0.1 Diamond dove, 0.0.1 Bartlett's bleeding-heart dove (DNS - 1st time in collection), 0.0.1 Dusky lory - 1st time in collection, 0.0.2 Red-billed buffalo weaver (0.0.1 DNS), 0.0.1 Melba finch, 0.0.1 Crimson seed-cracker (DNS), 0.0.4 Owl finch, 0.0.2 Rufous treepie; Reptiles - 0.0.4 Fan-footed gecko (0.0.1 DNS), 0.0.1 Greer's kingsnake - 1st time in collection, 0.0.1 Trans-Pecos copperhead - 1st time in collection; Aquarium - 52 Gulf toadfish - 1st time in collection, 30 Seahorse, 1+ Saratoga Springs pupfish. Our new Asian Cat exhibit will be open in August. Construction on the Great Barrier Reef exhibit will begin after Labor Day, and a new exhibit for our pair of Guam kingfishers has been planned. In October, we will be hosting an APWS/IWWA joint conference. Hope to see some of you there!

ZOOLOGICAL SOCIETY OF TRINIDAD AND TOBAGO.....John Seyjagat

B&H for June and July 1985 include; Mammals - 0.0.4 Collared peccary, 0.0.5 English red deer, 0.0.2 Common marmoset, 0.0.1 Red brocket deer, 0.0.1 Tufted capuchin; Birds - 0.0.9 Straited heron; Reptiles - 0.0.9 Common iguana, 0.0.17 Red-ear slider (*P. s. elegans*), 0.0.31 Red-leg tortoise, 0.0.1 Hinge-Galap (*Kinosternon*), 0.0.9 Red-ear slider (*P. s. callirostris*); Fish - 0.0.100s *Corydoras aenus* and 0.0.2 Knife fish (*G. carapo*).



COMING EVENTS, Continued

WILDLIFE SURVIVORS IN THE HUMAN NICHE

November 1-2, 1985

Washington, DC

Hosted by the National Zoological Park, this day and a half format brings together scientists with diverse interests and gives them a chance to discuss complicated wildlife issues that have controversial elements. This year's symposium will emphasize the success and failure of wild species in urban, suburban and rural environments. The topic will cover a number of intriguing questions such as: Why do some wild animals adapt to city life while others fail? How is it that black bears can live in people's back yards? How has urban architecture and vegetation influenced the kinds of wildlife that we are finding around our homes? What are the requirements for turning your backyard into a wildlife reserve? What kinds of wildlife can we expect to see in our urban areas in the next century? And what are some of the surprising wildlife inhabitants in the Washington area? Tickets for the event are \$12.00 and \$6.00 for students. For additional information, contact Kay Taub at the National Zoo.

THE RAPTOR RESEARCH FOUNDATION SYMPOSIUM ON
THE MANAGEMENT OF BIRDS OF PREY

November 1-11, 1985

Sacramento, CA

For further information, contact Nancy Venizelos, Raptor Conservation Office, San Francisco Zoological Society, Zoo Rd. & Skyline Blvd., San Francisco, CA 94132 (415) 661-2023.

THE FIFTH ANNUAL DR. SCHOLL CONFERENCE ON
THE NUTRITION OF CAPTIVE WILD ANIMALS

December 13-14, 1985

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information contact: Thomas Meehan, DVM, Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614.

1986 AAZPA REGIONAL CONFERENCES

Southern Regional - Greater Baton Rouge Zoo, 16-18 March, 1986: for more information contact: Barbara Gorman, Greater Baton Rouge Zoo, Box 60, Baker, LA 70714 (504) 775-3877.

Western Regional - Point Defiance Zoo, 13-15 April, 1986: for more information contact: Tom Otten, Director, Point Defiance Zoo & Aquarium, Point Defiance Park, Tacoma, WA 98407 (206) 591-5337.

Great Lakes Regional - Milwaukee County Zoological Gardens, 27-29 April, 1986: for more information contact: Mary Beth Carr, Milwaukee County Zoological Gardens, 1001 W. Bluemound Rd., Milwaukee, WI 53226 (414) 771-3040.

Northeastern Regional - Mystic Marineline Aquarium, 4-6 May, 1986: for more information contact: Laura Kezer, Mystic Marineline Aquarium, Sea Research Foundation, Inc., Mystic, CT 06355 (203) 536-9631.

Central Regional - Forth Worth Zoological Park, 18-20 May, 1986: for more information contact: Dudley Brown, Fort Worth Zoological Park, 2727 Zoological Park Dr., Fort Worth, TX 76110 (817) 870-7050.





Keeper Education To Be Addressed At National AAZPA Conference

*Submitted By
Pat Sammarco, Coordinator
AAZK Keeper Education Committee*

During the AAZPA National Conference in Columbus, September 8-12, there will be two separate opportunities to address Keeper Education Programs in zoos. During the Education Workshop Sessions on Sunday afternoon, Brandy Pound and Pat Sammarco will address the role that zoo educators can and do play in staff training. On Tuesday at 4 p.m., there will be a session for all delegates which is labeled as an AAZK Meeting.

During this time we will try to address the need for staff training, and how to solve problems in setting up a training program. This discussion session is intended to work as a forum to present the various points of view of all levels of zoo staff.

The schedule of events published in the August AAZPA Newsletter indicates an exciting and productive conference. All those who are attending are invited and encouraged to attend the AAZK Session on staff training and to bring ideas. Think about all the things we should learn to do our jobs better, reasons why training programs have not been set up, and ways to eliminate those blocks.

During both of the Keeper Training sessions, the Keeper Training Videotape, FEEDS AND FEEDING, will be shown. KTV and other AAZK projects will be presented to encourage their use by zoos. Since many of our projects add to the body of professional knowledge, and the others identify resources for continuing our educations, this will present AAZK's activity in Keeper training. This will be a great opportunity to discuss our professional development, and ways to improve captive animal care.

Zoo/U List Update

Harcum Junior College, Bryn Mawr, PA 19010 - Harcum Junior College offers Associate Degrees in Animal Health Technology and Laboratory Animal Science which have a practicum at the University of Pennsylvania School of Veterinary Science, and Animal Center Management which features practica at the Philadelphia Zoo, the AARK Foundation and other area zoos and wildlife facilities.

The Program Director to contact for more information is: Ms. Sherrill Baumgartner (215) 525-4100. Toll free numbers to call : in PA (1) 800-345-2606; in CT, DC, DE, MD, NJ, NY (1) 800-345-2600.

Thanks to input from members leading to new sources of entry level Keeper Education opportunities, the Zoo/U List continues to grow. When the public asks about where to go to learn to be a Zoo Keeper, we can now recommend obtaining a copy of the list from National Headquarters. The list is free for a self-addressed, legal-sized only, envelope with 22¢ postage attached.

From The AAZK Public Education Committee.....

The Public Education Committee Needs Your Help!

Is there a question about your animals or exhibits that visitors consistently ask you?...And that you have a "perfect" answer for?

Is there one that you find exceptionally difficult to answer?

Are there some questions that you'd rather not answer?

Here are some examples:

Are those two animals fighting?
Answering this may involve an explanation of animal behavior.

Why aren't the animals doing anything?
Another animal behavior oriented answer.

Why can't we feed the animals popcorn?...They eat it!
This answer may include zoo diets and nutrition.

Why don't you set the animals free?
SSP, habitat destruction and conservation may be included in this answer.

Where are the bathrooms?
THIS ONE DOESN'T COUNT!

The Public Education Committee would like to put together a booklet on frequently asked questions by zoo visitors and "perfect" answers to them. If you have some answers you'd like to share with others, or have some questions you'd like good answers for, write them down and bring them with you to the Miami Conference, or mail them to: *Jay Jasan, Staten Island Zoo, 614 Broadway, Staten Island, NY 10310.*

GROUP SEEKS TO PRESERVE HISTORY OF WILD ANIMALS IN CAPTIVITY

The first meeting of THE BARTLETT SOCIETY was held in England on 27 October 1984. Its purpose is to further the study of the history of keeping wild animals in captivity. The membership is made up of individuals who are contributing to this base of knowledge, preserving information and other material pertaining to the animals that have been kept and to the facilities that have kept them. If you are seriously interested in this area of research, contact me at the address below and I will send you a photocopy of the Society's first newsletter and other information:
Vernon N. Kisling, Jr., 1014 NW 14th Avenue, Gainesville, FL 32601.

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AAZK T-SHIRT PROJECT REVIEW

By
Joanie Stinson, President
Phoenix AAZK Chapter
Phoenix Zoo, Phoenix, AZ

In 1982, after the frustrations of being unable to obtain AAZK National Logo T-shirts, the Phoenix Chapter was fortunate to be able to take over that project. Since January of 1983 we have mailed over 350 T-shirts both nationally and world-wide, with shipments going to Saudi Arabia, New Zealand, Australia, Mexico and the Caribbean.

We have maintained our original price of \$6.75 which included mailing. To the best of our knowledge all shirts ordered in this period have been delivered. Except for a brief period when we had trouble obtaining our most popular dark brown from the distributor, shirts were usually shipped within one to two weeks of ordering. We have made all shipments by 1st class mail via heavy-duty mailing envelopes and plan to continue this policy.

We currently have three colors - tan, brown and light blue, available in a 50/50 poly-cotton blend, in four sizes. In order to keep the price down we have maintained a low profit margin. To date, we have cleared \$350.00 to be split with National. Because of increased mailing costs we feel it is necessary to increase the shirt price to \$7.00 (includes mailing) effective with this notice.

It would be possible for us to deliver orders of 1 dozen or more, assorted colors and sizes, to one address at \$6.50 per shirt. It would therefore be beneficial for Chapters to place group orders. It would also be possible for us to supply colors of your choice (green, red, black, etc.) in lots of three dozen or more, at the \$6.50 price.

With the popularity of the T-shirt today we think the AAZK Logo T-shirt is a great way to "show your colors". The Phoenix Chapter at this time has an adequate supply of all colors and sizes and looks forward to filling your future orders.



Information Please

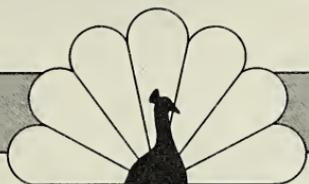
Information and examples needed of Keeper-designed, written and/or produced signage and other public educational material. Bring information/examples to the Miami Conference, or send to: Jay Jasan, Staten Island Zoo, 614 Broadway, Staten Island, NY 10310.

As part of the Topeka Zoo's Diet Review Committee, I am interested in receiving information from other zoos about Polar Bear feeding (diets) and other information relating to it.

I am also interested in information on the longevity of Polar Bears in captivity and would like to hear from zoos with Polar Bears over 20 years of age.

Please send pertinent information on either of the above requests to:
Tim Kurkowski, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.





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Reptile Care: Relating To The Inquiring Novice - Part 15

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

COMMONLY ENCOUNTERED DISORDERS (Accepted for publication, August 1984)

Last month I discussed the preliminary physical examination and some possible causes of illness. I shall now discuss the more common problems afflicting reptiles. From these discussions, the keeper should be able to determine whether or not an inquiring novice's animal needs veterinary attention. However, if there is the slightest doubt, the keeper should always encourage the novice to seek veterinary assistance.

Ulcerative stomatitis, also known as mouth rot, is a disease of the mucous membrane of the mouth. Such bacteria as *Aeromonas* and *Pseudomonas* have been reported by Gray, et al (1966) and Page (1966) to be causitive organisms of this condition. Symptoms include swelling and inflammation of the mouth, minute, rounded spots of hemorrhage, cheesy material, nodules, and/or ulcerations of the gums. Mouth rot can lead to loss of appetite, aspiration pneumonia, septicemia, bone involvement such as osteomyelitis, and ultimate starvation. The causes of moth rot are variable, and include improper hygiene, malnutrition, trauma, chronic low temperature and systemic diseases. Prior to treatment, a tissue culture should be taken by a veterinarian for antibiotic sensitivity testing. Gentle, daily scraping of the cheesy material may be indicated, followed by a Betadine® (Purdue Frederick) solution irrigation. Many investigators agree that parenteral administration of vitamin A, B-complex, and/or vitamin C may be helpful as supportive therapy; however, there is no evidence that vitamins have any theraputic effect in the treatment of canker. Parenteral antibiotic therapy is usually indicated.

Marcus (1981) reported that if untreated, pneumonia in reptiles is usually fatal within 2 to 3 weeks from its onset. The symptoms vary with severity; they include nasal and oral discharge (pneumonia can be confused with early stages of mouth rot), gaping, audible and labored breathing, depression, loss of appetite, and emaciation. As in mouth rot, the principal causitive organisms are *Aeromonas* and *Pseudomonas*. Sudden and chronic low temperatures, and other forms of stress are major contributing factors of pneumonia in reptiles. Prior to treatment, a veterinarian should take a saliva culture for antibiotic sensitivity testing. Many investigators administer parenteral multivitamins as supportive therapy. It is essential that the affected animal's preferred temperature (Part 6, Table 1) be met for about 12 to 16 hours per day, and nighttime temperatures should not drop below 29.5°C (85°F) during the treatment period. Ross (personal communication) reported that some tropical species of snakes have been maintained at 35°C (95°F) in order to effect a cure.

Although the snake mite, *Ophionyssus natricis*, has not been shown to cause pneumonia, Caimin (1948) reported it to be one means of transmission of *Aeromonas*. If snake mites are present, immediate eradication of these ectoparasites is essential.

Necrotizing dermatitis, also known as scale rot, is a disorder of the integument of snakes (can also occur in lizards). Symptoms are retained shed and/or focal lesions. These lesions may coalesce to involve large areas. Causes include improper temperatures and/or humidity, malnutrition, parasitism, gram-negative bacilli, or a variety of fungi. If possible, retained sheds should be removed. This can be accomplished by soaking the affected animal in a tepid water bath for 1 to 8 hours (overnight in some cases), depending on the severity of adhered shed. Undiluted hydrogen peroxide can be added to the water bath (Barnard, unpublished). Bring the bath solution to a ratio of 1:1, hydrogen peroxide:water, to aid in separating the retained shed from the animal's body, but only after it has had plenty of time to consume pure, fresh water. Once the shed is removed, Lugol's iodine solution or Polysporin[®] ointment (Burroughs Wellcome) should be liberally swabbed on the affected areas, or antifungal creams, such as tolnaftate or miconazole nitrate, can be applied in cases where fungi have been cultured. Based on a veterinarian's culture results, Ross (personal communication) recommends that injectable antibiotic therapy be administered. Lizards exhibiting this problem should also be exposed to an ultraviolet lamp for about 2 to 5 minutes per day until the problem clears. If direct sunlight is used, care should be taken not to expose the lizard to its critical high temperature (Part 6, Table I).

Left untreated, blister disease in snakes can be fatal. Lesions may become secondarily infected with gram-negative organisms or fungi. Blisters under the animal's scales are caused by a constantly damp environment. Treatment includes the draining of the vesicles and application of an antiseptic solution. Kiel (1974) recommends replacing aspirated fluid from vesicles with a 2% iodine solution. However, Ross (personal communication) suggests liberally coating the affected areas with Polysporin[®] ointment (Burroughs Wellcome) and based on culture results, the use of injectable antibiotics. Living quarters should be warm and dry. To hasten shedding, Zwart (1972) suggested the administration of parenteral vitamin A. Water should be provided ad libitum in a small, heavy bowl, and parenteral fluids administered if necessary.

Commonly encountered disorders will be continued in Part 16.

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Viewpoint

ZOOKEEPING AS A PROFESSION: A REBUTTAL

By
Eric M. Rundquist
Herpetarium, Sedgewick County Zoo
Wichita, KS

The August 1985 issue of Animal Keepers' Forum contained an article on "Cultivating a Professional Staff". Although most of the points in the article were relatively accurate, I had many problems with the thesis of the article.

For one thing, I seriously doubt that zookeeping is a high profession that is similar to nursing. The zoo business is a profession. I know very few people in this business that are or would be content to remain at the keeper level for the rest of their careers. For the vast majority, the one basic credential necessary is a high school diploma. Although most supervisors and curators require more than that and certain zoos do attempt to require some college experience, until a basic academic core program is developed for zookeeping, keepers do not begin at the professional level of nursing or similar professions. A degree in biology or zoology do not make a zoo-keeper.

I agree that supervision goes beyond merely explaining a routine to a new keeper. It also goes beyond explaining theory. A good supervisor is part cheerleader, part teacher, part taskmaster. This is a continuous process. More than anyone else, a supervisor is responsible for maintaining and improving morale in his given area. The supervisor is responsible for making his people aware of the latest in information and techniques, ensuring that his people have access to this information, and encouraging them to use this information. The keeper's primary responsibility is to his charges. The supervisor's responsibilities are to the animals under his charge and to his people. In my view, these responsibilities are equal. The supervisor is the buffer between his people and the often silly requests and demands of management. He also is the buffer between his animals and the sometimes cockeyed notions of keepers.

I am not sure that it is necessarily good or necessary for a supervisor to become friends with his staff. Personal feelings towards keepers can frequently get in the way of proper management of a collection. Although I realize that a close personal relationship between staff and supervisory personnel can create a truly superior work and management situation, this is an uncommon occurrence and requires an extraordinary sensitivity on the part of all persons involved.

Although a supervisor does have a responsibility to allay unnecessary fears among staff, he must also ensure that said staff does not become overly familiar in a personal way with animal charges. Most of us are aware of the 'cuddler syndrome'. Line keeping requires extraordinary sensitivity to the current states and well-being of all specimens and becoming too distant from or close to animal charges destroys that sensitivity; such sensitivity being the mark of an excellent keeper.

On the other hand, line staff should and must maintain a healthy respect for certain animals in their care. Keepers are killed every year and, in my experience, these occurrences happen from improper training, improper tools, poor supervision, and lack of respect. Crocodylians are still quite capable of scaring the hell out of me, as are large pythons, certain veno-

nous snakes, and the occasional large monitor lizard. I would demand from any staff that I might supervise that they share that same respect and small portion of fear or they can start looking for another line of work.

In regard to the intelligence levels of keepers, it is my experience that those people who do not follow instructions, do not question procedures, and do not show ability to adapt to and create within unusual situations, are not particularly gifted with a high level of intelligence. Those people that do these things, though, seem to be a step above the norm.

On the subject of monetary reward: the people that choose to stick with this business are well-aware that they aren't here to make money. I feel we choose to seek our rewards in other areas. Many people in many other professions are incapable of owning their own homes these days. That is a socio-economic fact and has nothing to do with zookeeping. This does not mean that we will willingly work ("like a dog" was, I believe, the phrase) for very little money and no recognition. If the pursuit of the American Dream (whatever that is these days) includes the pursuit of personal freedom, job satisfaction, peer recognition, and a wholeness within the environment that we occupy, then each and everyone of us is fully capable of that pursuit, whether we are zookeepers or carpenters.



Pandas Here And Abroad

Giant Pandas are making the news around the world. On 26 June, twin pandas were born to Mexico City's female, Ying-Ying. National Zoological Park veterinarian, Dr. Mitchell Bush, was invited to the Zoologico de Chapultepec in Mexico City to assist with the smaller of the two offspring who was born 2/3 the size of a normal panda cub. Dr. Bush flew to Mexico with additional feeding tubes as well as a special milk formula for the small panda that was ignored by its mother. Unfortunately, the underweight cub did not survive.

Half way around the world, Tokyo's female, Huan-Huan, who was artificially inseminated, gave birth to a panda cub that survived only 43 hours. And sadly, London's 12-year-old female, Ching-Ching, died from peritonitis on 20 July. On the homefront, Hsing-Hsing and Ling-Ling (NZP's panda pair) bred four times during Ling-Ling's 11-day heat cycle. It's too early to know whether Ling-Ling is pregnant, but urine samples are being taken to determine any changes in hormone levels. Panda births have followed breedings by periods of time varying between 97-168 days. If Ling-Ling is pregnant, a birth could occur sometime in late September to early December.

*from TIGERTALK, NZP
July 1985*



Conference..... '85

Update On Everglades Post Conference Trip

We have made the final arrangements with the Everglades Canoe Outfitters for our trip. The trip price has been confirmed at \$29.50 and will follow the itinery described in the July AKF.

Those interested must register by Tuesday, 22 October. This can be done during conference registration in Miami on Sunday, Monday or Tuesday and will be limited to the first 50 paid registrants.

For those of you new to South Florida and Everglades canoeing, here is a list of items you should consider bringing:

- Loose-fitting comfortable clothes, long pants and long sleeve shirts to discourage mosquitos.
- Windbreaker or rain jacket
- Sneakers or boat shoes
- Hat and sunglasses
- Suntan lotion and/or sunblocks (tropical sun is even hotter in October!)
- Mosquito repellent

These items are helpful whether you are planning on canoeing or not.

Guest Speaker At General Meeting

The South Florida AAZK Chapter is proud to announce that Dr. Dan Odell will be our guest speaker at this year's general meeting which will be held on Thursday, 24 October. Dr. Odell is a marine mammologist and considered to be one of the foremost experts in the world on manatees, which are our Chapter's logo.

Dr. Odell earned his undergraduate degree at Cornell University and went on for his master's and Ph. D. at UCLA. He is now an associate professor at the University of Miami's Rosentiel School of Marine and Atmospheric Sciences located on Key Biscayne, where he teaches classes on marine mammology and has been involved in serious research for over eleven years.

Dr. Odell's many responsibilities include serving on the Marine Mammal Commission, being Chairman of the Department of Biology and Living Resources Academic Committee, and he also is in charge of the South Eastern Regional Stranding Network. This latter duty involves salvaging manatee carcasses and performing various morphological and physiological studies on them. His current interests lie in sea turtle research and effects of oil spills on various sea creatures.

Again we are proud to have Dr. Odell as our speaker and look forward to a most educational and interesting talk. We hope to see you there!

Notes To Remember

---If anyone is still interested in finding a roommate, please contact: Rachel Rogers, Conference Committee Chairman, South Florida AAZK Chapter, 12400 S.W. 152nd St., Miami, FL 33177, BEFORE the Coconut Grove Hotel's Registration deadline which is 20 September, 1985.

CONFERENCE '85, Continued

--If anyone wishes to rent a car before the conference, please contact Rachel. She can arrange through Hertz to get conference rates any time before or after the conference during the month of October.

--Throughout the entire conference it will be greatly appreciated if all delegates wear their conference nametags to all conference functions. This will prove to be invaluable for identification purposes. Thank you.

--For those who have not yet registered for the 1985 AAZK National Conference: THERE'S STILL TIME. Registration will continue up to and throughout the entire conference. For a nominal late fee you still have time to register for what promises to be one of the best conferences ever!

SO DON'T MISS IT!!!

MIAMI AWAITS YOU!!!

CONFERENCE T-SHIRTS

We are selling conference T-shirts for 10.00 apiece if purchased at the conference. However, a \$1.50 savings is being offered for those who purchase shirts before the conference. Shirts will be attached to your registration packet when you arrive.

If you are not planning on attending the conference, T-shirts can still be bought at a savings. We do ask for 1.25 postage and handling in addition to the discounted price of \$8.50. Send our check or money order to: South Florida AAZK Chapter, 12400 S.W. 152nd St., Miami, FL 33177.

The design shown at right will be printed in 4 colors on the following choice of shirts:



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Shirts will be printed by Harlequin Nature Graphics. Check your local gift shop for other Harlequin designs. This discount is being offered to establish an accurate quantity of shirts we will need to print.



ZOO News From Japan

ONE EXAMPLE OF A RENOVATED TROPICAL EXHIBIT

By
Yoshi. Yonetani
ZooDEL, Zoo Design & Education Lab
Kobe, Japan

At the Takarazuka Zoological & Botanical Gardens, part of the famous amusement park, Familyland, we recently attempted renovation of their exhibits for tropical zone species. It was an undertaking for the 15th anniversary of the Panoramic Zoo which is the first flyover-styled, unique exhibits in our country. This three-story building with a basement is made up of some indoor and some outdoor exhibits including a nocturnal house, reptile-house, hippo pool, antelope yard and so on. Among these, the dome is the largest area (19m high x 16m across) and consists of two level floors along a round-way. The Zoo attempted to restore the poor looking landscape in this dome. As a Zoo-designer, I accepted the opportunity to establish a concept for this exhibit. During the planning phase, I racked my brain upon a lot of limitations for this renovation. For example, the effective space for animal display was very limited.

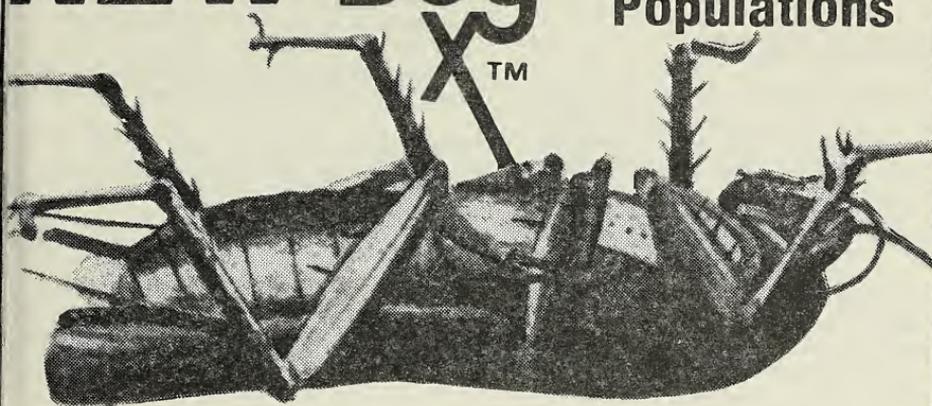
I proposed that the theme for the dome's renovation would follow a South American motif. The Zoo staff and I managed to set up the marmoset's colony, and we added squirrel monkey and capybara exhibits there recently. As was possible we utilized tropical plants native to South America. We built an artificial rockwork waterfall (but it's of a small scale) up on the top deck. From it to the caiman's pool, a narrow river is followed by circulation equipment. The observation pass for the public goes along this stream. The above-mentioned exhibits and the bird cages (mainly toucans and macaws) dot the ground level. Other small birds are free-ranging in the dome, but to my regret they are not all species endemic to South America.

On the partially glassed-in areas of the wall-side, a scene from the Amazon was painted by artists on the basis of my concept drawings. I suggested a keen idea for the exhibits, i.e. the use of stainless steel in the lower spots of openings left by cages. By this, I hoped to show the closed-in areas for exhibits would appear larger. In a sense, we had to make a plan for renovation in the Zoo which can be compared to doing a new building totally. Because many animals had to move to quarantine during construction and some animals had difficulty adjusting to the new exhibits, zoo-goers had to be stopped from passing through. After we got over some handicapping problems, our Bio-dome, "The Jungle" was completed.



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Chapter

DALLAS ZOO CHAPTER

I have recently resigned my position as Birdkeeper at the Dallas Zoo and therefore have resigned from the presidency of the Dallas Chapter of AAZK. Although I have thoroughly enjoyed my position, there is one disappointment I would like to express. I have noticed there is a lack of enthusiasm and interest in many AAZK Chapters across the U.S. I have yet to understand this, because AAZK is for the keeper and the animals they care for. I hope in the future AAZK will find a way to pull everyone together and really utilize the Association.

The Dallas Chapter is going to start from scratch by having a membership drive this fall. We have elected temporary officers until the first of the year election in 1986. The new officers are:

President.....Joel Hamilton
Vice Pres.....Dave Luce
Sec/Treas.....Sandy Upchurch

I wish good luck to all of them in the rebuilding of the Dallas Chapter of AAZK.

---Tamara Jones
Past President DZKA



MILWAUKEE CHAPTER

During the months of April and May, the AAZK Milwaukee Chapter received designs from fellow employees for the Chapter Logo. A number of attractive designs were submitted and voted on by the entire zoo staff.

Tim Tews, vice president of the AAZK Milwaukee Chapter, submitted the winning design, the Malayan Tapir. The Tapir design will be incorporated into the Chapter letterhead.

---Carol J. Boyd
Corresponding Secretary

News

METROPOLITAN BOSTON ZOO CHAPTER

Franklin Park Zoo and Stone Zoo have recently formed the Metropolitan Boston Zoos Chapter of the AAZK. A Constitution and By-Laws have been accepted by the membership. The election of officers is as follows:

President.....Cheryl Cullion
Vice Pres.....Chris Garland
Secretary.....Christine VanGemert
Treasurer.....Robin Brockett

The first project of our Chapter was a Sheep Shearing Festival which included weaving, carding and knitting demonstrations. We are organizing a newsletter, a keeper exchange committee and a picnic.

---C. VanGemert
Secretary



Legislative News

ENVIRONMENTAL BILLS ON THE MOVE

On Thursday, 2 August, Congress adjourned for the month and its members returned home to talk to their constituents and catch up on what's been happening in their district or state.

As often happens just before Congress adjourns for an extended period of time, there was a flurry of legislative action. The Endangered Species Act kicked off the action when it passed the House by a voice vote on 29 July. For next year, the bill authorizes about \$39 million to protect red-cockaded woodpeckers, grizzly bears, and other endangered plants and animals. In 1987, the funds increase to approximately \$45 million, followed by \$54 million in 1988.

The House also was busy on 30 July, passing bills that would reauthorize both the Coastal Zone Management Act and the Federal Nongame Act. The Coastal Zone Management Act, which protects our shores from haphazard development, expires this month. Until now, federal funds have played a valuable role in enabling states to fund coastal management programs. But the bill that passed the House, H.R. 2121, would cut the federal portion of the funds from 80 to 50 per cent, making it difficult for some states to maintain their coastal programs.

The Federal Nongame Act, a bill designed to aid robins, chipmunks, flying squirrels, and other "nongame" animals that are neither hunted nor fished, also passed the full House. But badly-needed funds were not included in the legislation, leaving wildlife managers without federal money to develop comprehensive management programs.

---Excerpted with permission from Conservation '85
National Wildlife Federation, August 1985

FWS LISTS CHANGES ON LIST OF ENDANGERED/THREATENED WILDLIFE

Newly listed as endangered on the U.S. List of Endangered Species are the following: the Carolina northern flying squirrel (Glaucomys sabrinus carolinensis) and the Virginia northern flying squirrel (Glaucomys sabrinus virginianus); the Tar River spiny mussel (Elliptio (= canthyria) steinstansana), three subspecies of field mouse - the Alabama beach mouse, Choctawhatchee beach mouse and the Perdido beach mouse; and the Modoc sucker (Catostomus commersoni), a fish native to California.

Listed as threatened were: the Niangua darter (Etheostoma nianquae) a native fish of west central Missouri; and the American alligator (Alligator mississippiensis) in Florida was reclassified from threatened to endangered due to a similarity of appearance. This change, based on evidence that this species is not biologically threatened, will enable Florida to expand harvest of alligators if desired.

---AAZPA Newsletter, August 1985



ONE OPINION ON ANIMAL TRAINING

By
Dora M. Jacobs, Senior Herpetarium Keeper
Rio Grande Zoo, Albuquerque, NM

Part III: What Not To Do

There are some big no-no's in animal training, either because they accomplish the opposite of what you want or because they put the animal under unnecessary stress.

1. Do not tease or harass animals. This makes them suspicious of you, and rightly so. Their behavior can only become predictable if yours is. You need to be able to trust each other. Establish your dominance, enforce it when necessary, and lay off.
2. Do not deliver a correction for a correct or neutral response, for the same reason. If the animal is responding, but not quickly enough to suit you, start delivering a bigger paycheck when the correct response has been completed and motivate the critter to do it faster instead of not at all.
3. Do not use illiogical corrections. Corrections should cause a correct response, not an incorrect one. Hitting a horse on the head will not make it go forward; it will make it back up or buck or turn or rear in sheer fear.
4. Do not repeat commands like a parrot trained by a tape recorder. Each speaking of a command or giving of a signal should be arranged to be obeyed. If the animal heard or saw and did not respond, correct it immediately. Interrupt right afterward with another command you feel sure will be obeyed, reward the obedience, and give the contended command again. Reward obedience emphatically or correct disobedience in a way that will make an impression. Repeated resistance calls for a vacation or variation in the routine to cause forgetting of the resistance.
5. Do not allow an animal to practice an erroneous response or to learn something that will not be OK when it grows up. A hundred-and-fifty pound St. Bernard is not cute jumping up on a hundred-pound arthritic old man with a walker, even if it is only trying to kiss him. Sabotage potentially uncute behavior, use the same technique to undermine resistance, or teach a command for behavior that will be acceptable only under certain circumstances, then correct for spontaneous demonstration by using the "no" or "quit" command. You don't need a camel coming up behind you and tipping you on your nose while you rake, but it might be a funny trick for a show.
6. Don't let a trained animal lie fallow just because you have no immediate use for it. Keep up training routines when someone is on vacation or it isn't the season for rides or the animal is old and retired from exhibition. Unemployed animals become neurotic and sometimes mean. My elderly, obedience-titled Irish Setter became so deaf that she couldn't distinguish one spoken command from another. I was going to retire her from training at that point, but she kept cramming herself between me and whatever dog I was training, so I gave her back her seniority and resumed working her first and then letting her go inside and sleep on the couch while everyone else waited their turn chained to a post. Fortunately,

When she was young I trained her to some hand signals for hunting. It's easy to teach her a new set of hand signals along with shouted verbal commands when she was only half deaf, and give her new hand signals by changing the old ones in combination with leash messages. You can teach an animal new tricks as long as its brain still works and you have some way to communicate with it.

Don't blame the animal for your own stupidity. Sometimes an animal won't obey because it can't. Check out a disobedient animal for health problems. A swollen elbow could keep it from lying down. Do the trick yourself to see if the conditions are right. I once saw a woman trying to make a dog lie while she had a death grip on the collar at her knee level. Only a sadist would make an animal lie down on ice, unless it's a polar bear. To ask a horse to lope on a slick surface can be hazardous to the health of both of you. Check the situation for logic. Once I asked my Irish Wolfhound to bring me the goats (Patsy seemed to think she was a Collie). Instead, she ran circles around them and kept them with the horses. My tiny mind finally perceived that she was trying to bring the horses too, but they were too busy eating to heed her. I hadn't taught her to bring only some of the animals out there. She was obeying to the letter, so I praised her and sifted out the goats myself. If I had browbeaten her, she might have lost her enthusiasm for herding.

Don't use a training technique or correction inappropriate for the individual animal. If a technique isn't working, try something else. Try to use one that makes the animal do what you want by itself. My first Irish Wolfhound would relax on the command "down" and wait for me to lift her down until I took to bribing her with a piece of cat food in front of her nose. She learned after these bribes what a year of putting her down wouldn't get across. A verbal reprimand may have the personal element required by some animals, but it may terrorize others. For the easily terrified, use "no" gently spoken only as a command, but enforce commands physically and, if possible, impersonally. Screaming at an animal, "I told 'down', you fool" is not a correction. Pulling its head next to the ground with a leash or halter strap until it has to lie down is. But you cannot legitimately use a correction until the command is clearly understood and the response conditioned. Correction is for disobedience, not instruction.

Don't use more than one command per action, or more than one action per command. Subtlety of human speech is lost on animals. Make a list of all the commands you ever want to teach an animal. Make sure none of them rhyme or mean two different things. Commands don't have to be grammatical, but they should be short and clear. They can be in any language. They shouldn't rhyme with the animal's name. By the way, don't expect an animal to learn a different name every time it changes handlers. Use the name it was raised with whether you like it or not. If you must change it, use one that rhymes closely enough for the animal to recognize. You've heard horses accused of being too stupid to learn their names. If they were named when small, they know their names. If you don't know their names, that's your problem.

Don't push an animal. Different individuals, even of the same litter, learn different things at different rates and in different ways. If the animal is learning slowly, let it learn slowly. Pushing will not make it learn faster; it will only make it insecure and even perhaps develop a learning block. Animals, like people, should be treated with respect for their individuality.

11. Learn how to teach before you attempt to teach an animal. Do the trick yourself to learn its mechanics and psychology. Practice your training sequence by yourself to coordinate your moves. If the animal still doesn't learn, consider the possibility of a personality conflict and try another trainer. Also try other training methods. Don't give up easily, but sometimes it isn't worth it.

12. Whenever possible, use the same form of parental discipline as the species being trained. Animals accept whatever form of correction their own parents used on them. The elephant ankus duplicates the mother's trunk, which she used liberally whenever the little one challenged her dominance. Even hand-raised elephants should instinctively recognize the feeling. Cats tap their cubs on the nose to wean them. We can do this for the same purpose with a cat that persists in sucking, or transfer the gesture to other situations. Dogs and wolves pin subordinates to the ground by the throat. We can easily copy this maneuver with our hand. Crossing species lines with social signals is meaningless and ineffective.

13. Don't use personal corrections for negative behavior. If an animal is doing something inexcusable, a correction it associates with us will only teach it not to do that to us or in our presence. If a dog raids the trash, the only way to teach it not to raid the trash is to arrange for the trash to attack it. A hot wire works admirably, and so does a mousetrap under a piece of aluminum foil. All baby animals try biting at some time, especially the ones that shed baby teeth and grow new ones. No need to constantly nag them at that tender age. No need, either, to let them shred your appendages. Just tuck the lips over the teeth (it's less obvious if you use the bottom jaw) and let them bite themselves. Of course it hurts! It hurts you, doesn't it? But if you make no issue of it, they decide to take up a safer hobby, such as not biting human beings. What's more, if this is done by all handlers as soon as biting is attempted, it works fast, and it won't be necessary to stop playing with a baby because it is dangerous.

14. Don't play rough with animals. Human beings are much more delicate than most other animals. Our best defense is our brains. Let animals play chase, bruise, and kill each other. Teach them to be gentle with people. Don't play games with baby animals that you won't be able to handle when they grow up. Let them kill a feed sack dummy, but don't play tug-of-war with it. To exercise an animal and interact with it, teach it to respond to commands. So as to have control over dangerous or skittish animals, train them to respond to given stimuli from a distance. No matter how optimistic we are, there are going to be times when we'll have to hand-raise zoo animals. Let's teach them to be successful tame animals.

15. Don't overhandle potential breeding stock. As soon as possible, a hand-raised animal should be returned to its own group. Sometimes a domestic foster parent can prevent its becoming imprinted on people. The condor parent puppets used in San Diego serve the same purpose. Try to teach animal babies the behaviors of their own species. Then introduce them to other members of their own species as soon as it is feasible. However, if it is necessary to hand-raise an animal, be sure to handle it sufficiently for its own culture. Baby apes need to be held most of the time, and can't be successfully kept in cages and handled for half an hour three times a day, provided the keeper has some spare time.

16. Do not give inappropriate corrections, over- or under-correct. A correction should make the animal do what it didn't. If there is no way

do this directly, teach an indirect correction along with the command. Some dog trainers use a leash jerk to correct all infractions. This only tells the dog that it did wrong; it doesn't tell it what to do instead. Use a jerk up for the sit, down for the drop, forward if it's lagging, back if it forges ahead, etc. Overcorrection intimidates; undercorrection loses your dominance. Use exactly as much force as is needed to cause an immediate correct response. One memorable correction is much easier on an animal mentally than constant nagging. Easier on us too.

Animal training is rewarding because it makes control possible with minimum stress. Social animals are given a language for interaction with their handlers, and therefore some control over what happens to them. This leads to better mental health for us both.

ADDENDUM: Marine Mammals

Marine mammals, and indeed individuals of other species as well, are capable of forming very close bonds with their handlers. They are best rewarded with personal attention in addition to food. The personal attention one comes to be more important to them than the food. They positively enjoy physical contact such as hugging and petting. The most effective correction for such animals is withholding of attention. It is easy to withdraw from an animal in a pool, but it is effective correction only if the animal cares about you personally.



Information Please

Information is requested on exhibit designs of outdoor owl enclosures, particularly exhibits for burrowing, long-eared, snowy, and barn owls. Anyone with this information please send to: David P. Ford, Animal Care Supervisor, Akron Zoological Park, 500 Edgewood Ave., Akron, OH 44307.

Over the past few years the Memphis Zoo and Aquarium, in conjunction with the Lichterman Nature Center (Memphis, TN), has been working with a technique for repairing turtle shell fractures. The use of fiberglass mat and polyester resin enabled injured specimens to be repaired and released after variable periods of recuperation. This technique has been used in the past for shell defects in tortoises. Up to the present, we have repaired and rehabilitated approximately a dozen specimens of Red-eared turtle (*Pseudemys scripta elegans*), Eastern box turtle (*Terrapene c. floridana*), and Three-toed box turtle (*T. c. triunguis*). We would like to take this opportunity to invite anyone with experience or interest in this topic to please correspond. Write to either: Donna Martin, Rehabilitation Specialist, Lichterman Nature Center, 5992 Quince Road, Memphis, TN 38119 OR George Heinrich, Herpetology Dept., Memphis Zoo & Aquarium, 100 Galloway, Memphis, TN 38112.



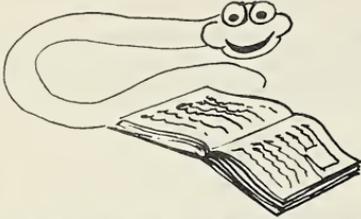
Book Review

East African Mammals: An Atlas of Evolution in Africa, Volume I.

By Jonathan Kingdon

University of Chicago Press, 1984

456 pages \$25.00



Review by Paula M. Davis
Publications Coordinator/
Archivist, Toledo Zoological
Gardens, Toledo, OH

When the first of the seven-volume series East African Mammals was published over a decade ago, it was hailed as a "luxurious wonder" by Scientific American. The distribution of the hardcover publication was limited, however, due to the astronomical price tags, ranging from \$75 to \$99 per volume. Zookeepers, librarians, naturalists, scientists, and others will now welcome the availability in paperback of the first three volumes of this masterpiece; they are sturdy, sewn-bound editions and quit affordable at \$25 each.

Kingdon developed the series to make an agreeable, broad, and complete inventory and introduction to all the mammalian species of East Africa. This first volume is largely concerned with primates (including Homo and other hominids), with the anteaters, the aardvarks, and the dugong completing the work. Since it is the first volume, it also has a set of introductory chapters as background, treating the vegetation and the general environment, the perspective of the long past of geologic time, and the foundations of the anatomy of mammals.

The book has a very attractive appearance, combining hundreds of impressive formal drawings, even anatomical ones, with a lively sketchbook from the field. Careful maps and diagrams are liberally distributed throughout the text, which is a thoughtful review of the literature in the context of field experience, both anecdotal and experimental. Full-color plates of related species and subspecies could prove invaluable to identifying subspecies based on fur coloration.

In short, no person interested in primatology should be without this volume, and mammologists and others will also want to add to their collection the other volumes in this classic series in modern natural history.

Also available from the University of Chicago Press:

---Volume IIA (Insectivores and Bats), 404pp.; \$25

---Volume IIB (Hares and Rodents), 428pp.; \$25

The remaining four volumes to be published in the future will include carnivores; large mammals, including elephants, rhinos, and hippos; and the wide variety of African hoofed mammals.



stitutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 35 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings for positions which become available close to deadline are accepted.

ZOO CURATOR...City of Atascadero, CA. population 18,200. Salary \$1531-1872 per month. (Salary negotiations are expected to result in an increase.) City paid PERF retirement, no Social Security deductions. Reports to Director of Parks and Recreation with responsibility of supervision of animal care and zoo operation. BS in Zoology, Biology or related life science, plus three years' experience in custodial care of wild animals and maintenance of grounds and facilities. Contact: Personnel, 6500 Palma Ave. P.O. Box 747), Atascadero, CA 93423. City application required. (805) 566-8000. Closes 10-11-85. EOE/AA.

SUPERVISOR/BIRDS...to supervise a diversified bird collection. Plans and oversees exhibits, assists in breeding/research projects and with acquisitions/dispositions. Knowledge of design and construction useful. Supervisory and bird experience required. Prefer zoological or related field degree, experience may substitute. Send resume to: Jacob P. Yelverton, Zoo Director, Louisiana Purchase Gardens & Zoo, P.O. Box 123, Monroe, LA 7010-0123.

ZOO ATTENDANT I/REPTILES...requires high school diploma and one year of zoo reptile experience. Responsible for care and husbandry of Fresno Zoo's reptiles and amphibians and maintenance of environmental exhibit chambers. Knowledge of reptile breeding and recordkeeping and experience with endangered and delicate species desirable.

ZOO ATTENDANT I/GENERAL ZOO/ELEPHANTS...requires high school diploma and one year of general zoo animal experience and desire to work with elephants on a relief basis at the Fresno Zoo.

For either of the above positions: send for application from Personnel Department, 2348 Mariposa, Fresno, CA 93721. Phone (209) 488-1574. Closes 1 October, 1985.

AQUARIUM BIOLOGIST/EDUCATOR...reports to Director of Wildlife Biology. Develops and teaches a wide variety of marine science programs for school groups as well as community outreach programs; prepares pre and post-visit materials for teachers; assists in care and maintenance of live animal collections and artifacts, and uses live animals and artifacts in programs. All be trained in non-marine animal care also. Maintains records and reports on living collections. Assists in development and preparation of exhibits. Assists in wildlife rehabilitation and answering public inquiries. May supervise aides and volunteers. Requires undergraduate degree in marine science, biology, or related field; prior teaching experience in a relevant subject and with similar audiences; strong skills in written and oral communication; strong background in marine sciences and/or aquarium operations, etc. Prior aquarium or museum experience preferred. Send resume to: Personnel Office, Science Museum of Connecticut, 950 Trout Brook Rd., West Hartford, CT 06119. No phone calls please.

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OPPORTUNITY KNOCKS, Continued

ZOO DIRECTOR...requires degree or suitable experience compatible with Zoo Administration. Will manage and direct full operations of zoo exhibiting diverse exotic animal collection. Responsibilities include directing curatorial, administrative, development, marketing, and education depts. Send resume to: Mr. Tom Nekota, Director of Parks and Recreation, 650 South King Street, Honolulu, HI 96813. Salary and benefits given on request. The City and County of Honolulu is an equal opportunity employer.

ADVERTISING/CLASSIFIED REPRESENTATIVE... wanted for New Methods, the journal of Animal Health Technology. We seek experienced or very interested individual(s) to participate in sales. Some training provided. Commission only. Expenses paid. Part or full time. Write: New Methods, P.O. Box 22605, San Francisco, CA 94122 or call (415) 664-3469. Attn: Ron Lippert, AHT.

REPTILE/AMPHIBIAN KEEPER VI...requires high school diploma and one year of zoo experience. More extensive education and experience preferred. Salary \$13,428-\$18,972. Contact Lyndon Mitchell, Supervisor, Dallas Zoo, 621 E. Clarendon Dr., Dallas, TX 75203 (214) 946-6898.



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AAZK MEMBERSHIP APPLICATION

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Mail this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers.

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PRINTED IN U.S.A.

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of Zoo Keepers
Topeka Zoological Park
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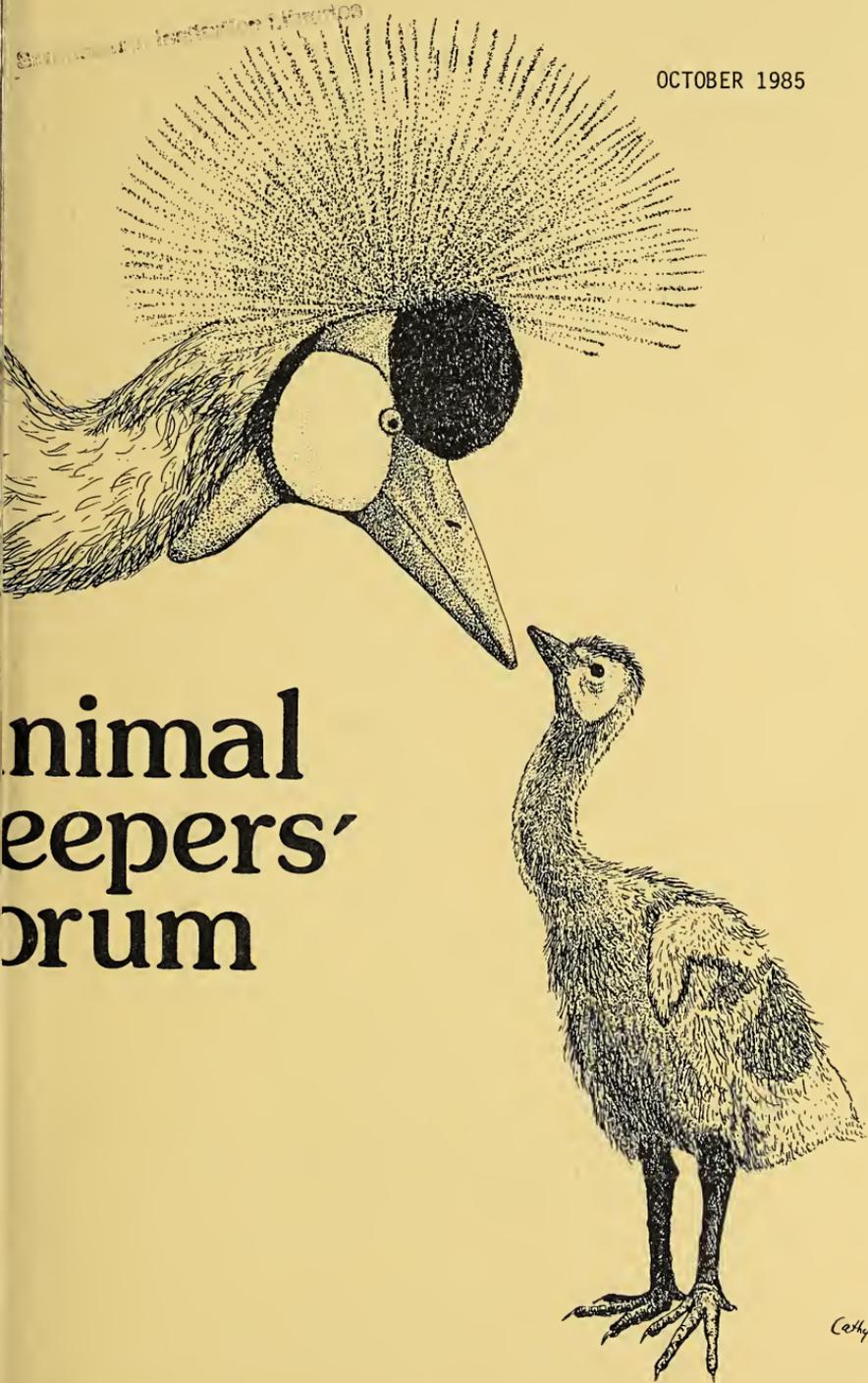
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OCTOBER 1985



Animal Keepers' Drum

Dedicated to Professional Animal Care



Executive Editor: Alice Miser
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OCTOBER 1985
VOLUME TWELVE
NUMBER TEN

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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States West of Mississippi - Debra Stetcher, Woodland Park Zoo, Seattle,

Individual Regional Coordinators and the states under their oversight are listed elsewhere in each issue of *Animal Keepers' Forum*.

This month's cover art features a Crowned Crane and chick (Balearica pavonina) and was submitted for publication by Cathy Taibbi, a Keeper at the Atlanta Zoo, Atlanta GA. Occasionally building its large nest in low trees, the Crowned Crane will deposit from one to three, bluish-white eggs. After an incubation period of approximately 30 days, reddish-brown chicks will emerge. The chicks are capable of walking from the first day and, in an emergency, can swim. Thanks, Cathy!

Scoops and Scuttlebutt

RC'S TO MEET AT MIAMI

Debra Stetcher, Co-Director for the Regional Coordinator System, has announced that all RC's for the Eastern and Western Regions will meet at the Miami Conference on Sunday, 20 October from 8:30 to 10:00 a.m. in Parlour A or B at the Coconut Grove Hotel. Everyone interested in the RC Program is invited to attend and to bring their ideas and suggestions for improving the functioning of this program.

FROM THE ELECTION COMMITTEE CHAIRMAN

Election Committee Chairperson Lynne Villers, Indianapolis Zoo, recently notified AAZK National Headquarters of the results of the election to fill the vacancies on the AAZK Board of Directors with the completion of the terms of Pat Sammarco, Lincoln Park Zoo, and Kevin Conway, NZP Conservation & Research Center. Elected to fill these two vacancies are: Susan M. Barnard, Atlanta Zoo, and Kerry Hoffman, Arizona-Sonora Desert Museum, Tucson, AZ. Susan and Kerry's terms of office will begin on 1 January 1986 and continue through 31 December 1989. Other board members continuing their terms of office are: Jean Hromadka, San Diego Wild Animal Park; Frank Kohn, National Zoo; and Oliver Claffey, Metro Toronto Zoo.

AAZK RECEIVES MEMORIAL CONTRIBUTION

AAZK National Headquarters has received a \$100 memorial contribution from Diana Culpepper, Thonotosassa, FL. Diana is the sister of Professional Member Frankie James Saginson, who died on 15 July 1985 at the age of 29. Frankie worked in the zoo department of Nature's Classroom in Tampa, FL. Our sincere condolences to his family and friends.

National Headquarters has also been notified of the death of Carolyn E. Thomas, wife of Gerald "Red" Thomas, on 19 August 1985. Gerald "Red" Thomas, a keeper at the San Diego Zoo was one of the founders of AAZK in 1967 and served on its first board of directors. Our sincere condolences to her family and friends.

FROM THE EDITOR'S DESK

Because I will be leaving on 19 October to attend the National AAZK Conference in Miami, the November issue of AKF will have to be at the printers before my departure. Therefore it is important that individuals who have information they wish published in the November issue have such information to me by the October 15th deadline. Your cooperation is very much appreciated. ---Susan D. Chan, Managing Editor



FROM THE PRESIDENT

Dear Members,

Last month I attended the AAZPA National Conference where I acted as representative for the AAZK. The conference, hosted by the Columbus Zoo, Columbus, OH, was attended by over 1200 delegates, several of whom came from Australia and Europe.

As would be expected, sessions at the conference touched on numerous aspects of maintaining zoological parks and aquariums. The concurrent sessions which occupied two days of the conference included: Small Zoos, Aquariums, Mammals, Aviculture, Herps, Marketing, Development, Trustees, Conservation, the Zoo Image, Education, Animal Information Management, Exhibits and Design, and Docents.

Besides myself there were several AAZK administrative personnel in attendance for part or all of the conference. They were: Pat Sammarco, board member and Continuing Keeper Education Committee Coordinator; Larry Sammarco, AAZK Historian; Alice Miser, Animal Keepers' Forum Executive Editor; Connie Cloak, International Affairs Coordinator; Mike Crocker, Awards Committee Chairman; and Diane Forsyth, Book Review and Exhibit Design Form Coordinator; and Brandy Pound, AAZK Liaison to AAZPA, IZE.

Pat Sammarco's AAZK video tape presentation to educators and the Public Education Committee were well received and those present expressed great interest in ordering copies of both AAZK training video tapes. Brandy Pound very successfully presented the whys and wherefores of the AAZK liaison to the AAZPA Public Education Committee as well as supporting the concept of Staff Training. In addition, she allowed me time to speak on behalf of AAZK and the liaison during the final committee meeting. Diane Forsyth presented a poster explaining the Exhibit Design Form and made available copies of the form for interested individuals. Diane reports that interest in the form is increasing, especially regarding requests for it from graphics departments and zoo administrators. Throughout the week those persons mentioned above and other AAZK members attending the conference acted as ambassadors for AAZK and we all feel there was genuine interest in AAZK by the delegates with whom we spoke. The conference provided us with the opportunity to meet zoo administrators and share our views with them away from the tensions the work environment often produces.

The Public Education Committee was not the only meeting I attended. On Sunday I sat in on the AAZPA board meeting as an interested observer. Later in the week I attended the AAZPA Legislative Committee meeting as AAZK liaison. A brief meeting also occurred with Judy White representing International Zoo Educators (IZE) and it was decided that we would meet later at National Zoo to discuss areas of mutual interest and cooperation.

On Tuesday all delegates toured the Columbus Zoo, attending workshops and participating in SSP meetings. In addition, the American Association of Zoo Horticulturists held their conference at the zoo on Tuesday with all papers being open to the AAZPA delegates. The Columbus Zoo is, of course, noted for its exceptional Lowland Gorilla breeding program; and fittingly as the home of the first gorilla born in captivity had a spacious, new outdoor enclosure for the gorillas to show off to the conference delegates. The post-conference tour included the Cincinnati Zoo and King's Island Wild Animal Habitat. The Cincinnati Zoo highlighted several buildings and exhibits for the visiting delegates, those being: The World of Cats and the World of Insects, the Red Panda Exhibit and the Joe H. Spaulding Children's Zoo. As a member of the Cincinnati Wildlife Research Federation (other members being King's Island Wild Animal Habitat and the University of Cincinnati College of Medicine), the Cincinnati Zoo has estab-

FROM THE PRESIDENT, Continued

lished the "Frozen Zoo", a repository for eland, cat and bongo embryos and semen samples for various animals. The zoo is also the birthplace of "E.T." the first exotic animal born as a result of an embryo transfer. At King's Island delegates took a monorail ride through the Wild Animal Habitat with attention being paid to the Eland herd used in the embryo transfer research.

The members of the Columbus Zoo Chapter AAZK deserve special recognition for their activities while the delegates were at their facility. During the afternoon delegates were invited to a reception hosted by the Chapter. Later in the day there was an AAZK meeting where the "Feeds and Feeding" video tape was previewed again and those attending were able to meet with Pat Sammarco and myself. The Columbus AAZK Chapter is also looking forward to May 1986 when they will host the regional AAZK conference with many surprises in store for those who attend.

In conclusion, I found attending the AAZPA Conference a very good way to prepare myself for our upcoming conference in Miami. I look forward to seeing all of you there and will be happy at that time to discuss the AAZPA conference in greater detail. See you in Miami!

Dear Dolly,

It is with deep regret and some reservation that the Board of Directors accepts your resignation as AAZK Administrative Secretary. Your four and a half years of service has seen the association grow in stature and recognition. Most members are not aware how major a role yours has been while you were with AAZK. If an issue of Animal Keepers' Forum was late arriving you heard from members, but how many realize that you've kept track of close to 2000 members and made it look easy? Our greatest benefit was your strength of feeling for zoological facilities and their purposes and for the goals of AAZK. Your support of zoos in general and AAZK in particular was plainly evident to those people whose first AAZK contact was you.

Your strong support of AAZK allowed the board over the last four and a half years to turn their attention to matters other than the routine maintenance of the association. Since we could rely on you to handle the office duties with a minimum of input, we were able to devote larger amounts of time to achieving the association's goals. Consequently, our association is more widely perceived in the conservation community today. In the zoological community we are accepted as the source of zookeeping educational materials and career information. In truth, AAZK has become an internationally recognized organization with numerous foreign members; helping to promote and establish good relationships among professional zookeepers worldwide.

While we wish that you could remain with AAZK we also understand that we currently are unable to provide you with all that you require as an employee. We can remain confident, however, that AAZK will continue to have a friend and strong supporter wherever you will be. We thank you for your efforts on behalf of zoo professionalism and wish you the best of luck with your future endeavors.

Best Regards,

Kevin Conway

AAZK President



1985 AMERICAN ASSOCIATION OF ZOO KEEPERS AWARDS

The following awards will be presented at the AAZK National Conference held in Miami, FL on October 20-24, 1985. The Excellence in Zoo Keeping and Meritorious Achievement Awards are selected by the AAZK Awards Committee from nominations proposed by the AAZK membership. Mike Crocker of the Dickerson Park Zoo in Springfield, MO is chairman of this committee. The Excellence in Journalism Awards are selected by the editorial staff of Animal Keepers' Forum.

1985 EXCELLENCE IN ZOO KEEPING AWARD WINNERS

Larry Zolton, Honolulu Zoo, Honolulu, HI

Oliver Claffey, Metro Toronto Zoo, Toronto, Canada

Alan Sharples, Atlanta Zoological Park, Atlanta, GA

Roseann Giambro, Philadelphia Zoological Society, Philadelphia, PA

John Houck, Washington Park Zoo, Portland, OR

Beth Poff, Mill Mountain Zoo, Roanoke, VA

Gene Noda, Los Angeles Zoo, Los Angeles, CA

AAZK MERITORIOUS ACHIEVEMENT AWARD WINNERS

In recognition of outstanding contribution in the field of wildlife conservation and animal husbandry

Ken Howell, Miami Metro-Zoo, Miami, FL

Patricia Leon, Miami Metro-Zoo, Miami, FL

Joan Daniels, Brookfield Zoo, Brookfield, IL

AAZK OUTSTANDING SERVICE AWARD

In appreciation for hosting the 1985 AAZK National Conference

Miami Metro-Zoo
Miami, FL

1985 AKF EXCELLENCE IN JOURNALISM AWARDS

Outstanding Mammal Article: "Management and Husbandry of the Western Tarsier at the National Zoological Park"

Frank B. Kohn, Miles Roberts, Angela Keppel, Eugene Maliniak, Michael Deal, all of the National Zoological Park, Washington, DC.

1985 AMERICAN ASSOCIATION OF ZOO KEEPER AWARDS, Continued

Outstanding Avian Article: "Husbandry and Breeding of the Water Ouzel at the Washington Park Zoo"

John H. Houck, Ralph Arrison and Janet Buskirk, all of the Washington Park Zoo in Portland, OR.

Outstanding Herpetological Article: "Captive Maintenance of Tailed Frogs at Washington Park Zoo"

Stanley P. Held, Washington Park Zoo, Portland, OR

Outstanding Exhibit Design Article: "Sliding Door Nestboxes at Front Royal"

Kevin Conway, NZP Conservation & Research Center, Front Royal, VA

Outstanding Research Article: "An Ethogram Representing the Behavior of a Captive Troop of Black-handed Spider Monkeys at the Akron Zoological Park"

Diane C.M. Forsyth, Akron Zoological Park, Akron, OH

Outstanding Narrative Article: "The Cockroach Conspiracy: Who Will Endure?"

Sandra Healy-Will, Lincoln Park Zoo, Chicago, IL

Outstanding Management/Husbandry Article:
"Animal Introductions: Some Suggestions for Easing the Trauma"

Debbie Hewitt, San Diego Zoo, San Diego, CA

Outstanding Educational Series: "Reptile Care: Relating to the Inquiring Novice"

Susan M. Barnard, Atlanta Zoo, Atlanta, GA

Outstanding Cover Art:
July 1984, "Red Guenon"

Cathy Taibbi, Atlanta Zoo, Atlanta, GA

HONORABLE MENTION AWARDS

"Establishing a Pride of Lions at the New Pittsburgh Zoo", Regina Grebb. Pittsburgh Zoo, Pittsburgh, PA (Mammal Category)

"Hand-Raising Infant Insectivorous Bats", Susan M. Barnard, Atlanta Zoo, Atlanta, GA (Mammal Category)

"Results of a Post-Release Telemetry Study Involving Barn Owls in Northern Illinois", Joan M. Daniels, Brookfield Zoo, Brookfield, IL (Avian Category)

"Breeding the Rockhopper Penguin at the St. Louis Zoological Park", Gary A. Michael, St. Louis Zoological Park, St. Louis, MO (Avian Category)



Births & Hatchings

ASSINIBOINE PARK ZOO.....*Phil King*

B&H during the month of July 1985 included: Mammals - 0.1 Lion-tailed monkey, 1.2.1 Formosan sika (0.1 DNS), 2.2 Mule deer, 2 North China leopard (1 killed, 1 abandoned), 2.0 Addax, 1.0 California bighorn sheep, 1 Canada lynx, 0.1 Afghanistan markhor, 0.1 Vicuna, 1.0 Woodland caribou; Birds - 1 Red-whiskered bulbul, 1 Mandarin duck and 1 Mourning dove.

METRO TORONTO ZOO.....*Harry Hofauer*

April to June 1985 B&H include: Mammals - 0.0.1 Brush-tailed bettong, 1.0.5 Egyptian fruit bat, 0.1 Ring-tailed lemur, 1.0.3 Black lemur, 1.0.1 Barbary ape, 0.0.1 Japanese macaque, 1.1.1 Hamadryas baboon, 0.0.1 Patas monkey, 0.0.1 Douroucouli, 0.0.3 Sugar glider, 0.0.1 Plains rat, 0.1.7 Mara, 1.0.8 Slender-tailed meerkat, 0.1 South African fur seal, 2.2.1 Domestic bactrian camel, 3.1 Llama, 1.0 Alpaca, 1.1.3 Reeve's muntjac, 0.1 Northern Indian barasinga, 3.2.1 American elk, 1.0 American moose, 2.1 American Woodland caribou, 5.3.2 White-tailed deer, 5.1 European reindeer, 0.1 Pronghorn, 1.3.2 Wood bison, 2.0 Wisent, 2.2.1 Domestic yak, 0.1 Gaur, 0.0.1 River hippopotamus, 2.1 Greater kudu, 0.1 Grevy's zebra, 1.2 Sable antelope, 0.1 Gemsbok, 0.2 Scimitar-horned oryx, 6.4 Himalayan tahr, 8.7 West caucasian tur, 7.7.1 Dall's sheep, 0.1 Barbary sheep, 0.0.2 Chinese leopard; Birds - 0.0.11 South African ostrich, 0.0.2 Mute swan, 0.0.7 Mandarin duck, 0.0.1 South African yellow-billed duck, 0.0.15 Hooded merganser, 0.0.10 Indian peafowl, 0.0.1 Nicobar pigeon, 0.0.1 Pied imperial pigeon, 0.0.4 Zebra dove, 0.0.2 Peach-faced lovebird, 0.0.2 Renauld's ground cuckoo, 0.0.4 Star finch, 0.0.1 Tawny frogmouth; Reptiles - 0.0.2 Blanding's turtle, 0.0.11 American chuckwalla, 0.0.1 Green tree python, 0.0.36 Common boa; Amphibians - 0.0.18 Green and black arrow poison frog; Fish - 0.0.8 White cloud mountain minnow; Invertebrates - 0.0.140 Brazilian giant cockroach.

DALLAS ZOO.....*Sandy Upchurch*

August 1985 B&H include: Mammals - 1.0 Okapi, 1.0 East African oryx, 0.0.1 African porcupine; Birds - 0.0.3 Crested wood partridge, 0.0.1 Double-striped thick-knee, 0.0.1 Fulvous whistling duck, 0.0.3 Spur-winged lapping; Reptiles - 0.0.13 Neotropical rattlesnake, 0.0.3 Hybrid Mexican kingsnake, 0.0.4 California mountain kingsnake, 0.0.1 Gaboon viper and 0.0.1 Honduran milksnake.

PHILADELPHIA ZOO.....*B. Bahner*

B&H for August 1985 include: Mammals - 1.0 Red kangaroo, 1.1 Springbok; Birds - 4 Javan tree duck (DNS), 2 Red & white crane, 1 Renauld's ground cuckoo (DNS), 1 Green wood hoopoe, 4 Hooded pitta (2 DNS), 1 Blue-faced parrot finch and 2 Rothchild's mynah (1 DNS).

WOODLAND PARK ZOOLOGICAL GARDEN.....*Harmony Frazier-Taylor*

August 1985 B&H include: Mammals - 1.0 Bison (DNS), 0.0.1 Hoffmann's sloth, 0.0.2 Vampire bat; Birds - 2.3 North American ruddy duck (0.2 DNS), 0.0.9 Half-masked weaver (0.0.4 DNS), 0.0.2 Small-billed tinamou (0.0.1 DNS), 0.0.7 Cape teal; Herps - 0.0.5 Leopard gecko.

BIRTHS AND HATCHINGS, *Continued*

ATLANTA ZOO.....*Ellen Bradfield*

B&H for the first nine months of 1985 include: Mammals - 1.0 Himalayan black bear, 1.0 California sea lion; Birds - 0.0.3 East African crowned crane (0.0.1 DNS); Herps - 0.0.12 Leopard gecko, 0.0.1 Beaded lizard, 0.0.8 Indigo snake, 0.0.18 Corn snake, 0.0.15 Reticulated python, 0.0.2 Belize wood turtle, 0.0.2 Spotted turtle, 0.0.10 Barbour's map turtle, 0.0.1 Bog turtle, 0.0.24 Snapping turtle, 0.0.3 Loggerhead musk turtle.

BUSCH GARDENS/TAMPA.....*Susan Rackley*

B&H for August 1985 include: Mammals - 1.1 Nyala, 5.6 Greater kudu, 0.1 Gemsbok, 1.0 Muntjac deer, 1.3 Thomson's gazelle, 1.3 Impala, 0.1 Scimitar-horned oryx, 0.2 Grant's gazelle, 0.1 Grant's zebra, 1.0 Sable antelope, 1.0 Sitatunga, 1.0 Kafue (Red) lechwe; Birds - 1 Jandaya conure, 5 Indian peafowl (Blue Phase), 1 Crested tinamou, 3 Senegal parrot, 3 Scarlet ibis, 5 Sacred ibis, 2 American flamingo, 3 Mitred conure, 3 Sun conure, 2 Forsten's lorikeet, 2 Blue & gold macaw, 1 Cockatiel, 2 Chilean flamingo, 1 Mexican military macaw, 1 White-headed buffalo weaver.

MIAMI METROZOO.....*Lori Bruckheim*

August 1985 B&H include: Mammals - 0.1 Nyala, 1.0 Sambar deer, 1.0 Eland, 1.0 Gibbon, 1.0 Greater kudu, 1.0 Nilgai, 0.1 Dama gazelle; Birds - 0.0.2 Stanley crane and 1.2 Ruddy duck.

MILWAUKEE COUNTY ZOO.....*Carol J. Boyd*

B&H for August 1985 include: 0.1 Greater kudu, 0.0.1 Vampire bat, 0.0.10 Northern watersnake, 0.0.4 Laughing gull and 0.0.3 Wild turkey.

SAN ANTONIO ZOO.....*Debi Reed*

August 1985 B&H include: Mammals - 2.0 Gelada, 0.0.1 Three-banded armadillo, 0.0.5 Meerkat (1 DNS) 1st time in collection, 1.1 Giraffe, 1.1 Greater kudu (0.1 DNS), 1.0 Blackbuck (DNS), 2.0 Dama gazelle, 0.1 Grant's gazelle, 1.0 Thompson's gazelle, 1.0 Springbok; Birds - 0.0.7 Ruddy duck (5 DNS), 0.1 Andean condor (DNS), 0.0.1 Superb starling, 0.0.3 East African crowned crane, 0.0.2 Sarus crane (1 DNS), 0.0.2 Great currawong, 0.0.1 Dusky lory, 0.0.1 Yellow-backed chattering lory, 0.0.4 Painted conure (3 DNS), 0.0.2 Red-crested touraco (DNS), 0.0.1 Picathartes, 0.0.1 Crimson seedcracker (DNS), 0.0.2 Owl finch (1 DNS); Reptiles - 0.0.2 Fan-footed gecko (DNS), 0.0.4 Amazon tree boa, 0.0.7 Honduran milksnake, and 0.0.1 Broad-banded copperhead (1st time in collection).

WILDLIFE SAFARI (Winston, OR).....*John A. Cooper*

Sativa, a 10-year-old cheetah died 19 Sept., 1985 from birthing complications after giving birth to six cubs. Five of the six cubs were found dead that day by the staff veterinarian. The sixth, a 9-ounce female, is being cared for and is in guarded condition. Savita had given birth to 22 healthy cubs in four previous litters. The birth raises the total number of cheetahs born at Wildlife Safari to 97 cubs from 22 litters, making Wildlife Safari the third ranking center for the breeding of this endangered cat in the world.



Coming Events

THE 1985 AAZK NATIONAL CONFERENCE

October 20-24, 1985

Miami, FL

Hosted by the South Florida Chapter at the Metrozoo in Miami. For more information contact: Rachel Rogers, AAZK Conference, South Florida Chapter, 12400 SW 152nd St., Miami, FL 33177.

THE 1985 INTERNATIONAL WILD WATERFOWL ASSOCIATION and THE AMERICAN PHEASANT AND WATERFOWL SOCIETY

October 23-26, 1985

San Antonio, TX

Combined conference hosted by the San Antonio Zoo. For more information contact: Mary Healy, Curator of Birds, San Antonio Zoo, 3903 North Saint Mary's Street, San Antonio, TX 78212.

WILDLIFE SURVIVORS IN THE HUMAN NICHE

November 1-2, 1985

Washington, DC

The National Zoo's Fall Symposium for the Public. Lecture series. For more information contact the National Zoo, Office of Public Affairs, Washington, DC 20008 (202) 673-4866/4840.

THE RAPTOR RESEARCH FOUNDATION SYMPOSIUM ON THE MANAGEMENT OF BIRDS OF PREY

November 1-11, 1985

Sacramento, CA

For further information contact: Nancy Venizelos, Raptor Conservation Office, San Francisco Zoological Society, Zoo Rd. & Skyline Blvd., San Francisco, CA 94132 (415) 661-2023.

THE SIXTH BIENNIAL CONFERENCE ON THE BIOLOGY OF MARINE MAMMALS

November 22-26, 1985

Vancouver, BC

Sponsored by the Society for Marine Mammalogy, it will address issues concerning cetaceans, pinnipeds and other marine mammals. For information contact: Sharon Proctor, Program Chairman, Vancouver Aquarium, P.O. Box 3232, Vancouver, British Columbia, Canada V6B 3X8.

THE FIFTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 13-14, 1985

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information contact: Thomas Meehan, D.V.M., Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614.

COMING EVENTS, *Continued*

1986 AAZPA REGIONAL CONFERENCES

- Southern Regional - Greater Baton Rouge Zoo, 16-18 March, 1986: for more information contact: Barbara Gorman, Greater Baton Rouge Zoo, Box 60, Baker, LA 70714 (504) 775-3877.
- Western Regional - Point Defiance Zoo, 13-15 April, 1986: for more information contact: Tom Otten, Director, Point Defiance Zoo & Aquarium, Point Defiance Park, Tacoma, WA 98407 (206) 591-5337.
- Great Lakes Regional - Milwaukee County Zoological Gardens, 27-29 April, 1986: for more information contact: Mary Beth Carr, Milwaukee County Zoological Gardens, 1001 W. Bluemound Rd., Milwaukee, WI 53226 (414) 771-3040.
- Northeastern Regional - Mystic Marineline Aquarium, 4-6 May, 1986: for more information contact: Laura Kezer, Mystic Marineline Aquarium, Sea Research Foundation, Inc., Mystic, CT 06355 (203) 536-9631.
- Central Regional - Fort Worth Zoological Park, 18-20 May, 1986: for more information contact: Dudley Brown, Fort Worth Zoological Park, 2727 Zoological Park Dr., Fort Worth, TX 76110 (817) 870-7050.



THE TUCSON CHAPTER OF THE AAZK
IS PROUD TO ANNOUNCE
THE PUBLICATION OF ITS CHAPTER PROJECT
A 1986 CALENDAR

Designed with the professional keeper in mind, the calendar is packed with interesting information gleaned from Zoos across North America. Combined with pleasing Black and White photographs, taken by AAZK members, and large date blocks, the 12" x 20" wall calendar is both a useful working tool and attractive Christmas gift. To order your copy/copies, please clip and mail the following order blank:

Please rush _____ copy/copies of the Tucson Chapter's 1986 calendar @ \$5.00 per copy plus 50¢ postage and handling for each to:

Name _____

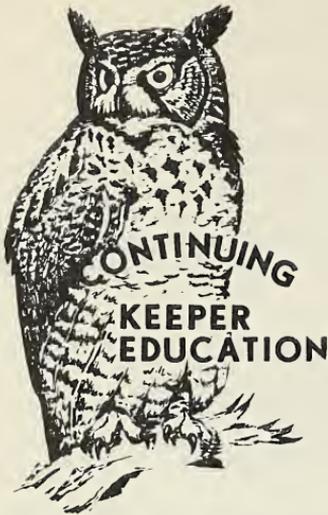
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Make check payable to the Tucson Chapter AAZK, and mail to:

Tucson Chapter AAZK
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Tucson, AZ 85705

Or purchase your copy at the National AAZK Conference in Miami, FL.
SUPPORT YOUR FELLOW AAZK CHAPTER



HSUS Booklet On Careers Working With Animals Available

By
Patricia E. Sammarco, Coordinator
AAZK Education Committee

As you are all aware, the Zoo/U list is a reference for you to use in answering the questions that we all get from the public asking where one goes to learn to be a Zoo Keeper. The number one place is, of course, the zoo, with fellow Keepers and experience being the best basic teachers. Soon AAZK will produce a book, to act as a basics text, but some young and

eager potential Keepers want some formal training to help them and, indeed, more and more zoos are requiring formal education and degrees at entry level in our profession.

Remember that the Zoo/U list is available from National Headquarters for a self-addressed, 22¢ stamped legal size envelope. As a Keeper you may want to keep a list handy for reference, or keep the availability of the list in mind as people ask for guidance.

To help those who are interested in all animal-oriented careers, I recommend obtaining The Humane Society's Guide to CAREERS WORKING WITH ANIMALS, by Guy R. Hodge, Director, Research and Data, HSUS. In this guide is Appendix 1 - Scholastic Programs, including a Directory of Scholastic Programs, as copied below with permission of HSUS Assistant to the Director, Captive Wildlife, Nancy Blaney.

Appendix 1 - Scholastic Programs

There are diverse educational options for the student contemplating a career in animal welfare or conservation. Scholastic programs are offered by community colleges, universities, and vocational schools. Programs of study vary in length from six months to nine years.

This appendix is presented as an introduction to unique curricula which provide specialized preparation for a career in animal welfare, environmental quality, or conservation. Programs of study, course offerings, and degree awards are continuously revised by educational institutions. The scholastic programs listed in this appendix reflect only a portion of the educational options available to high school graduates. Excluded from listing are common curricula in the biological sciences and other programs of study routinely offered by educational institutions.

Several universities permit students to pursue independent study programs which are specially designed to fulfill the educational requirements for particular career fields. For detailed information on the programs of study, coursework, or entrance requirements of an educational institution consult the current school catalog or contact the Office of the Registrar.

In preparing this appendix every effort has been made to avoid errors and omissions. However, The Humane Society of the United States cannot guarantee the accuracy of the information provided to our office nor can

CONTINUING KEEPER EDUCATION COLUMN, *Continued*

the HSUS attest to the relative merits of courses offered by individual educational institutions. Certain scholastic programs are accredited by professional associations such as the American Veterinary Medical Association and the Society of American Foresters. The reputability of an educational institution may also be determined by contacting one of the six regional educational associations: Western Association of Schools and Colleges, New England Association of Schools and Colleges, Middle States Association of Colleges and Secondary Schools, North Central Association of Colleges and Schools, Northwestern Association of Secondary and High Schools, or the Southern Association of Colleges and Schools.

In general, scholastic programs for which a certificate is offered upon completion are one year in length. Associate degree programs are two years in length. Bachelor degree programs are four years in length. A master's degree requires two years of postgraduate study after obtaining a baccalaureate degree and a Ph.D. requires an additional one or two years of study.

Several scholastic programs do not directly result in a degree award. An educational institution may require that a student transfer to a cooperating university after the second or third year of study. The appropriate degree is awarded by the educational institution at which the student completes his or her final year of study. The student entering a pre-professional program may apply for admittance to a professional school after his or her junior year. The undergraduate institution will award such a student a baccalaureate degree upon successful completion of the first year of study at the professional school. Some non-vocational programs of study are designed for the student who intends to enter the job market after one or two years of study. No degree is awarded to the student enrolled in such a program.

DIRECTORIES OF SCHOLASTIC PROGRAMS

AIBS Directory of Bioscience Departments and Faculties in the United States and Canada, edited by Peter Gray. New York: Halsted Press, 1976, \$25.00.

University Curricula in the Marine Sciences and Related Fields; Academic Years 1979-1980, 1980-1981, by the Interagency Committee on Marine Science and Engineering of the Federal Council for Science and Technology, Rockville, MD: National Sea Grant Program of the National Oceanic and Atmospheric Administration, 1979, complimentary.

Baron's Profile of American Colleges, revised edition, by the College Division of Baron's Educational Series, Inc. Woodbury, NY: Baron's Educational Series, Inc., 1976. \$15.25 (\$5.95 paperback).

Comparative Guide To American Colleges, by James Cass and Mac Birnbaum. New York: Harper & Row, 1977, \$17.50 (\$8.95 paperback).

Lovejoy's Career and Vocational School Guide, 5th Edition, by Clarence E. Lovejoy. New York: Simon and Schuster, 1978, \$9.95 (\$4.95 paperback).

Directory of Professional Preparation Programs in Recreation, Parks and Related Areas. The National Recreation and Park Association, Arlington, VA, 1973, \$3.00.

These guides will help new zookeeping professionals enter the field. Since a major portion of the Continuing Keeper Education Column's intent

is to guide us to ways to continue our learning experience, please write to Coordinator Pat Sammarco relating your ideas and experiences in your on-going professional development. Let me know about your in-house training programs, apprenticeships, formal education and other means of mid-career development. AAZK has been developing many tools to share what we learn, and this should include how we learn.

(Note: The HSUS booklet CAREERS WORKING WITH ANIMALS may be purchased by sending your name and complete mailing address plus \$6.95 per copy to: The Humane Society of the United States, 2100 L Street, NW, Washington, DC 20037. Makes checks payable to The Humane Society of the United States. If ordering for a library, animal-welfare organization, or a dues-paying HSUS member, the cost is \$5.95. If ordering six copies or more, the price is \$4.80 per copy. Please note organization affiliation when ordering under special reduced rates.)



Public Education

----- By Jay Jasan, Coordinator
AAZK Public Education Committee

Many animal care personnel are becoming involved in educational programming in zoos. Training demonstrations, behind-the-scenes tours and segments of college-level animal science classes are being conducted by Keepers and other animal care staff members who know the animals they care for best.

Sometimes, there is not much training offered Keepers in effective ways of presenting information to the public, and this can result in a less than rewarding program for the instructor as well as the audience. The following outline has been used by the National Park Service to help their interpreters evaluate the effectiveness of the programs they present, and may be useful to everyone involved in speaking to groups. It was passed on to me by Judie Steenberg of the Woodland Park Zoo, Seattle, WA. Thanks, Judie!

SELF-APPRAISAL FOR ORAL PRESENTATIONS

(Adapted from National Park Service Training Aide -- public domain)

The purpose of this list is to encourage those speaking to groups to review their performance--to be their own critic in detecting rough spots that need polishing.

Preparation of the Talk

1. Do you schedule your time so that you have the opportunity to prepare for your presentation?
2. Do you organize your thoughts so that the important points are covered in an orderly, concise manner?
3. Do you vary the outlines of your talk with new concepts and new illustrations occasionally?
4. Do you find yourself using too much technical language?
5. Do you memorize your talk? (A practice that is generally not encouraged).
6. Do you have a planned beginning and a planned end to your talk, even though it may be a brief and informal presentation?

TECHNIQUE NOTES, Continued

Delivery of the Talk

1. Do you use a friendly, conversational tone?
2. Do you speak loud enough to be heard with ease? How do you check this?
3. Do you talk with enthusiasm? Do you talk distinctly?
4. What words do you slur? Do you run your sentences together with "and uh" or "ah" instead of having clean breaks between sentences?
5. Do you pause to emphasize important points?
6. Do you open your mouth and use the tongue and lips for clean enunciation?
7. How is your eye contact -- front row, one or two people, or do you cover the field and make everyone feel included?
8. Do you periodically check your rate of talking?
9. Do you vary the rate of talking (from 125 to 190 words per minute) as a means of keeping audience interest and stressing important ideas?
10. Do you modulate your voice so as to avoid a monotonous tone?
11. Are you over-serious in your talk?
12. Is your manner friendly?
13. Do you use objects, or exhibits in your talks? If so, how effectively do you use them?
14. Do you use a tape recorder periodically to check on your rate of speech, enunciation and modulation?
15. Do you listen regularly to the better radio and TV speakers or other outstanding speakers to note in particular their style of delivery?
16. Do you invite someone (fellow employee, friend, etc.) interested in your self-improvement to give you candid criticism?
17. Do you conscientiously try to improve your use of the English language?

Attitude Toward the Audience

1. Do you enjoy speaking to people?
2. Do you enjoy talking about the features of the area?
3. Do you keep the attention of the audience? How can you tell?
4. Are you as interested in your audience as your subject matter?

General Appearance

1. Is your uniform (if applicable) well-fitting, clean, pressed and in good condition?
2. Do you stand erect and poised before the group?
3. Do you have nervous mannerism that distract attention?

It requires many hours of practice to incorporate all the skills implied in this list. The interpretive talk is perhaps the severest test of an interpreter's ability, so perfect your delivery by enlightened practice; there is no other way.

Recommended Additional Reading

- Barnlund, Dean C. 1968. Interpersonal Communication: Survey and Studies, Houghton Mifflin Company, New York.
- Bettinghause, Erwin P. 1968. Persuasive Communication, Holt, Rhinehart and Winston, New York.
- Boulanger, F. David, and John P. Smith. 1973. Educational Principles and Techniques for Interpreters, USDA Forest Service General Technical Report PNW-9, Pacific Northwest Forest and Range Experiment Station, Portland, OR.
- Harrison, Randall R. 1974. Beyond Words, An Introduction to Nonverbal Communication, Prentice-Hall, Inc., Englewood, Cliffs, NJ.
- Hovland, Carl I. Irving L. Janis and Harold H. Kelley. 1966. Communication and Persuasion, Yale University Press, New Haven.
- Eastman Kodak Company. 1974. Effective Lecture Slides. S-22, Rochester, New York.



ELEPHANT SET



ELEPHANT COMMAND SURVEY RESULTS

By
Ron Ringer, Chairman
Committee To Standardize Elephant Commands
Topeka Zoological Park, Topeka, KS

Last December the Committee to Standardize Elephant Commands started a survey on zoo's elephant commands to try and establish a list of basic commands that all zoos could share. At this time I am happy to report that the survey has been completed and a tentative list of commands drawn up. I would like to thank everyone who responded to the survey by sending in their commands and comments. For those of you who haven't yet responded, please do so for our records.

When the committee started, we looked on the ISIS inventory for anyone who exhibited elephants in their collections. We then sent out a survey to all those who had not responded to my request in the January 1985 issue of AKF. Out of the 78 zoos which exhibit either Asian or African elephants, I have received command lists from 58 of them. That figures out to be almost 68%. I also received command lists from two circuses and two private collectors of elephants. Again, I thank you all.

Accompanying this article is the results of the survey. The commands which have an asterisk (*) by them are the ones we intend to use on our standard list of commands. These commands are tentative for we wish to present them for approval at the Elephant Workshop in Fort Worth, TX. After the conference the members of the committee will be assigned a certain region of the U.S. and Canada in which they will be responsible for contacting zoos in order to get these commands adopted for use. It will be up to the keepers to help this project work. There are many qualified elephant handlers in the U.S. and Canada who can be contacted for advise on how to change your present commands to the new ones. I think most of you will find that it isn't very difficult to accomplish and it will benefit keeper and elephant alike.

From here the committee hopes its work is not done. Many of you who responded to the survey said, "Why stop here?". There seems to be some support in standardizing hook points, with the possibility of putting together some sort of training manual which would outline the basic care and maintenance of an elephant. I personally feel this type of idea is long overdue.

SURVEY RESULTS

1) Sternal Recumbancy:

*stretch: 76%
down: 20%
crush: 2%
down square: 2%

2) Lateral Recumbancy:

*down: 60%
over: 24%
command not used: 8%
roll in: 2%
stretch: 2%
die: 2%

ELEPHANT COMMAND SURVEY RESULTS, Continued

3) Return to Standing Position:

*come up: 54%
release command: 40%
rise: 6%

5) Walk With Keeper:

*move up: 40%
command not used: 18%
lead out: 10%
let's go: 8%
follow: 8%
come: 8%
move out: 4%
pick it up: 2%
forward: 2%

7) Move Forwards:

* move up: 54%
come here: 16%
come in: 10%
command not used: 8%
forward: 6%
lead out: 2%
come out: 2%
front: 2%

9) Raise Trunk:

*trunk up: 60%
trunk: 40%

11) Release Command:

*alright: 74%
okay: 12%
command not used: 8%
thank you: 4%
good: 2%

4) Present Foot:

*foot: 96%
leg up: 2%
lift: 2%

6) Move Backwards:

*back: 58%
backup: 12%
command not used: 10%
Come back: 8%
move back: 8%
go back: 4%
*the key word in this
group of commands is
back. It is used 90%
of the time.

8) Side Step Away

*get over: 40%
move over: 30%
command not used: 12%
over: 8%
side step: 4%
sideover: 2%
shy: 2%
cross: 2%
*the key word in this group
of commands is over. It
is used 80% of the time.

10) Hold Command:

*steady: 70%
hold: 16%
hold steady: 10%
stay: 2%
there: 2%

12) Stop Unwanted Behavior:

*no: 78%
quit: 12%
command not used: 6%
leave it: 4%



Chapter News

APPALACHIAN CHAPTER AAZK

Mill Mountain Zoo is pleased to announce the formation of the Appalachian Chapter of AAZK. This is the first chapter to be formed in the southwestern Virginia area. Elected officers are:

President.....Beth Poff
Vice Pres/Treas.....Rosemary Jalink
Secretary.....Laurie J. Thomas

Our first fundraiser was a wildlife art show, "All Creatures Great and Small" held at the Mill Mountain Zoo in July. Several local artists displayed their works for zoo visitors to admire and purchase. We are currently working on ideas for future fundraisers.

---Laurie J. Thomas

ATLANTA ZOO AAZK CHAPTER

On 21 August, 1985, nine Atlanta Zoo staff and three Atlanta Zoological Society members participated in the local PBS television station's pledge drive. Dinner was provided in exchange for answering phones and taking pledges. The pledge goal for the evening was \$23,600, but by the end of the evening almost \$28,000 was pledged! We felt that everyone enjoyed being involved in a community project and we were given some positive public exposure. We intend being a part of the pledge drives in the future.

On 7 September, 1985, the Atlanta Zoological Society had their annual member's picnic. About 800 tickets were sold, entertainment and food was provided. In addition, "Behind The Scenes" tours were given with

keepers standing by to explain their areas and answer questions from the members. These types of interaction help to bridge the gap between the zoo society and the keeper staff, and we hope to continue it also.

---Ellen Bradfield

THE LOS ANGELES CHAPTER

The Los Angeles Zoo Chapter will be holding an Australian Mammal symposium in January. We are accepting papers for this two-day event. All interested please write: AAZK/LA Zoo, 5333 Zoo Drive, Los Angeles, CA 90027.

The LA Chapter also held a T-shirt auction on 5 September. We would like to thank all those who so graciously donated shirts and patches. The response and interest was overwhelming. In fact, so many shirts were donated, we had to split the amount in half and will have an additional auction in a few months. THANKS!!!

---Kay Paull, President

PENNSYLVANIA CHAPTER OF AAZK

The Pittsburgh Zoo and the Pittsburgh Aviary are happy to announce the formation of the Pittsburgh, PA Chapter of AAZK. Newly elected officers are:

President.....Henry Kacprzyk
Vice Pres.....Kathy Robbibo
Secretary.....Margie Marks
Treasurer.....Raymond E. Bambrick

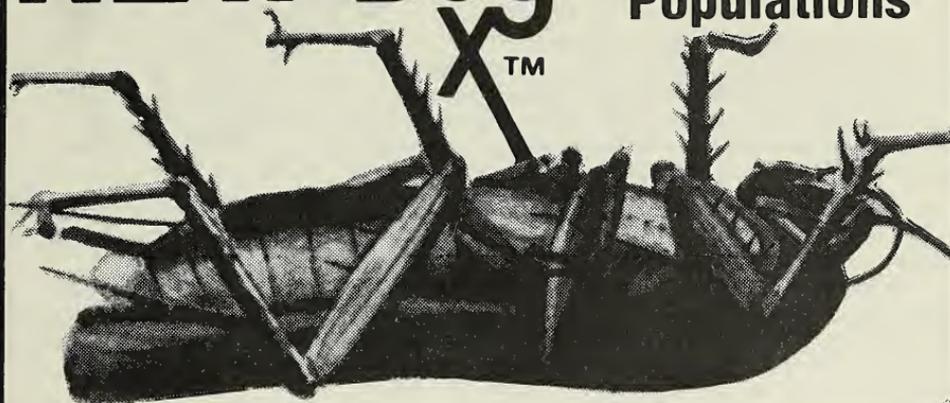
The first chapter project was a very successful bake sale on the zoo grounds. We raised close to \$200! The next fundraiser we are planning is a Spaghetti Lunch on Columbus Day, 14 October, 1985. We are also participating in the WQED (local PBS station) pledge week by answering phones. We are all excited about our new chapter and our greater participation with AAZK.

---Margie Marks



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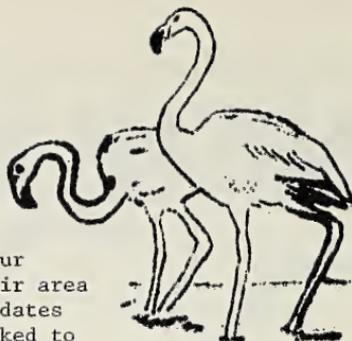
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WATCHING THOSE FLAMINGOS

By
Janet Jacobson, Keeper
Busch Gardens, Tampa, FL



The serious challenge to learn more about our flamingos hit me when I was assigned to their area on 8/3/83. Until this time, only hatching dates were recorded. During the next year, I worked to gather information for the following article.

For the focus of my study, I chose an older pair (specific age unknown) that was easily recognizable and still sitting on an egg. Both seasons they built their nest in the same spot, about six feet from the feed trough which I visited daily. Unfortunately, the eggs this pair laid were infertile.

Flamingo chicks hatch in late May or early June, so the 1983 season was in full swing when I began my observations. Due to this reason, I was unable to gather much pertinent data for 1983.

During the 1984 season, I walked through the flock and counted each egg every day or two. The group accepted this practice as part of the routine of feeding. Although there was an occasionally panic-stricken flamingo, basically a pattern was established with the sight of me at the feeder. As I walked at a slow pace toward the nest mounds I caused the group to move to the other side of the pen. Towards the end of the incubation, this was not always the case. Now, some would remain on nests while others would charge and occasionally nip at me. Males and females guarded with equal vigor and stood close to the mate or chick on the nest. This time was filled with loud calling which quickly ended after I retreated. Since some nests were only inches apart, the bickering amongst the birds continued throughout the day. They did fight and steal each other's nests, but this behavior ended when an egg was laid.

Here are my observations:

1/10/84--My first chance to observe complete breeding cycle. It was signaled to begin with the parade of males, each one lining up and with heads held high they strutted from one side of the pen to the other, chattering and turning in unison. The females would stand together, off to one side, in the typical "plastic flamingo stance", some with heads tucked under a wing as if to exaggerate their indifference. How do these birds stand with their legs stretched out in such awkward angles?

1/15/84--Mating followed, and, at this time, our work began: Draining of the moat surrounding the nest area and adding of clay to the nest area were the preparations necessary for a conducive breeding environment.

3/24/84--Our work was completed. It was obvious that the flamingo couples were eager to lay because of the immediate nest building activity that followed. March was a rainy and difficult time for the birds. Nests appeared to be going up and down with each passing rainstorm. Some clay washed out of one area, half filling the moat. This created a new nest area near the feeding trough.

In 1983, some sand nests were built on the opposite side across the moat in a sandy area. It appeared to be due to a lack of clay for nest building. This year, there were plenty of materials utilized in the building of their nests, such as: clay, grass, sticks, feathers, and anything else

WATCHING THOSE FLAMINGOS, Continued

they could lay their beaks on! Both males and females worked constantly. One would sit on the nest building it up while its mate would stay nearby and pass it more building materials.

4/16/84--The first egg was laid. Until this point, the chicks from the previous year were still occasionally being fed by their parents. Soon more and more eggs were laid on top of the clay mounds made especially for them. Some nests were not quite complete and, as the parents continued to build, the eggs were buried. Most eggs were recovered by workers and placed back on top of the nests with relatively little concern from the parents.

4/30/84--There are now 8 eggs with about 20 nest mounds.

5/9/84--An egg was found in the grass today. Its shell had an unnatural, pitted texture to it; it was placed in the incubator but never hatched. Two other eggs with the pitted texture were found in different nests, but I was unable to determine if they hatched.

5/17/84--At this point, there are 24 eggs. One other egg is believed to have been buried or washed away in last night's rainstorm. Rainstorms were the major cause in the loss of eggs, although seagulls were observed pecking at and destroying eggs. Some eggs were also crushed by the flamingo parents getting on and off the nests.

5/24/84--The first chick was observed pipping today, but it died before it hatched.

5/28/84--Today was the first successful pipping and hatching. The pippings average 48 hours and usually begins with a hole in the middle of the egg. Chicks hatch with a covering of grey down. Chicks were pinioned at an age of one day. Once again, the flock was in a uproar, but no rejections occurred.

6/8/84--The eggs have increased to 30 with 2 chicks already off of their nests. This was the highest egg count. We began to lose some eggs and others were known to be laid. The chicks averaged 6-8 days on the nest after hatching. They would occasionally go back onto the nest if they fell off during this time. After the chicks had left the nest, I observed them frequently climbing on their parents' backs when the parents would lie on the ground.

6/19/84--The 7th chick of the flock was hatched by a female with grey legs. It is believed she is one of last year's hatch. Her chick lived 9 days and was then found stuck in the mud following a rainstorm. It appeared weak and, despite the attention of the veterinary staff, it died that afternoon.

6/28/84--The chicks are growing rapidly, standing about 1 foot tall at the end of one month, still covered with grey down.

6/30/84--The chicks are venturing further and further from their parents and playing with other chicks. As they gain courage to nip at one another, it appears that the younger ones are more aggressive.

7/10/84--The oldest chick is 43 days old. It is beginning to get juvenile plumage or actual feathers. It stands about 3 feet tall. Today I noticed that one of the older chicks may be stunted and have leg problems.

WATCHING THOSE FLAMINGOS, Continued

This has been a recurring problem over the past years but usually only affects one or two chicks each year. Sometimes they grow out of this problem.

7/16/84--The final chick is hatched today. Nine eggs remaining, with those adults continuing to build on their nests.

7/26/84--Remaining eggs are past their due dates. When checked, they proved to be infertile. First chick is 60 days old, adult plumage (pink feathers) beginning.

8/2/84--Chick that had looked stunted in growth died today. The body was too decomposed to necropsy.

This ended the actual breeding and hatching season for this year. My observations of infant development will continue throughout the winter.

ADDENDUM From AAZK Infant Development Project Avian Data Form

I. Reproductive History

1980--Hatched 12--4 died
1981--Hatched 13--6 died--1 runt euthanized
1982--Hatched 14--2 runts euthanized
1983--Hatched 9--1 died
1984--Hatched 11--2 died

II. Environment

Clay nest area 40' x 15', surrounded in front by a 5' wide moat with feed trough on one side. In front of this there is an area of sand and grass, bordered by a hedge. Total enclosure is approximately 125' x 75' excluding the lake behind it. No shelter. Clay nest mounds were about 2-2½ feet tall.

Dec-Jan H-60°F, L-30°F
Feb-Mar H-70°F, L-40°F
Apr-May H-80°F, L-65°F
Jun-Jul H-90°F, L-75°F

III. Raising The Young

Hatched covered with gray down and pink legs. Parents' diet -- 3 (5 gal) buckets 1/2 flamingo flair, 1/2 dog kibble topped with 1 cup chopped carrots & beets. Roxanthin red is added for color. Diet of the chicks is said to contain blood, but I never had the opportunity to see what is fed. Feedings are quite lengthy, lasting as long as five minutes. No movement was noticed in either bird's neck, but chick's crop would fill. Feedings begin with chick calling and stamping feet. Chick walks in front of adult with head bent backwards over its back. Adult stands behind and places beak into chick's. They stay together until feeding is over. All feedings ended with the adult walking away to take a drink of water. Feed throughout the day. Chicks were seen eating from the trough after 29 days but continued to be fed by adult until they went to nest. Averaged 6 to 8 days on nest. Parents stimulate chicks to stand and feed in first few days.





SEE YOU SOON!!

at the

1985 AAZK National Conference

October 20-24, 1985

Miami, Florida

LAST MINUTE NOTES

- October 10th is the deadline date for those who wish to cancel their registration at this year's conference, and to still receive full refunds. After this time no refunds will be available as reservations for all conference activities will have been completed. Thank you.

- Please send in your auction items or a piece of paper which includes: description of the item, quantity (if more than one), sizes (if applicable), the value of the item, and your name and address. We need to get these auctions set up and only you can help us do it! Thanks!! We are all looking forward to seeing you very soon in Miami!

- Miami in October is lovely. The days are sunny, breezy and in the low 80's. It drops to the 70's in the evenings.

Dress is casual and comfortable. Comfortable walking shoes are a MUST, and you'll want a sweater or jacket for air-conditioned places. The hotel has a pool, and you are close to Biscayne Bay and several parks.

Shopping in Coconut Grove is within walking distance of the hotel. All price ranges are available. State sales tax in Florida is 5%. The hotel has a lounge and disco on the 20th floor (Top-of-the-Grove), and the Cafe Brasserie is next to the pool area. There will be a cash bar at the Ice Breaker and the Banquet.

There is valet parking at the hotel, but also free public parking along the streets, and free night parking available for AAZK delegates across the street from the hotel. Please contact Coconut Grove Hotel directly at their toll free numbers: Outside Florida 800-327-8771, Within Florida 800-432-6155, if you have any other questions regarding hotel information.

Fellow Keepers,

Do you feel strained, stretched, perplexed, vexed, entangled, burdened, troubled, scourged, pressured, distressed, disconcerted, discombobulated, discontented, discomposed, distraught, dismal,



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Then, don't miss a minute of the STRESS WORKSHOP at the 11th Annual AAZK Conference in Miami!

Experts from The Management Sciences Institute of Miami will work with us to discover ways of feeling good about ourselves and our work.

The Workshop will be held at The Coconut Grove Hotel from 7:00 to 9:00 p.m. on Monday, 21 October, 1985.

Bring your troubles, come on, get happy!





CONFERENCE T-SHIRTS

We are selling conference T-shirts for \$10.00 apiece if purchased at the conference. However, a \$1.50 savings is being offered for those who purchase T-shirts before the conference. Shirts will be attached to your registration packet when you arrive.

If you are not planning on attending the conference, T-shirts can still be bought at a savings. We do ask for \$1.25 postage and handling in addition to the discounted price of \$8.50.

Send your check or money order to: South Florida AAZK Chapter
12400 S.W. 152nd Street
Miami, FL 33177

IMPORTANT NOTE: The 1985 Conference T-Shirts will not be available in the color yellow as previously advertised. This color has been replaced by tan colored shirt featuring the four-color design shown above.

White _____ Lt. Grey _____ TAN _____

(*please put your order of preference 1 to 3)

SIZE: Small _____ Medium _____
Large _____ Extra-large _____

Quantity of Shirts Ordered: _____ @ \$8.50 each

Shirts will be printed by Harlequin Nature Graphics. Check your local gift shop for other Harlequin designs. This discount is being offered to establish an accurate quantity of shirts we will need to print.



THE ATLANTA ZOO - An Update

By
Alan Sharples, Keeper
Atlanta Zoological Park, Atlanta, GA

After a long and troubled history, the ninth oldest continually operating zoo in the country is being revitalized. The major turning point came when Dr. Terry Maple stepped into the melee as Director in June, 1984. Former Assistant Director of Audubon Park Zoo in New Orleans, currently a Professor of Psychology at the Georgia Institute of Technology, and Affiliate Scientist at the Yerkes Primate Research Center, Dr. Maple's first move was to slash the miles of red tape that were strangling this city-owned and operated park. To expedite smooth running of the zoo, Susan Hood was hired to fill the newly created position of Assistant Director of Operations.

Next, full-time veterinarian, Dr. Rita McManamon was brought on board. A U.C. Davis graduate, "Dr. Rita" immediately won the confidence of the keepers, proving to be both a highly competent animal practitioner and a friendly, caring individual. Dr. McManamon shares her office with Lorraine Perkins, who fills yet another newly created position as Record Keeper. The Atlanta Zoo has recently joined ISIS, and the old vet clinic is now undergoing major renovations. At the same time, John Croxton, formerly Senior Keeper at the Riverbanks Zoo, SC, was recruited as Assistant Curator of Mammals.

In July 1985, Guy Farnell from Audubon Park Zoo, New Orleans, became the first Assistant Curator of Birds in our zoo's history. Guy will have the fantastic opportunity of building our bird department from the ground up. To our formerly token avian selection he plans to add a large waterfowl collection, softbills, ratites, pheasants and more. Who knows what future plans may bring?

In September we welcomed our latest addition to the zoo team, Dr. Deitrich Schaff, formerly Curator of Mammals at the Philadelphia Zoo, who has become our first General Curator. Already the Atlanta Zoo has experienced visible improvements not only in veterinary care, but in facilities, animal management, employee relations, public image and keeper morale.

Recent acquisitions include one pair each of the following: Bald Eagle, Sarus Crane, Sumatran Orangutan (on loan from Yerkes), Lady Amherst Pheasants, and Blood Pythons. Many more exciting plans are in the works.

For instance, Yerkes Primate Center is holding 17 Lowland Goirllas and 12 Sumatran Orangutans for the Atlanta Zoo, in anticipation of our first major renovation and addition - a unique and progressive Great Ape complex. Ground-breaking is predicted for the summer of 1986, and completion of the Gorilla exhibit is forecast within a year.

The master plan includes a variety of other naturalistic exhibits including an Okefenokee Swamp, East African savanna and polar-marine facility. A major breakthrough occurred this July when Fulton County commissioners voted unanimously to give financial and managerial support to the Atlanta Zoo, and \$16 million was set aside for its development. Land acquisitions will enlarge the facility from 28 to 37 acres.

THE ATLANTA ZOO - An Update, *Continued*

While the schedule for keepers is more hectic than ever, the job is infinitely more rewarding. A staff increase is planned to cope with the newly created animal shows and demonstrations that are performed several times weekly, not only for the public but as occupational therapy for the animals as well. Pay increases are also expected. Old cages are being refurbished and new quarantine areas built. Round-the-clock watches are sometimes called for when births are expected (we recently had out first California Sea Lion pup born and successfully parent-raised); when hand-rearing is necessary (a Himalayan Black Bear has just been weaned); and for special public events. In addition to all this, a small group of talented keepers has undertaken a major graphics revolution, producing highly professional, full-color, illustrated signage.

As you can see, we are really going places. By the time you read this, the Atlanta-Fulton County Zoo will be on its way to becoming the nation's next great zoo.



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Reptile Care: Relating To The Inquiring Novice - Part 16

By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

COMMONLY ENCOUNTERED DISORDERS (Continued) (Accepted for publication, August 1984)

In continuance of last month's discussion on commonly encountered reptilian disorders, mycotic dermatitis in aquatic turtles (White Spot Disease) appears typically as multiple white and gray spots and shell pitting. This fungal problem is primarily caused by improper husbandry. Turtles exhibiting this condition should be removed from their water environment, kept in a warm, dry place for about 12 to 16 hours, and then, daily returned to water for hydration, excretory functions, and also when feeding. The affected area(s) should be scraped and swabbed with Lugol's iodine, tolinaftate, or miconazole nitrate 1 or 2 times daily. It is helpful to expose the affected animal to ultraviolet light. If a sunlamp is used, exposure times should be 5 to 10 minutes each day, or expose the animal to one hour of natural sunlight: be sure the reptile does not reach its critical temperature (Part 6, Table 1).

Septicemic cutaneous ulcerative disease (SCUD) is primarily found in soft-shelled turtles (family Trionychidae). The causitive organism was reported by Doyle and Moreland (1969) to be Citrobacter freundii. This gram-negative rod is found in soil, water, and in the intestinal tracts of various animals, including humans. The symptoms are loss of appetite, skin ulcerations and hemorrhage, abnormal drowsiness, loss of digits, and paralysis. Death may occur if lesions are not discovered in time for treatment. Abrasive substrates and contaminated water are attributed to its cause. This condition can be avoided with proper hygiene (Part 13). Also, antibiotic therapy should be administered by a veterinarian; according to Marcus (1981), specifically Chloramphenicol IM (intramuscular) or IP (intraperitoneal) at an initial dose of 8 mg/100g. of body weight followed by 4 mg/100g of body weight twice daily for 7 days. Supportive therapy with parenteral vitamin A, B, and C has been suggested by Frye (1981).

Ulcerative shell disease, also known as shell rot or spot disease, is a contagious and chronic problem affecting freshwater turtles. The disease has been reported by Marcus (1981) and Wallach (1976) to be caused by Benecka chitinovora, a gram-negative bacillus. Transmission is possible from one turtle to another and by introducing such animals as crayfish, lobsters, and crabs into the captive's enclosure. This condition is characterized by the loosening and shedding of shell plates. While the disease may be self-limiting, secondary infections can occur. Treatment by a veterinarian should include parenteral Chloramphenicol at 40 mg/kg, local curettage (scraping), and topical antiseptics.

Hypoglycemia (low blood sugar) is a disorder of crocodylians. Clinical signs are upward gazing, dilatation of pupils, swimming in circles, tremors, and loss of righting reflex. This condition has been described by Wallach et al (1967), and is most likely to occur in winter and in spring when blood glucose of crocodylians may be at the lowest level. Such stressful conditions as low temperature, overcrowding, excessive vibrations, loud noises,

Table 1. Common Causes of Accidental Injuries and Deaths in Captive Reptiles

Problem	Remarks
Animal escapes	Improper cage construction, intentionally allowing animal "freedom" to exercise
Cannibalism	Due to ophiophagous cagemates or feeding multiple cagemates in same housing facility
Chemical poisoning	From insecticides and/or disinfectants
Chronic low temperature	Chronic low temperatures at or below 70°F can result in poor digestion of food, ultimately leading to death from starvation or rotting food in stomach
Falling cage props	Can inflict animal injury or damage to cage
Faulty heating devices	Can result in overheating/underheating environment, and can inflict animal burns
Hanging or fatal nose-rubbing	From the use of wire mesh in cage
Owner-induced deaths	Can be caused by improperly removing eye caps, force-feeding, or excessive restraint techniques
Trauma from food animal bites	Can be avoided by pre-killing food animals before feeding to reptile

and excessive handling may bring on a hypoglycemic attack. It is essential to eliminate the stressful factors, provide the animal with its preferred temperature (Part 6, Table 1), and have a veterinarian administer parenteral or oral glucose when necessary.

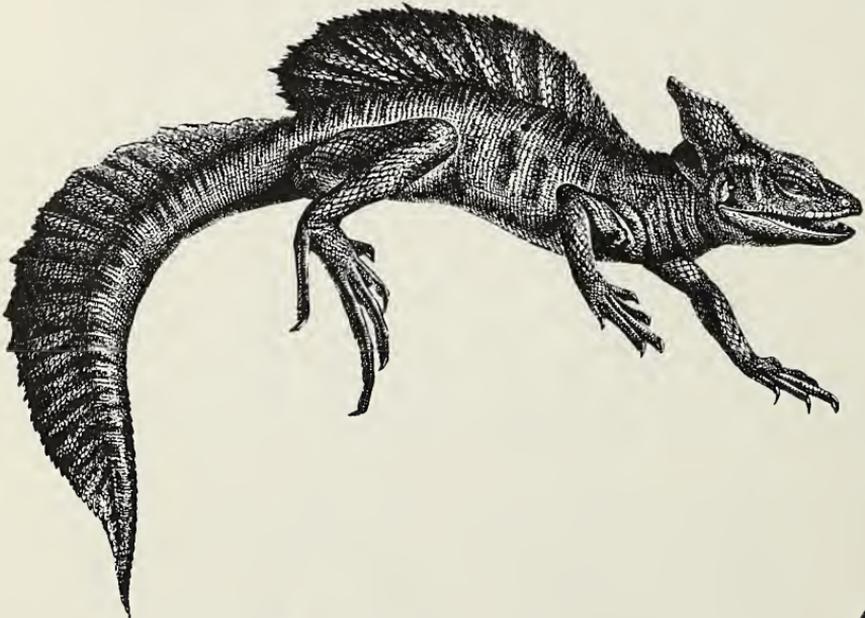
As a direct consequence of captivity, reptiles suffer a variety of traumatic injuries. While euthanasia may be the only solution for some injuries, many can be saved. Inquiring novices should be advised to seek veterinary care, and should not attempt to repair these injuries themselves.

Table 1 lists some common causes of accidental injuries and deaths in captive reptiles.

In Part 17 of this series, I shall discuss parasitism.

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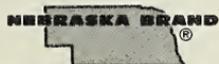
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REFLECTIONS ON CENTRAL AFRICA

(Part I)

By

Robert Berghaier, Senior Keeper
Philadelphia Zoological Garden
Philadelphia, PA

Late last year I had the opportunity to travel to Rwanda and the East Kivu province of Zaire. On this trip I visited three national parks in the region. This article will relate my experiences plus try to provide advice on how to travel in these two countries. I have also included comments on the parks' ecologies and their conservation status.

VIRUNGA NATIONAL PARK AND EAST KIVU

The city of Goma is located on Lake Kivu on the Rwandian-Zaire border. It makes a convenient, comfortable base to visit the wildlife areas of eastern Zaire. There are two accessible parks located nearby. Kahuzi Biega, which I did not visit, is a forest park famous for its Eastern Lowland Gorillas. The other reserve, Virunga, has boundaries just minutes outside of Goma. However, the major wildlife regions are several hours to the north.

Virunga National Park is probably the most ecologically diverse in all of Africa. It stretches for three thousand square miles along the Zaire, Rwanda and Ugandan borders. The southern portion of the park contains two active volcanoes located just to the north of Goma. These mountains have erupted as recently as the seventies. As a result, vast cooled lava fields surround Goma to the east, west and north. The southern section also contains an area of forest behind the Volcanoes National Park of Rwanda - a habitat used by the Mountain Gorillas. The northern sector is the most interesting and was unfortunately too distant for me to reach. It contains the famous Mountains of the Moon, the Ruwenzoris, along with a section of equatorial forest, and a vast plain containing large herds of game. This part of Virunga has a very diverse fauna: elephants, bongo, okapi, gorillas, chimpanzee, buffalo (forest and cape), lion, hippo, and several types of antelope.

My travels were to take place in the central sector, the Rwindi plains. Located two hours north of Goma, this part of the park is a grassy expanse running along the western arm of the Great Rift Valley up to Lake Idi Amin. The plains contain the highest recorded wild animal biomass per square kilometer in the world. However, that figure is contrasted with a mammal fauna that is less diverse than nearly all African grassland ecosystems. Rwindi has its own version of the 'big five': Cape buffalo, kob, topi, warthog and hippo. You see very few other herbivores. You especially see many hippos. The Rwindi has the world's largest recorded population of these creatures. Their paths, leading from the Rutshuru river to their nocturnal grazing grounds, can easily be mistaken for roads. This mass of 25,000 animals provides most of the biomass of the plains. Some other species which I saw included lion, hyena, waterbuck, bushbuck, capehare, elephant, olive baboon, and vervet monkey. A grand total of thirteen species of large mammals in a four-day stay. In most other parks in East Africa I would have spotted 20-30 species within the same time frame.

This should give the impression that Rwindi was a disappointment. I happen to be fascinated by antelope behavior and the large herds of Uganda Kob were a treat. Kob are one of the best studied of the ungulates. Their group structure and territoriality are classic examples of antelope behavior. I observed the spacing of solitary males holding their own little piece of

ome-ground. Interwoven within this territorial mosaic were groups of emales, some with calves, along with occasional groups of bachelor males. f a male stayed too close to the boundaries of another's territory, the wner would charge up to the trespasser with head held back, horns strattling its shoulders.

he presence of the Rutshuru River and Lake Amin along with the Rwindi plain rovides for diverse bird life. I saw crowned crane, fishing eagle, goliath eron, combed duck, egyptain geese, pelicans, sacred ibis, maribou stork, reyheaded kingfisher, harrier hawk, francolins, blackbellied bustard, blackinged stilt, spurwinged plover, and senegal coucal. These were some of he more easily identified large birds with many smaller birds in abundance.

ocated in the Rwindi area is one of the world's more unusual examples of uman/wildlife coexistence. The Vitshumbi fishing village is positioned long Lake Amin. Because the village is located within the park's boundaries, wildlife cannot be molested. Maribou nest on nearly every rooftop. elicans search for leftover scraps from the fishermen. Egyptain geese graze long the shore, ibis root for invertabrates, hippos float offshore. Elehants, however, are the most surprising sight. The village usually has hree or four elephants calmly strolling through it, stopping to eat grass r take mud baths on the lake shore. This last behavior, I observed, was one within twenty feet of a group of women doing laundry. It was a bizzare cene.

ccommodations for the area are provided by Rwindi Lodge. The facility urpasses nearly all the game lodges that I have previously stayed at in enya and Tanzania. The food is excellent and the rooms comfortable. They rovided me with the only hot shower that I was to have during my threeweek stay in Zaire. Cheaper rooms can be found in the chauffer's quarters t the lodge complex.

here are other sights to see in East Kivu. Both volcanoes outside of Goma an be climbed. The treks vary from one to three days. The Ruwenzori's re open for hiking. Lodgings are provided at various elevations. To visit he equatorial forest means mounting a minor expedition. If you want to ee an okapi be prepared to work for it. From Bukavu, Kahuzi Biega Nationl Park is a few hours away. Here you are guaranteed to see gorillas. The rip is cheap and can be done for about a hundred dollars U.S. from Goma. his includes transportation, lodgings and food.

ravel in Zaire is greatly facilitated by even a rudimentary knowledge of rench, Zaire being an ex-Belgium colony. The easiest way to reach Goma s via a flight from Kinshasa. One can enter the area by way of Gisenyi wanda, as I did. The border post here can be a problem. The customs eople occasionally hassle tourists with threats of confiscation of cameras, r other equipment. What the border guards are looking for is a bribe. he equivalent of a few U.S. dollars works wonders. Remember that Zaire s like no other country in Africa. It is politically and economically nstable. Be cautious but not overly paranoid. Under no circumstances ake photos in cities, and also avoid walking around them at night. The ivu region has a strong American Peace Corps presence. This forms a nice afety net if you have problems or need information. Offices are in Goma nd Bukavu. A French-speaking person can use the mission network. Monesaries and churches will often provide lodging and food at low prices.

he most expensive travel item in Zaire is gasoline. Therefore the renting of vehicles is costly. It is possible to share expenses by getting on ackaged tours offered through the Amiza organization. Offices are in

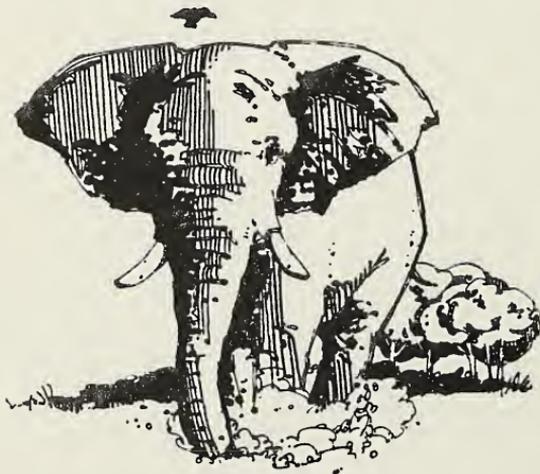
the main cities. The cheapest method of travel is hitchhiking. A fluency in French is essential for this option. The major truck route of eastern Kivu runs through Virunga so there is always transportation heading to and from the park. Negotiate a price with the driver. Often you can ride hundreds of miles for a few dollars. Food can be cheaply purchased in any market place. If you carry a sleeping bag and a light tent, Zaire is amazingly inexpensive to visit. The less adventurous should stick with the more organized offerings from Amiza.

Because of Zaire's instability its once-excellent parks system is hard pressed. The central government is short of funds, and often park rangers go unpaid for great lengths of time. This, of course, lowers morale, efficiency and breeds corruption. As a result, some rangers poach game, or can be bribed to allow others to do so. One reliable source told me that it is common knowledge in Goma that the Zairian police and military will get tourist drivers to take them out hunting at night in the Rwindi area. As confirmation of this, I noticed that the animals there were very jumpy compared to other game parks I have visited. As I mentioned before, Virunga park is one of the most ecologically diverse in Africa and therefore is important to world conservation. Hopefully the problems mentioned can be corrected and the park, which was until recently one of the best run in the world, will reclaim that distinction.

An address for Zaire tourist information:

Centred Accueil Touristique
Building La Rwindi
Boulevard du 30 Juin
B.P. 9502 Kinshasa, Zaire

(Part 2 of "Reflections on Central Africa" will cover Robert's travels in Rwanda and the Parc des Volcans to view the magnificent realm of the Mountain Gorilla.)



WHITE OAK PLANTATION: An Introduction

By

Mac McIntyre, Head Animal Keeper
White Oak Plantation, Yulee, FL

White Oak Plantation is a unique rare animal breeding center located on 1,000 acres in northeast Florida. It is bordered to the north by the beautiful St. Mary's River which also serves as the boundary between Florida and Georgia. White Oak Plantation is a private facility that is owned and operated by the Gilman Paper Company and supported through the generosity of Howard Gilman and the Howard Gilman Foundation. The rare animal breeding compound encompasses approximately 200 acres of the plantation with several additional areas currently under development. At White Oak we are currently concentrating our energies on the breeding of endangered ungulates, Maned Wolves and Cheetahs.

For years Howard Gilman has supported wildlife conservation and research on the national and international level. The animal program initially began at White Oak Plantation in 1975 starting with a pair of Greater Kudu. Several animals were added in the ensuing years and in 1982 Gilman's commitment to wildlife conservation was further expressed by realizing the necessity of professional management and the hiring of John Lukas as Director of Wildlife Conservation. From that point on the program has steadily progressed from one man's hobby to a scientifically managed program that houses over 200 mammals and can boast an over 93% survival rate. Turkeys and over 200 exotic ducks, geese and swans, as well as thoroughbred horses, turkey, quail and peafowl are also raised at White Oak Plantation.

There are many features that are unique to White Oak Plantation and set it apart from all other breeding centers; generous funding, scientific management, seclusion, subtropical climate and, most important, space. It is the combination of these that has made White Oak Plantation the forerunner of all private animal breeding centers. Because White Oak is not opened to the public, funds can be channeled directly into the animal program. This allows the animals to receive optimal care while enabling the staff complete concentration on their responsibilities. White Oak Plantation is located about 15 miles from the nearest town and about 4 miles from the nearest asphalt road. The animals are not exposed to many of the environmental problems that face many species in urban zoos - for example, air pollution and noise pollution are practically nonexistent because of its rural location. The privacy of White Oak offers the seclusion that many captive animals are lacking. Besides these features, White Oak also has the added advantage of a subtropical climate that is very similar to that of the home ranges of many of the world's threatened animals. Adequate space has always been a drawback to breeding programs in zoos, thus making it very difficult to maintain herd species as well as maintaining the genetic variability therein. We are able to provide the animals with more than adequate space which has resulted in the eliciting of more "natural" behaviors, or at least as natural as can be expected of captive-bred animals. Space is very important to many ungulates to set up and maintain territories. Space is very important for animals when birth is eminent, allowing them to separate themselves from the group in order to give birth in a less stressful environment. Our animals are supplied with adequate enough space as to never be intimidated when their pastures and corrals are entered by animal keeping personnel.

WHITE OAK PLANTATION- An Introduction, Continued

In-depth records are maintained at White Oak Plantation as well as active participation in the I.S.I.S. program and the AAZPA's Species Survival Plans. White Oak enjoys a reciprocity with many zoos and related institutions, thus allowing an exchange of information and animals through breeding loans to further enhance the genetic variability of our stock.

Captive propagation in conjunction with other conservation methods are needed to save many animal species from extinction. Hopefully, through scientific management, animals bred at White Oak Plantation will make an important contribution to the survival of their individual species.



Keeper's Alert

CHESAPEAKE WILDLIFE SANCTUARY SEEKS TO PLACE DISABLED RAPTORS

The Chesapeake Wildlife Sanctuary, a non-profit wildlife rehabilitation center in Bowie, MD (15 miles east of Washington, D.C.), has a number of permanently disabled raptors which are available for placement. The following species are presently available: Great Horned Owl, Red-tailed Hawk, Red-shouldered Hawk, Turkey Vulture, Black Vulture and (1) female Golden Eagle. Inquiries should be directed to: Diane Pearce, Executive Director, Chesapeake Wildlife Sanctuary, 17308 Queen Anne Bridge Road, Bowie, MD 20716, phone (301) 249-1640.

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THE DEVELOPMENT OF A BREEDING COLONY
OF TREE SHREWS (*Tupaia belangeri*)

By
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Tree shrews (*Tupaiaidae*) are small, squirrel-like mammals endemic to southern Asia. These relatively obscure animals have received a lot of attention in taxonomic circles because they share a number of characteristics with both primates and insectivores, and their official classification oscillates between these two orders. Regardless of the outcome of the classification controversy, tree shrews are interesting animals to study, especially with regards to their reproductive behavior.

Of the eighteen species of *Tupaiaidae*, *Tupaia belangeri* has been the most commonly studied species. Martin (1968), working with *T. belangeri*, stumbled upon an unusual pattern of maternal care. Newborn tree shrews nurse immediately after birth; and this first feeding initiates the tree shrews' regular cycle of nursing only once every 48 hours. Each nursing bout consists of the mother spending only 5-10 minutes suckling the young at the maternal nest. The rest of the time the litter is left to fend for itself. This pattern continues until weaning, about one month after birth. Although this peculiar cycle was first found in *T. belangeri*, it is now known to also occur in other tree shrews as well.

Tree shrews are extremely high-strung, which makes breeding them in captivity quite a challenge. Von Holst (1974) measured stress levels in *belangeri* using a Tail Ruffling Index (TRI) which he devised. He noticed when tree shrews were under stress, the hair on their tails stands out. When individuals are under stress for long periods of time (90% or 8 days) they die. At more moderate levels of stress (20-70%) successful breeding ceases, with the actual amount of stress determining at what stage the reproductive effort fails. Tree shrews with moderately high stress levels (around 50%) do not copulate, whereas those with moderately low stress levels (20%) will successfully give birth to healthy litters which the parents promptly cannibalize.

In order to breed tree shrews in captivity it is necessary to identify and minimize potential sources of stress. Potential sources of stress can be divided into those from physical environment (including climatic features, diet and cage design) and those from the social environment (including both intra and inter-specific interactions). The specific parameters involved can be readily examined and manipulated in the controlled environment of a research lab (this study was conducted in the animal care facility at UCSB). Despite the ease with which the parameters can be controlled, these animals' stress levels were high enough to result in a non-breeding colony of tree shrews. After one and a half years of constant effort to lessen their stress as well as the instigation of a hand-rearing regime, the tree shrews were breeding successfully; the population has tripled in size.

The best way to eliminate stress from the physical environment in captivity is by duplicating the natural physical environment as closely as possible. Components of the physical environment, such as climatic features, can be easily simulated. The rooms which house the tree shrews are kept at a temperature of $25 \pm 1^\circ\text{C}$, a relative humidity of $70 \pm 10\%$

and a 12 hour dark/light cycle. There is some question about tree shrews breeding seasonally in the wild, but in captivity (under proper conditions) they breed year-round, so there were no adjustments made for seasonal changes in climate.

Diet is another aspect of the physical environment which can usually be accurately recreated in captivity. In nature, tree shrews eat mostly fruit and insects. In the lab, they are successfully maintained on a diet of dry cat chow (they are not finicky), canned cat food (Kal Kan[®]), fruit (bananas and oranges), meal worms, and a vitamin supplement (Vionate[®]). Although this is not a strict duplication of their diet from the wild, it is apparently an adequate duplication of their nutritional needs while also being palatable to the tree shrews.

In the past the tree shrews lived on a different diet. They were fed monkey chow (Purina[®]) instead of cat chow, and canned dog food (Kal Kan[®]) instead of canned cat food. They were fed the same fruits, worms and vitamins that they presently eat; and in addition, they were also given peanuts. This diet was sufficient for basic maintenance; but while they were on this diet, the tree shrews did not breed successfully. However, over the same time period in which the new diet was implemented, a number of other changes occurred as well. As a result, it is not possible to state whether the old diet was inadequate for breeding or simply more expensive (which is what prompted the change).

Providing captive housing which adequately simulates the natural environment of tree shrews is a complex and difficult task. First, it is necessary to have a thorough understanding of the demands an animal makes on its natural physical environment. Unfortunately, little is known about tree shrew behavior in nature because being so shy and elusive makes them difficult to study in the field. Second, it requires the ability to design and create a physical environment in captivity which can fulfill these demands. Financial and spatial concerns usually set the limits on the degree to which that fulfillment can be attained. Finally, it requires creativity to overcome the problems inherent in attempting to create a microcosm of a tropical forest of southern Asia in a small room in southern California.

An animal enclosure can be divided into two components; (1) whatever functions to actually enclose and (2) the furnishings within an enclosure. In our facility, the enclosures are stainless steel wire mesh cages. We are currently using two rather different sized cages for housing tree shrew breeding pairs. The larger cages are 1 meter deep, 2 m tall and 5 m long; the smaller cages are 2/3 m deep, 1 m tall and 1 m long. Other design differences exist simply as a result of the size differences; the larger cages are furnished with more of everything that is found in the smaller cages. There appears to be strong correlation between ultimate breeding success and cage size. Cage size obviously influences physical environmental stress, and therefore breeding success; however, there were other variables which confound this perceived correlation which will be discussed later.

Good interior decorating means the effective combination of the practical with the aesthetic, and it can make the difference between a cold cage and a happy home. When furnishing a tree shrew enclosure it is necessary to accommodate the full range of the behaviors which will occur in the cage, while keeping everything simple enough to be cleaned without unduly stressing the animals. Creativity is needed to balance the natural needs of the tree shrews against the more practical concerns of life in captivity.

Keeping the emphasis on simple, there are four major furniture items in the tree shrew enclosures. First, there is at least one horizontal wooden shelf attached to the back wall of each enclosure. Captive tree shrews display an interesting pattern of daily activity with morning and evening energy peaks separated by a mid-day period of relative inactivity. They prefer to spend this "resting period" on such shelves. Second, each enclosure has an angled tree branch extending from the cage floor to the cage ceiling. These branches are used as perches from which the animals defecate, and for scent-marking. In addition, the animals often use these branches as formal staircases to and from anywhere in the cage. Since all six sides of the enclosure are wire mesh, the tree shrews are able to travel freely throughout the inside perimeter of the cage; the branches allow access to the area of the cage interior proper. Third, each enclosure has a minimum of two cardboard tubes. These tubes are 10cm in diameter, 30cm in length, and closed at one end. The tree shrews seem to use these for hiding places. The last major piece of furniture is the nest box, of which each breeding cage has at least two. Each box is 15cm high, 5cm wide and 25cm deep, with a small circular opening at one end. The bottom of the box is lined with a light layer of cedar shavings on top of which the tree shrews build their nest of leaves. They are periodically given fresh leaves which are quickly incorporated into their nests (ava-ado leaves are their favorite). Both the male and female tree shrew sleep in the same nest (parental nest). About 10 days before giving birth the female builds the maternal nest for her litter, in another box. If only one nest box is provided, the cannibalism rate increases significantly (Martin 1968).

The former non-breeding status of these tree shrews was probably due more to stress from their social environment, rather than from their physical environment. Social stress in captivity occurs because the tree shrews are no longer free to leave unpleasant social situations. These unpleasant situations arise in interactions with a mate, with other tree shrews, or as is most frequently the case, with humans. Each of these sources of social stress must be minimized for successful breeding.

The effects of social stress on reproductive behavior are most obvious when the source of the stress comes from within the "breeding pair". This is especially true for species, such as tree shrews, which pair bond. Schwaier (1973) noticed in her captive colony, that certain pairs of tree shrews were simply incompatible. She found that some individuals were of such different dispositions that they refused to even copulate. When these tree shrews were paired with more compatible partners, they were good breeders. It is important to be continually aware of the emotional well-being of potential breeding individuals and pairs, and to make the necessary changes when partners are incompatible.

Interactions with unfamiliar tree shrews can be stressful to breeding pairs. Martin (1968) noticed that intrasexual encounters created more stress, whereas intersexual interactions had a minimal effect. To minimize stress, adult tree shrews should never be housed with more than one breeding pair in a cage, and physical contact with other individuals should be avoided. When other animals must be kept in close proximity, it is necessary to limit their potential for interaction. In this regard, visual contact is the most stressful, and the easiest to eliminate. Green flowery shower curtains between cages create sufficient visual isolation, and a "tropical forest" ambiance. Auditory and olfactory interactions are unaffected by these curtains, yet neighboring tree shrews pairs breed successfully with just that minimal level of separation.

DEVELOPMENT OF A BREEDING COLONY OF TREE SHREWS, Continued

Given the ease with which intraspecific social stress can be alleviated, that leaves interactions with humans as the greatest single source of social stress for the tree shrews. Fortunately, following a few simple guidelines can lessen the negative impact of these necessary interactions. First, as few people as possible should come in direct contact with the animals, especially in the weeks preceeding and following a birth. Second, anyone dealing with the tree shrews should concentrate on behaving innocuously; loud noises and sudden movements must be eliminated. When a major disturbance is unavoidable, for instance when cleaning a cage, the duration of the disturbance should be minimized, and avoided completely shortly before and after birth. Third, as time and energy permit, it is possible to tame tree shrews. Besides being rewarding to the personnel involved, this acclimation allows for non-stressed interactions with humans which translates into a greater likelihood of successful breeding.

Hand-reared tree shrews tend to be easy-going and relatively unsusceptible to social stress from humans. These animals would be expected to breed more readily in captivity than their high-strung, wild-caught counterparts. This is the main confounding factor in our correlation between ultimate breeding success and cage size. Due to space limitations, it made sense to pick breeding pairs with the highest liklihood of success for the prototypes of the larger cages; the hand-reared tree shrews were the logical candidates. However, at present it is not worth disturbing the breeding pairs to ascertain whether the hand-reared individuals would breed in the smaller cages which currently house the wild-caught pairs and vice versa. Without further experimentation, it is impossible to tease apart the relative breeding value of living in larger cages verses being hand-reared. Although this would be interesting to examine at some point, it is irrelevant to the ultimate goal of this research project.

Although tree shrews are not currently endangered, Thailand now prohibits their exportation. This is consistent with the general trend against removal of animals from their natural habitat. Research facilities must recognize and accept their share of responsibility by, at least, discontinuing the practice of taking animals from the wild. Recently tree shrews have become more popular in research as a model animal for studying human physiological phenomena. As such, it is heartening to note that although breeding them in captivity is difficult, it is certainly not impossible. It simply requires the same methodical approach needed to answer any other scientific question, and some common animal sense.

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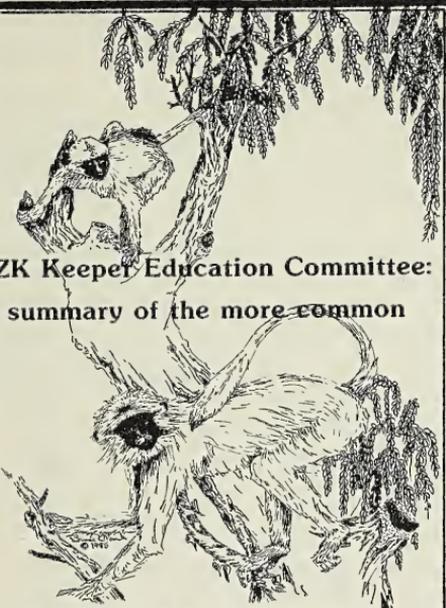


Announcing . . .

AAZK is pleased to announce the availability of its new publication ZOONOTIC DISEASES. This 56-page booklet details the most common zoonotic diseases, offers guidelines for preventive control and covers personal hygiene and disinfection procedures.

The booklet, a cooperative effort produced by the AAZK Keeper Education Committee, is produced in a 8½" by 11" format hole punched for insertion in a standard three-ring binder (not included).

Copies may be purchased by completing the order form below. Prices are: \$2.00 for Professional AAZK Members; \$3.50 for other AAZK membership categories and \$5.00 for non-members. This price includes postage and handling. Order from: Zoonotic Diseases, c/o AAZK National Headquarters, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK".



AAZK Keeper Education Committee:
A summary of the more common

ZOONOTIC DISEASES

**including disinfection,
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635 Gage Blvd.
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Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listing for positions which become available close to deadline are accepted.

KEEPER...needed for full-time job in private zoo in Northeast Pennsylvania. Two years' hands on experience required as a paid full-time keeper in a zoo. Some college training desired. Good opportunity to learn all phases of zoo operation. Call or write: Vince Hall, Claws n' Paws Wild Animal Park, RD 1, Lake Ariel, PA 18436 (717) 698-6154.

ZOOLOGY CURATOR...for nature and science center expanding into a "living" museum. Integral in implementation of live exhibit habitats; responsible for management and husbandry of live animal collection ranging from invertebrates, fish (salt and fresh water), herps, birds to small mammals and deer native to Virginia. Requires BS in zoology, wildlife management or related field, Masters desirable; 2-3 years paid experience in captive management of native wildlife. Salary \$17,500 plus benefits. State date 1 December, 1985. Resumes by 31 October to: Patricia Gordon, Peninsula Nature and Science Center, 524 J. Clyde Morris Blvd., Newport News, VA 23601.

ZOO CURATOR...each candidate must have a Bachelor's Degree in an animal related field and a minimum of 3 years responsible supervisory experience at an administrative level. Experience is required in the following: personnel supervision, animal collection management, budgetary and financial management, public relations skills, and educational program development. The Curator will also work directly with non-profit zoo society on capital improvement development. Salary is \$17,965 (\$18,773 in 1/86), plus excellent benefits. Send resume by 21 October to: John Plonski, Borough Manager, Borough of Norristown, 235 East Airy St., Norristown, PA 19401.

TRAVELING ZOO INSTRUCTOR...to work under the direction of the Staten Island Zoo's Education Department staff in planning, scheduling, conducting and evaluating off-site zoo education programs for school classes and other groups. Qualifications include ability to relate to and teach elementary school children using live animals. Must be experienced driver with good driving record. Paid and unpaid positions available. Internship period from 9/85 to 6/86; possible extension through 8/86; minimum of two days per week. Must possess skills for confident handling of a variety of live animals, including ferrets, rabbits, chickens, and non-venomous snakes. Send resume to: Bob Szita, Traveling Zoo Coordinator, Staten Island Zoo, 614 Broadway, Staten Island, NY 10310 (718)442-3174.

WILDLIFE SANCTUARY INTERNSHIPS...wildlife rehabilitation center in Bowie, MD is accepting applications for student internships. Program involves working directly with the wildlife patients as well as educational programs and other special projects. Internships offered year-round. Qualifications: a college student or recent graduate, studying wildlife habits, veterinary medicine, or related field; some experience with people and animals; a respect and sincere concern and interest in working with animals. Both paid and non-paid internships offered. To apply, submit resume, statement of goals and three references to: Diane Pearce, Executive Director, Chesapeake Wildlife Sanctuary, 17308 Queen Anne Bridge Rd., Bowir, MD 20716, or call (301) 249-1640 for more information.

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INFORMATION FOR CONTRIBUTORS



Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

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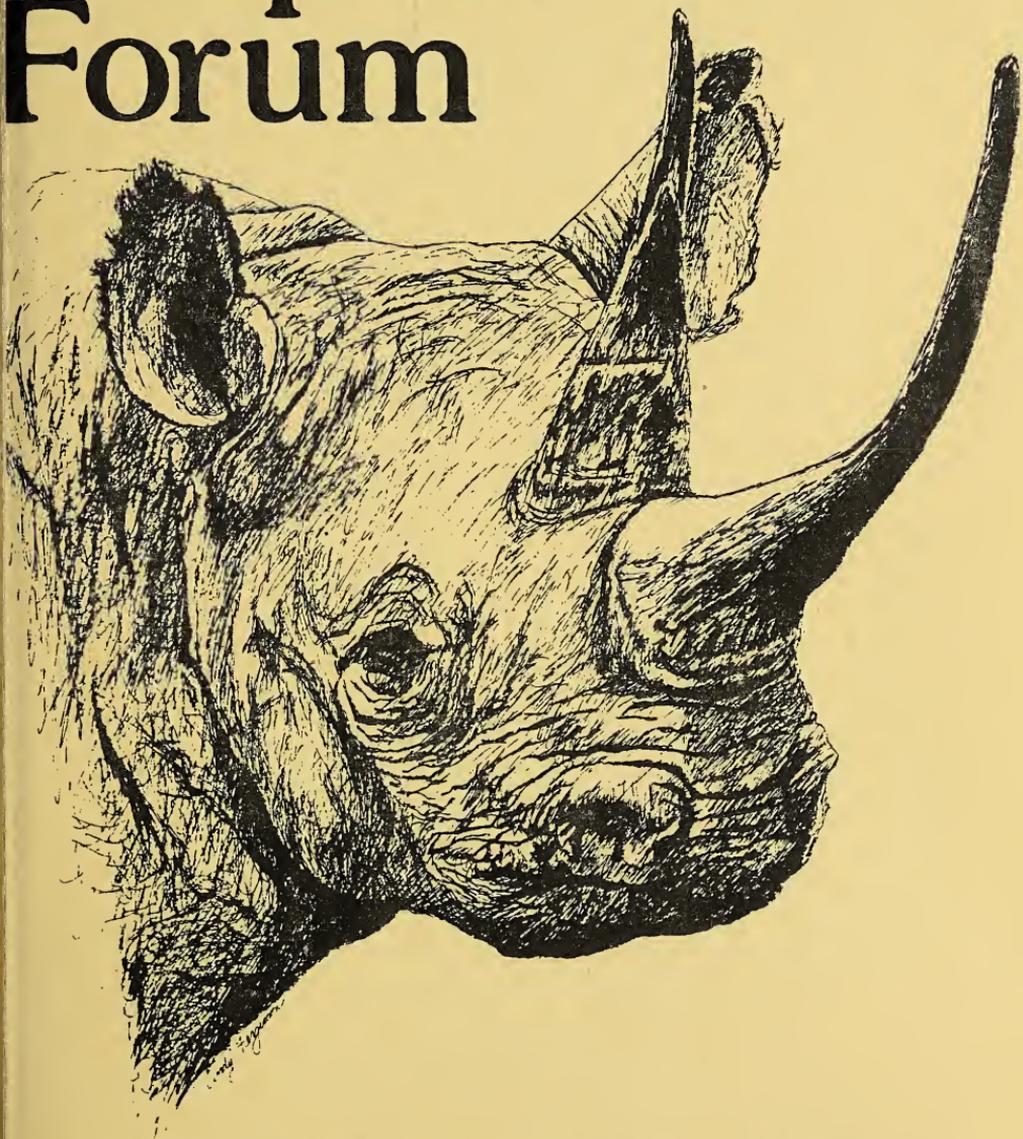


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Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publishing costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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This month's cover art of a rhinoceros is by Cindy Ferguson, a free-lance artist of both domestic and exotic animals. All species of rhino are endangered both from habitat destruction and the commercial sale of their horns for either dagger sheaths and, in the powdered form, as a medicinal substance which enjoys particular popularity in the Far East. Enlargements of Cindy's work (suitable for framing) are available by writing to her at: Box 340, Carmel, NY 10512. Thanks, Cindy!

Scoops

and

Scuttlebutt

DECEMBER AKF TO CONTAIN CONFERENCE PROCEEDINGS

The December 1985 edition of Animal Keepers' Forum will again be expanded to include the proceedings from the AAZK National Conference which was held in Miami, FL from 20-24 October. Along with some of our regular features, this special issue will contain the report on the Board of Directors meeting at the Conference and the papers which were presented at Miami. All members who are current as of 20 November 1985 will receive this special issue as a membership benefit. Other wishing to purchase a copy may do so by sending a check or money order for \$7.00 to: 1985 AAZK Conference Issue, 635 Gage Blvd., Topeka, KS 66606.

ZOONOTIC DISEASES HANDBOOK AVAILABLE FROM NATIONAL

The AAZK Keeper Education Committee's Zoonotic Diseases is now available from National Headquarters. This 56-page booklet details the most common zoonotic diseases, offers guidelines for preventive control and covers personal hygiene and disinfection procedures. Produced in an 8½" by 11" hole-punched format, the booklet fit easily into a standard three-ring binder and will be compatible with the Zoo Keeper Husbandry Fundamentals manual which will hopefully go to press in early 1987. A order form for the zoonoses booklet can be found elsewhere in this issue of AKF.

GREAT LAKES REGIONAL ISSUES CALL FOR PAPERS

The planning committee for the AAZPA Great Lakes Regional Conference to be held in Milwaukee in April 1986 have issued a Call For Papers. The conference theme will be "Animals as Marketing Tools: Pros and Cons". Also planned are concurrent sessions on such topics as elephant management, keeper training and education, as well as a film/videotape session. Interested persons are asked to submit even a preliminary plan for a paper, videotape or filmclip. For information, please contact Ken Kawata or Bill Kopp, Milwaukee County Zoo, 10001 West Bluemound Road, Milwaukee, WI 53226.



Births & Hatchings

BROOKFIELD ZOO.....*John S. Stoddard*

B&H for August and September 1985 include: Mammals - 2.0.3 White-toothed shrew, 0.1.6 Goeldi's monkey, 0.0.1 Capuchin monkey, 0.0.1 Siamang, 1.3.2 Spiny mouse, 0.0.2 Degu, 0.0.2 Meerkat, 0.2 Collard peccary, 0.0.2 Golden lion marmoset, 1.0 Tonkeana macaque, 0.1 Grant's zebra, 1.2 Greater kudu; Birds (fledged) - 0.0.6 Grey-headed kingfisher, 0.0.2 Humboldt penguin, and 1.1 Scarlet-crowned barbet.

ASSINIBOINE PARK ZOO.....*Phil King*

August and September 1985 B&H include: Mammals - 0.4 Llama (0.1 DNS), 0.1 California bighorn sheep, 1.0 Addax, 0.1 Vicuna, 0.1 European bison, 0.0.1 Parma wallaby; Birds - 4 Indian peafowl, 2 Luzon bleeding-heart pigeon (1 DNS), 1 Crested pigeon.

SEDGWICK COUNTY ZOO (Wichita, KS).....*Terrie Correll*

Recorded B&H for August/September 1985 include: Mammals - 0.0.1 Matschie's tree kangaroo (DNS), 1.0 Axis deer, 0.1 Fringe-eared oryx (DNS), 0.2 Tayra, 0.0.1 Patagonian cavy (DNS), 0.0.2 Accouchi, 0.0.6 Ossabaw Island pig (2 DNS); Birds - 0.0.1 Little blue heron (DNS), 0.0.1 Bali mynah, 0.0.2 Piping guan (1 DNS), 0.0.4 Ringed teal, 0.0.1 Speckled mousebird; Herptiles - 1.1 Leopard gecko and 0.0.7 Banded krait (1 DNS).

TAMPA/BUSCH GARDENS.....*Susan Rackley*

B&H for September 1985 include: Mammals - 2.1 Greater kudu, 0.1 Blesbok, 3.3 Nyala, 0.4 Thomson's gazelle, 0.1 DeBrazza monkey, 1.0 Sable antelope, 1.1 Scimitar-horned oryx, 1.0 Addra gazelle, 2.0 Muntjac deer, 1.2 Grant's gazelle, 0.1 Congo buffalo, 0.0.1 White-handed gibbon; Birds - 9 Scarlet ibis, 2 Blue & gold macaw, 2 Sacred ibis, 3 Chilean flamingo, 1 Eyton's tree duck, 2 Superb starling, 2 East African crowned crane and 1 Red-crested touraco.

COLUMBUS ZOO.....*Stacy Katz*

July-September 1985 B&H include: Mammals - 1.0 Greater kudu, 1.0 Reeve's muntjac, 3.2 Cheetah (1.0 DNS), 0.1 Dromedary camel, 1.1 Blackbuck, 0.2 Barbados sheep, 1.0 Damara zebra; Birds - 0.0.3 Black-footed penguin, 0.0.4 Road runner, 0.0.3 Black-necked swan, 0.0.2 Egyptian geese, 0.0.4 Mute swan; Herptiles - 7 Yellow-blotched map turtles, 9 Salvin's giant musk turtle, 12 Giant musk turtle, 1 Ceylon hill turtle, 1 Costa Rican ground turtle, 1 Red-cheeked mud turtle, 8 Leopard gecko, 2 African fat-tailed geckos, 12 Florida water moccasin, 10 Japanese rat snake, 2 California king snake, 27 Yellow rat snake, 4 Northern black-tailed rattlesnake, 7 Southern black-tailed rattlesnake, 11 Malay spitting cobra, 10 Egyptian cobra, 23 Red-spitting cobra, 5 Taiwan beauty snake and 74 Cassabel rattlesnake.

BIRTH OF A HARBOR SEAL AT THE SEATTLE AQUARIUM

Submitted by Judy A. Fritz, Biological Aide/Marine Mammals Unit

Recently, The Seattle Aquarium announced the birth of its first harbor seal pup; a healthy and precocious male given the name "Barney". The pup arrived on Saturday, 14 September at 7:30 p.m. and weighed 20 lbs. at birth. Staff at the aquarium were aware for three months that "Clydie", mother of the pup, was pregnant. She steadily gained weight, her teats became swollen, and finally, three weeks prior to delivery, fetal movement was observed. The length of the labor is unknown but, following the last stages of dilation, the actual birth took approximately two minutes. Although this was a first at The Seattle Aquarium, harbor seal births are not uncommon events at facilities housing this species.

The Seattle Aquarium currently houses four harbor seals (including the new pup). "Clydie" came to the aquarium in 1979. "Ohlde" (nicknamed 'Doc') arrived in 1977, and "Decatur" in 1979. All three were pups when brought to the aquarium by 'well-intentioned' citizens convinced the pups had been abandoned by their mothers. As normal gestation in this species is approximately 11 months and sexual maturity is reached between 3-5 years, it is not known why it took seven years for the first birth to occur.

Following the birth, an around-the-clock 'Harbor Seal Watch' was established wherein volunteers monitored and recorded group behavior and interactions. "Clydie" has proven to be a very protective mother; having been removed as a pup from her own mother seems not to have interfered with her instincts for mothering. It has also been noted that "Clydie" is much more tolerant of "Doc's" curiosity towards the pup than she is of "Decatur's" similar behavior. For this reason it is presumed that "Doc" is the father of the pup.

The Seattle Aquarium has been very successful in its marine mammal breeding program. It currently houses sea otters (*Enhydra lutris*), northern fur seals (*Callorhinus ursinus*), and harbor seals (*Phoca vitulina*). All three species have now bred and given birth to viable pups at this facility. Both the northern fur seal and sea otter pups were 'firsts' for a North American facility. This unusually successful record is the result of very intensive efforts on the part of Marine Mammal Biologist C.J. Casson and a large group of trained volunteer assistants.

The Seattle Aquarium is equipped to house only three harbor seals. To date, no decision has been made as to the final disposition of "Clydie" and her new pup "Barney"; other accommodations are being sought.

PHILADELPHIA ZOO.....B. Bahner

September 1985 B&H include: Mammals - 3 Geoffroy's marmoset (1 DNS), 0.1 Reticulated giraffe, 2 Prevost's squirrel (1 DNS); Birds - 2 Southern lapwing, 1 Superb fruit dove (DNS), 1 Renault's ground cuckoo (DNS), 1 Lilac-breasted roller, 2 Rothchild's mynah (DNS); Reptiles - 9 Emerald tree boa.



Coming Events

THE SIXTH BIENNIAL CONFERENCE ON THE BIOLOGY OF MARINE MAMMALS

November 22-26, 1985

Vancouver, BC

Sponsored by the Society for Marine Mammalogy, it will address issues concerning cetaceans, pinnipeds and other marine mammals. For information contact: Sharon Proctor, Program Chairman, Vancouver Aquarium, P.O. Box 3232, Vancouver, British Columbia, Canada V6B 3X8.

THE FIFTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 13-14, 1985

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information contact: Thomas Meehan, D.V.M., Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614.

SCHOOL FOR PROFESSIONAL MANAGEMENT DEVELOPMENT FOR ZOO AND AQUARIUM PERSONNEL

February 2-6, 1986

Wheeling, W. VA

Held at Wilson Lodge, Oglebay Park. Contact Dora Shell, North Carolina State University, Division of Continuing Education, P.O. Box 5125, Raleigh, NC 27650 (919) 737-2261.

THE FIFTH ANNUAL SYMPOSIUM OF THE NATIONAL WILDLIFE REHABILITATORS ASSOCIATION

February 19-23, 1986

Boston, MA

Hosted by the New England Wildlife Center, the symposium will be held at the Park Plaza Hotel. Symposium will include paper sessions, workshops and open panel discussions. For further information contact: Dr. Vaughn R. Pratt, Executive Director, New England Wildlife Center, 146 A Justice Cushing Highway, Hingham, MA 02043 (617) 749-5387, 749-1248.

1986 AAZPA REGIONAL CONFERENCES

Southern Regional - Greater Baton Rouge Zoo, 16-18 March, 1986: for more information contact: Barbara Gorman, Greater Baton Rouge Zoo, Box 60, Baker, LA 70714 (504) 775-3877.

Western Regional - Point Defiance Zoo, 13-15 April, 1986: for more information contact: Tom Otten, Director, Point Defiance Zoo & Aquarium, Point Defiance Park, Tacoma, WA 98407 (206) 591-5337.

Great Lakes Regional - Milwaukee County Zoological Gardens, 27-29 April 1986: for more information contact: Mary Beth Carr, Milwaukee County Zoological Gardens, 1001 W. Bluemound Rd., Milwaukee, WI 53226 (414) 771-3040.

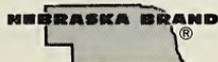
Northeastern Regional - Mystic Marinelife Aquarium, 4-6 May 1986: for more information contact: Laura Kezer, Mystic Marinelife Aquarium, Sea Research Foundation, Inc., Mystic, CT 06355 (203) 536-9631.





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FROM THE EDITOR'S DESK

Dear Readers,

Animal Keepers' Forum is your journal. The primary thing that makes it a successful publication is the input from the membership. I could type, edit, lay-out and paste-up till I'm blue in the face, but without the supportive contributions of you, the members, AKF would cease to exist. The working relationship between the editorial staff and contributors is based on trust - our trust in what members contribute to the pages of the Forum. We trust that information sent to us for publication is accurate, acknowledges original sources, and in no way attempts to circumvent the avowed goal of promoting professionalism among all those involved in the care of captive exotic animals.

This trust has been violated and, to make the situation even worse, was so done to satisfy a personal grievance by some unknown individual who I hope is reading this editorial as you are. AAZK has struggled long and hard throughout its eighteen year history to receive acceptance as a professional association within the zoo community. It is incidents such as the following which tend to besmirch our credibility and make our full acceptance even more difficult.

While preparing the September issue of AKF, our office received a job listing for inclusion in the "Opportunity Knocks" section. As you know, this section is run as a service to you, the members. We do not charge a fee for these classified listings nor do we benefit in any other way. It is strictly a service we provide to let the membership know of available jobs within the zoo community. This particular listing was for an opening for a zoo director at the Honolulu Zoo. The ad insertion arrived by mail, in a Honolulu Zoo letterhead envelope and, at the time, we had no reason to question its authenticity.

On 4 October, I received a long-distance phone call from a Honolulu radio station asking about the ad. It seems there was no vacancy for a zoo director position at Honolulu. A second phone call that evening with a reporter from a Honolulu newspaper shed a bit more light on the situation. I was told that there had been some problems at the zoo relating to the deaths of several animals and while I do not claim to know the scope of the entire situation, obviously some dissatisfaction did exist both within the community and among zoo staff. It became rather clear that person or persons unknown had used the ad as a way to show this dissatisfaction and perhaps to 'get back' at either the City of Honolulu or the Zoo Administration. It bothers me greatly to think that an AAZK member would be responsible for such a hoax, but since the readership of AKF has a fairly specialized audience, I find it difficult to believe that the average citizen would know about the job listings or even the Forum for that matter.

Letters explaining our unwitting participation in this hoax have been sent to both the Honolulu Zoo Director and the Director of Parks and Recreation for Honolulu. Apparently, according to the radio show host, the City had received a number of applications for this position which lets us know that AKF is certainly being read. However, this does not diminish the feeling (and its accompanying anger) that we were used to perpetrate a cruel hoax which appears to have been based on a personal vendetta.

AAZK and AKF have always stood for the promotion of professionalism among zoo keepers and will continue to support this goal. The individual responsible for the bogus ad certainly cannot count him or herself a professional.

Susan D. Chan
Managing Editor



ELEPHANT SET

SKIN CARE IN ELEPHANTS



By
Alan Roocroft
Animal Training Supervisor/Elephants
San Diego Wild Animal Park, San Diego, CA

Take a good look at your elephants' skin, are you proud of how it looks? From the tip of its trunk to the end of its tail, every elephant needs skin care. Access to water and sand are fundamental needs for an elephant. Roaming the plains of Africa or in the deep jungles of Asia, elephants can be found at certain times of the day in the vicinity of water. The purpose of this article is to bring to mind an essential part of an elephant care program which is very often overlooked.

ELEPHANTS IN THE WILD STATE

Elephants in the wild state are their own keepers. They are not restricted to a small enclosure and their skin treatment doesn't depend upon the varying experience of the staff around them.

Depending on the season, both African and Asian elephants usually have enough water in which to bathe; although there have been times on both continents where the lack of water has taken its victims. In the early 70's in a major National Park in Kenya, an estimated 5000-6000 elephants died of starvation following a particularly severe drought.

Mud and sand are an addition to their daily cosmetic treatment; large rocks and termite mounds are also used to scratch the inaccessible places the trunk and tail cannot reach.

This skin care takes the same form for the wild elephants it has taken over the past million or more years. The elephant has its own natural skin care - driven by instinct and necessity.

Elephants in their own habitat usually become the color of the region. For instance, in Kenya East Africa, the wandering herds in the Tsavo National Park have taken on a deep red color and look quite peculiar moving across the plains with the evening sun on them.

WORKING ELEPHANTS IN ASIA

In Sri Lanka the mahouts (name given to an elephant person) are extremely proud of the appearance of their charges. Before work the elephant will be bathed for anything up to two hours. Having the elephant lie first on one side till the excrement stain on its flanks has been completely submerged for a good period of time, the mahout gives the animal the command to raise and lie down again on the opposite side. At this point the mahout will begin to scrub the stain which has been soaking with the rough edge of a coconut husk. For those of you who are not familiar with the coconut fresh from the tree, they have a green, fibrous husk covering the nut inside. This fibrous husk is cut into handleable shapes and used to scrub and massage the skin of the elephant. Every inch of the animal will be scrubbed and massaged with coconut husk, leaving the skin clean and supple. The mahout then leads his animal off to do a day's work. Returning in the early evening, the elephant receives the same treatment before retiring for its evening meal. (See Diagram 1)

ELEPHANT SKIN CARE, Continued

In the Asian lands where the elephant must work in harness or carry a saddle for long periods, the greatest threat and problem are abscesses caused by ill-fitting equipment. Left too long, an abscess can cause an elephant great pain and make him very aggressive. The mahouts are usually very observant where the health of his animal is concerned, but even out in the land of the elephant where our trade has its foundations, interest and experience varies from mahout to mahout. In Thailand the mahout or ozzie as he is called in that area, uses a creeper plant that is found in the Thai jungle to scrub his elephant. When in contact with water this particular plant foams like an expensive piece of soap.

So in all those different lands where the elephant is used as a beast of burden, no particular treatment is offered for the elephants' skin except good old-fashioned water and elbow grease.

Let's take a leaf out of their book and care a little more about the appearance of our elephants.

ELEPHANTS IN ZOOLOGICAL GARDENS

Water, sand, a mudbath, objects with a rough surface against which they can scratch and shade---these are the ingredients for an elephant skin care program in a Zoo.

If you then throw in a person with an interest in and dedication to his animals, the scene is set; of course, providing an elephant training program is underway and in control. The elephants will be the pride of the zoo and the envy of other zoos and elephant people.

Very few zoological gardens would be able to accommodate an elephants' every wish and need, but there are a few essential things an elephant does need in captivity. Adequate water, for instance, would be a good start; a pool where the elephant can completely submerge. A mud bath is also very important for the daily skin care of the elephant. A mud coating will protect the animals' back from the hot sun and also keep irritating insects at bay. Providing a mud bath for your elephant would, of course, take up too much room in a small enclosure. If mud is not available, sand can be used to dust their bodies down. Shade from the sun or even a corner where the elephant can retreat when cold winds and rain blow across the enclosure must be available.

Skin diseases in the African elephant are a fairly unknown quantity; but its needs in a zoological collection are exactly the same as its Asian cousin.

The Asian elephant has been domesticated for over 3000 years and thus man has had time to study and treat skin and other ailments which arise. This is not to say that all is known about diseases in elephants.

Large objects such a rocks, bolted-down tree trunks will be used after bathing or a bout in the mud bath, to scratch against. The combination of water and sand act like sandpaper on the elephants' skin as he scratches against the objects provided, revealing a healthy skin as the old skin is rubbed away. Past experience in other zoos has shown that if these objects are too rough the elephant will not use them for fear of hurting itself.

In hot climates without shade or water an elephant can very easily become sunburned with large blisters forming on the back and neck. Heat exposure can be a very serious problem in hot climates, especially in young animals. Access to water should always be available.

ELEPHANT SKIN CARE, *Continued*

Elephants kept in a cold climate face much more of a problem. Sub-zero temperatures are not an elephants' natural environment. Of course, there are people among us who would argue that acclimatization of elephants is possible; but this point has not yet been proven because, I suppose, the elephants die of exposure before the experiment is completed. Seriously though, any temperature lower than 13-14°C for long periods can cause discomfort in the animal and even serious illness in later life.

One can well imagine the effects on an elephants' stomach from drinking cold water every morning throughout the winter months, then being forced to stand outside for long periods. It must be very uncomfortable; only, we wouldn't know because we are back in the staff quarters drinking coffee.

Cracking around the eyes and feet caused by cold wind are just one of the problems your elephant may face in cold climates. Then the extreme problem with cold climates can be frostbite, attacking mostly the ears and tail. This condition is tremendously painful for the elephant. Not all elephants can retire at night to a warm barn; high electricity bills in many zoos force the temperature down in the elephant house. Through the winter months a good temperature in an elephant house is between 19-21°C; this, of course, is expensive. Chaining in a house where there is a draft is just another of an elephants' cold weather ordeals.

Bath time in winter can still be practical with a good supply of warm water, allowing the elephants (restricted only by the back chain) to scratch their bodies against each other or the back wall of the stall. It's occupational therapy for the elephants plus giving them a good appearance through the winter. Also advisable is to keep the elephants inside after a winter bath since their heat loss will be greater with wet bodies.

EXCREMENT AND URINE STAINS

How many elephants have you seen in zoos with what looks like a large, unfinished painting on their sides and flanks?

These are, of course, dark brown excrement stains caused by the elephant lying in its own droppings. I, myself, have seen many such elephants, even in zoological parks with a reputation in elephant breeding and so-called elephant management programs. The animals are presented to the public with these ugly stains on their sides.

Seeing elephants in this condition, one can easily judge the caliber of the staff responsible. In some cases it can be put down to inexperience, but in others laziness is the offender. All the blame should not be pushed upon the elephant people; the administration itself carries a great deal of the responsibility for giving little encouragement to its elephant staff.

Regular scrubbing with a good hard brush and water will soon change the appearance of your animals. This part of elephant care you cannot find in the books--it takes hard work and a routine that is adhered to everyday. These stains have eaten their way into the elephants' skin rather like a tattoo.

Urine can also do a lot of damage to the inside legs and feet of the elephant. Urine stains, just like excrement stains, should be scrubbed off everyday.

ELEPHANT SKIN CARE, Continued

CHAIN MARKS ON LEGS

Chaining elephants at night is a good practice, but there are certain rules to follow. Obviously the chains must be strong enough to restrain the elephant. If the animal can break its chains it can cause serious injury to itself or other elephants in the night stall.

You may be saying, what has chaining an elephant properly got to do with skin care? Let me explain.

The sensible way of chaining an elephant is to alternately chain opposite legs front and rear. This method allows adequate movement for sleeping at night. The front leg chain should not be tight around the ankle because in most cases the chain is secured while the animal is in the 'lift' position. When the foot is placed back on the floor it will spread making the chain even tighter. This can damage the bones in the feet and ankle. Leave enough room between the chain and foot of the elephant; a good test is to place your hand between the chain and foot. (See Diagram 2); if your hand will not pass between the chain and foot, you have the chains too tight.

The rear leg is a different matter. In this case the chain should be just below the knee and reasonably tight, but not so tight that it interferes with the blood circulation. If possible, cover this section of chain that is in contact with the leg with rubber hose (See Diagram 3). If the chain is not covered with rubber hose, the straining motion of the elephant will sometimes cause severe abrasion and discomfort.

The circumference of the rear foot is not as great as the front so if the chain is not placed high and tight on the rear leg it will be easy for the animal to slip its chain. Check the legs everyday where the elephant has been wearing the chain. Abrasions and small abscesses can sometimes go unseen.

THE BUILD-UP OF OLD SKIN

In order to stay in the best possible condition, an elephant must lose the old skin that builds up on its body and allow the new skin to come to the surface. This is in no way similar to a reptile. If the elephant is not given what nature requires for this process (water, sand, mud and rough-surfaced objects against which to scratch) there becomes an unhealthy build-up of old skin all over the animals body. Long, claw-like pieces of skin develop on the elephants' legs, resembling warts. The skin becomes dry and lifeless at this stage and the elephant certainly lives up to its nursery book name - hugh grey object. Under that grey exterior lies anything from a gun barrel blue to a pinky rose colored skin.

That build-up of old skin can harbor disease and infection and is downright unhealthy for your elephant.

OILS AND OTHER PREPARATIONS

It was an old establishment practice many years ago to oil the elephant completely. This practice should be avoided because the application of oil opens the pores of the skin and allows the heat to escape; in cold climates this treatment can be fatal.

In parts of India they use coconut oil on the forehead of the elephants thus having the opposite effect of keeping the animals' head cool. A little vaseline may be applied to the hair on the tail. This induces the growth of the hair giving the elephant a better appearance.

ELEPHANT SKIN CARE, Continued

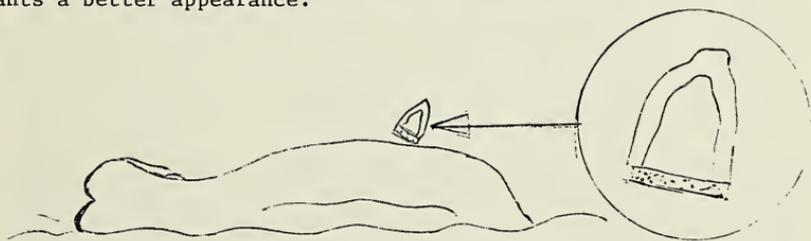
THE TAIL OF YOUR ELEPHANT

Yes, the tail is also covered in skin and needs occasional care. All sorts of nasty things can happen to your elephant's tail - the worse being, of course, bitten off by another elephant. Looking around at captive elephants, one wonders whether they wouldn't be better off without tails. Some tails resemble wooden clubs hanging from the back of the animal, little use they would be for swishing away pestering insects. Regular bathing in warm soapy water can help the hair growth and bring back the blood circulation to the tip of the tail. Add a small amount of disinfectant to the water to kill any infection there may be. After bathing, rub the tail liberally with vaseline, filling the hair sockets. Repeat this after every bathing.

TREATMENT OF WOUNDS ON HEAD AND RUMP CAUSED BY RUBBING ON CONCRETE FLOORS WHILE SLEEPING

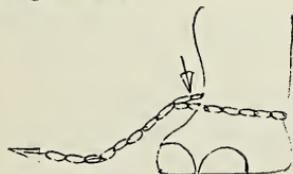
The cheek and hip bones of an elephant take particularly hard treatment when the animal is sleeping in a lying position. While sleeping the elephant will sometimes shift its position and cause rubbing of these points on the hard concrete. Splitting of these callous areas sometimes occurs and infection takes hold. If the wound should become infected it usually takes a long time to heal, owing to the continual rubbing and irritation while sleeping. Wash and clean the wound daily, sprinkling it with a disinfectant powder after washing. This will keep the wound dry. A little vaseline around the rest of the affected callous will help to keep it supple.

In elephant care and management there are many aspects to be considered. Nutrition, housing, foot care, a training and control program--the list is endless. None the less important is skin care. Let's give our elephants a better appearance.



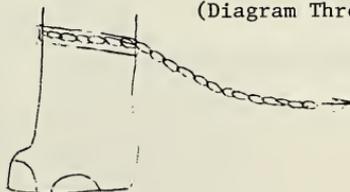
(Diagram One) Showing position of elephant in water and outer husk of coconut which is used to scrub and massage the skin.

(Diagram Two)



Leave enough room between chain and leg as arrow indicates.

(Diagram Three)



Rubber hose covering chain on hind leg to protect against abrasion.



Information Please

I am conducting a survey on the husbandry and management of De Brazza's monkeys (*Cercopithecus neglectus*) in captivity. I wish to contact those zoos or individuals that have previously worked with this species. Anyone with information on the husbandry, behavior, medical treatment or nursery care of De Brazza's monkeys is asked to contact: E. Jean Brennan, Yale University School of Forestry and Environmental Studies, 205 Prospect Street, New Haven, CT 06511.

The Dierenpark Wassenaar Zoo in the Netherlands is seeking information on captive Roloway Guenons (*Cercopithecus diana roloway*). We had developed a successful breeding program for this subspecies, producing several female and one male offspring. However, breeding ceased when our older male died. Our young male is currently breeding with unrelated females at the Parc Zoologique des Minieres, Doue la Fontaine, France. We located a single male at a small zoo in France, but so far he has shown no sexual interest in our females. Another male is currently in private hands in Munich and we are attempting to secure him for our captive propagation program. Those with information on the location of captive Roloway Guenons are asked to contact: John Rens, Assistant Director, Dierenpark Wassenaar Zoo, Rijksstraatweg 667, 2245 CB Wassenaar, Netherlands.

In 1980, the occurrence of encephalo-myocarditis virus (EMCV) was reported at three zoological parks. Since January 1985, EMCV has been confirmed as the cause of death in six primates and is suspected in other cases at Audubon Park Zoo in New Orleans. Deaths from EMCV are usually acute and can occur in young or old animals. Pulmonary edema or congestion and cardiomyopathy are the most consistent necropsy findings. Serum samples from elephants, cats and primates which will be used to measure antibody levels and determine the incidence of exposure in the zoo animal population can be submitted to either of the labs assisting in this study. Tissue samples from suspect cases will also be accepted for virus isolation. Samples will be accepted through September 1986. For submission forms or more information, contact: John Olsen, DVM, Busch Gardens, P.O. Box 8158, Tampa, FL 33674 (813) 988-5171 or Andrew Gutter, DVM, or Susan Wells, DVM, Audubon Park Zoo, 6500 Magazine St., New Orleans, LA 70118 (504) 866-5819.



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NOTES ON A METHOD FOR MOUNTING SNAKE SKINS

By
Charles F. Smith
Zoo Department
Worcester Science Center
Worcester, MA

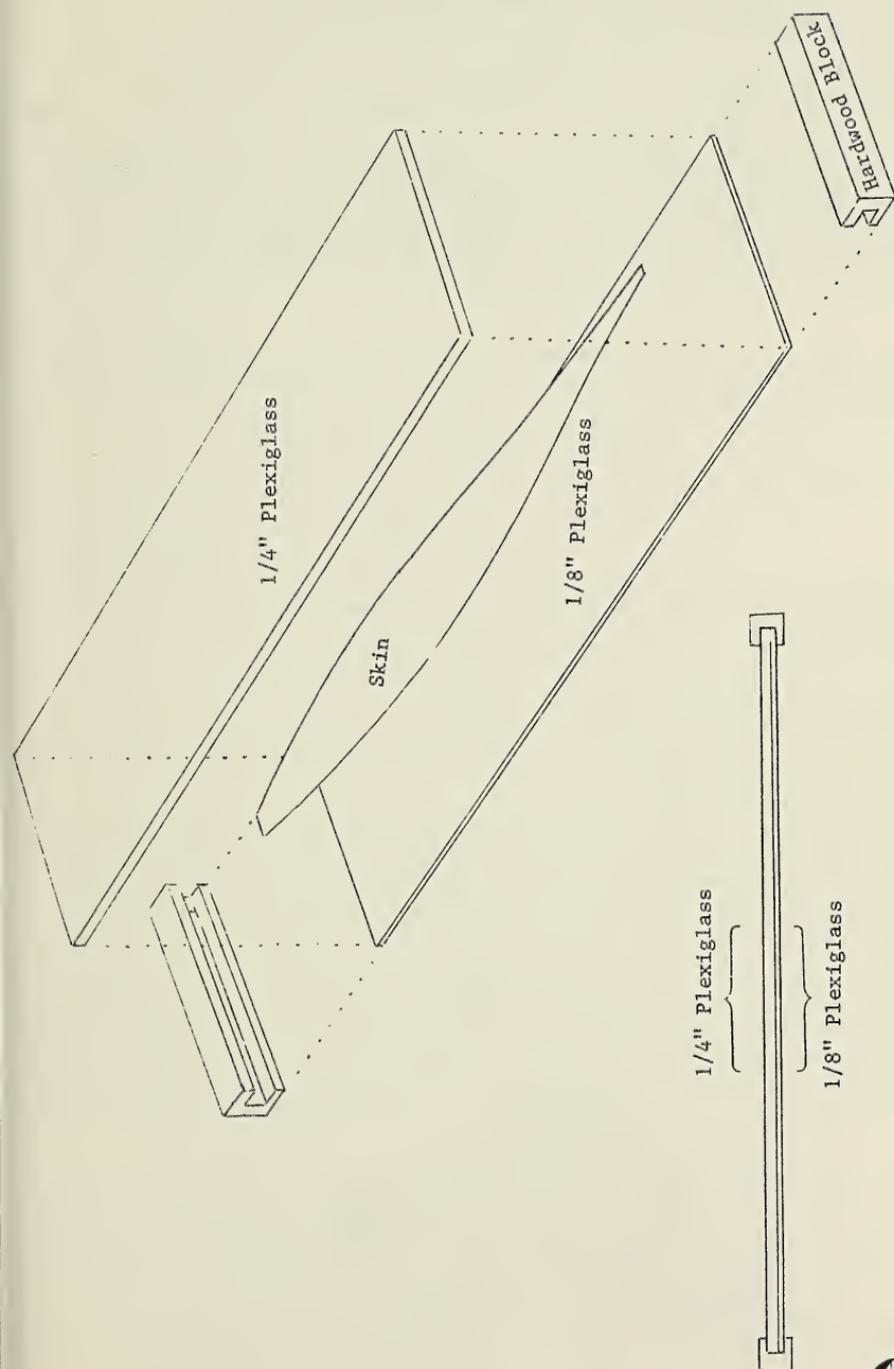
The following method for preserving and mounting dried snake skins is used by myself privately for display and educational purposes. It is not necessarily a better way of preserving them, only another option for doing so. The materials are inexpensive, readily obtained and can be utilized in the most primitive workshop. The advantages of this type of mount are that the skins are easily displayed and stored. They are odorless, clean and hopefully permanent. The disadvantage is that they cannot be removed from the mount without destroying it.

Basically, the mount is a sandwich of plexiglass with the dried snake skins between. Preparation of the skin is similar to most other skins. After it is removed from the animal, it is stretched, and left out to dry as would be done with a mammal skin. After drying, a damp, rough sponge is run up the outer surface of the skin to remove any loose skin or scales. The skin is again left to dry. After complete drying, I will usually trim a small amount of skin from the outer edges as this area curls, and completely flat skin is necessary for mounting.

The plexiglass is next cut to fit the skin, using one-quarter inch plexi for the top cover and one-eighth inch for the lower. The reason for the difference is that the plexiglass must flex to accommodate the skin, using one-quarter inch top and bottom would place too much strain on the bonded edges.

When measuring for size, leave at least one to one and a half inches excess of plexiglass around the skin, to further reduce stress on the bond. The skin is next placed between the two layers of plexi, matching up the edges of the plastic as closely as possible. If desired, a label may be placed with the skin for identification. The mount is clamped in this position and a plexiglass solvent, such as Plexitic[®], is run around the edges using a small paint brush. The solvent will be drawn into the seam by capillary action. It is then allowed to sit and dry for 15 minutes. The unit is then unclamped, and the edges are sanded smooth, preferably with a disc sander, but it is possible to do so by hand. After sanding, more solvent is applied to the edges to seal the mount and further strengthen the bond. The mount can now be considered complete, although I will usually place two grooved pieces of hardwood along the upper and lower edges to further strengthen it and to add a more appealing look to the display. Although I am unaware of such, I would like to apologize to anyone having previously described this method.





U.S. POSTAL SERVICE
STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
(Requirement of Section 448.31 Domestic Mail Manual)

Title of Publication: *Animal Keepers' Forum*
Publication Number: 425390
Date of Filing: 27 September 1985
Frequency of Issue: Monthly. Number of issues published annually = 12
Annual Subscription Price = \$20.00
Location of Known Office of Publication: Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.
Publisher: American Association of Zoo Keepers, Inc., Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.
Executive Editor: Alice Miser, 635 Gage Blvd., Topeka, KS 66606
Managing Editor: Susan D. Chan, 635 Gage Blvd., Topeka, KS 66606
Owner: American Association of Zoo Keepers, Inc., Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

The purpose, function, and nonprofit status of this organization and the exempt status for Federal Income Tax purposes has not changed during the preceding 12 months.

EXTENT AND NATURE OF CIRCULATION

	Average No. Copies Each Issue during Preceding 12 months	Actual No. Copies of Single Issue Published nearest to Filing Date
Total Number Copies Printed	1923	1950
Mail Subscriptions	1850	1871
Copies Not Distributed (Office use, left-over)	33	36
Exchange, Complimentary Copies distributed	40	43
TOTAL	1923	1950

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Signature and title of Editor



Susan D. Chan
Managing Editor

REFLECTIONS ON CENTRAL AFRICA
(Part 2)

By
Robert Berghaier, Senior Keeper
Philadelphia Zoological Garden
Philadelphia, PA

RWANDA

Rwanda is a small nation squeezed between Zaire, Uganda, and Tanzania. It has the highest population density in Africa. Even though population pressures are extreme, the country has two excellent national parks. The two parks preserve radically different habitat and species. Akagera is a typical eastern African park with large herds of plains game. Volcans National Park is the forested home of the Mountain Gorilla.

PARC DES VOLCANS

The Volcans are now well known as the area where Dr. Dian Fossey has done her gorilla studies. The park contains the southern slopes of five extinct volcanoes. It contains five major vegetation types ranging from bamboo forest to Afro-alpine vegetation. Mountain gorillas are the most famous resident mammals, but the park protects other forest species. During my six-day stay, I saw, along with gorillas, bushbuck, blackbacked duiker, tree hyrax, giant gambian rat, and saw sign of buffalo and genet.

The gorillas, however, are the main attraction. There are four groups habituated to tourists. Group Nine is a family of nine animals - complete with males, females, and youngsters ranging from one to four years old. Group Eleven is a sort of aberration: an association of six males - a silverback, a blackback and four younger males. Group Thirteen is a family group of eleven animals similar in composition to Group Nine. Susa Group is the largest with twenty individuals including two silverback males, several females with many youngsters.

The gorillas in the Volcans park can only be observed on a reservation system. A limit of six tourists per group with a one-hour viewing time is imposed. These restrictions allow the habituated groups to function as normal gorillas since the stress of tourist contact is kept to a minimum. The restrictions seem to work since comparative studies of tourist and nontourist groups show no measureable differences in behavior.

I saw two groups, Nine and Susa. I do not hesitate to state that gorilla watching is the ultimate in wildlife viewing. I've previously spent hours stalking howler and titi monkeys in Peru, driven through the Serengeti plains seeing at least a million head of game in three hours. But nothing can compare to sitting in a forest, surrounded on all sides by gorillas--some not more than five feet away.

Susa Group was my favorite. It took an hour and a half walk up the slopes of Karisimbi until we found the group. No other visitors had registered for Susa that day so it became a party of three--myself and two Rwandan gorilla guides. During the climb we passed bushbuck tracks and buffalo droppings. We entered an area of matted down vegetation. The presence of familiar shaped dung boluses showed that gorillas had spent the night here. As we climbed further an obvious pathway became apparent. A group of gorillas moving through a forest leave quite a trail of smashed vegetation. The guides, sensing that the gorillas were near, stopped and

started vocalizing that deep, guttural gorilla grunt. It is a sort of hmmm sound, familiar to gorilla keepers. We slowly entered a small open area and made contact. The gorillas, only youngsters at first, stared curiously. The little ones would even advance to get a better look. They moved off and we followed. The main body of the group then came into view, several females and one of the males. The guides laid down and motioned for me to do the same. They both started pretending to eat vegetation. At the time, both males appeared to be feeding but were also glancing sideways to see what we were up to. The males quickly relaxed and the guides motioned that it was alright to stand up and take pictures.

I ran out of film within the first half hour. The remainder of my allotted time I just sat and watched the group's activity. The adults would casually grab branches, stalks or plants and just munch away. The males would tear out whole bushes, eat a few leaves, throw the rest aside and move on to another. It was rather awesome to see just how effortlessly that was done. The groups seemed unconcerned with our presence. Once we accidentally cut off a female with a baby in a tree from the main group. She emitted some short, sharp coughs, and we stepped aside. She climbed down and hurried away. Occasionally an infant would scream and one of the males would give the hmmm sound, and reassured, the infant became quiet. My hour time limit ran out all too quickly and we slowly withdrew.

Besides the gorillas, Volcans park offers excellent hiking opportunities. Several treks exist. While walking the Lake Negezi trail, I saw tree hyrax, coots, several smaller birds, and observed gorilla group eleven for a short time. A trail system linking all of the volcano peaks exists. The tops of these contain the alpine vegetation and support different bird species than the lower slopes. The mammals which could be seen on such a walk include blue monkey, golden monkey, and buffalo. The trails offer a visitor a much different picture of Africa than the usual van safari.

Your options for accommodations for the Volcans park are varied. Camping sites exist at park headquarters. Tented sites also exist at the foot of Mt. Visoke. All campers must bring their own food, but that is easily purchased in native markets. Water is available at all sites, but charcoal must be brought since no wood gathering is allowed. Hotel accommodations are in Rhungeri and range from \$25 a night at the Mutubura Hotel to \$5 a night for quarters in a mission. You will need transportation to the park if you stay in Rhungeri. Renting a vehicle is expensive, but other tourists will be traveling through town to see the gorillas. It is possible to negotiate a lift. Reservations to see gorilla groups can be arranged in Kigali. Weekends and the months of June through August are usually fully booked. Other times of the year, if you are on a flexible time schedule, are underused and you will have your choice of what groups to see.

Before visiting the Volcans park I had serious doubts that the mountain gorilla could be saved. I came away impressed with the park and the Mountain Gorilla Project (M.G.P.). My stay at the Visoke tented site allowed me to meet Jeff Towner who had a cabin nearby. Jeff is an American on contract to the M.G.P. to help train the Volcan rangers. Jeff and I spent several night talking about the past, present, and future of the gorillas.

The effectiveness of the park patrols has lowered the mortality rate of young gorillas. These youngsters will often become caught in snares set for antelope. The gorillas usually break out of the traps, but the wire snares slowly tighten around their legs or arms cutting off circulation. Loss of limb or fatal gangrene often results. The silverback male of

REFLECTIONS ON CENTRAL AFRICA, *Continued*

Group Eleven lost a hand at an early age in such a manner. The Volcans park has an area of fifty square miles with fifty rangers for patrolling duties. It is an unheard of 'man to land' ratio for a Third World national park. For example, Akagera park has thirty rangers to cover 970 square miles. Each of the Volcans' rangers are paid a bonus for every snare they find in addition to their regular salary. Jeff's role is to improve the ranger force's effectiveness by starting week-long patrols.

At present, approximately one hundred and twenty-five gorillas inhabit the Rwandian side of the volcanoes. These animals use only 3/4 of the Volcans park available to them because the western slopes of Karosombi have been abandoned by the gorillas due to poaching activity. This year anti-poaching patrols will be expanded to include this area and an increase in the gorilla population there is expected.

More important to the long-term viability of the gorillas is the status of the Zairian side of the volcanoes. This habitat is considerably larger than the Rwandian side and is, on paper, protected as part of the Virunga National Park. I have previously mentioned Zaire's conservation problems. The lack of effective patrol work has lowered the population there to an estimated one hundred and fifty individuals. A project, sponsored by the Frankfurt Zoological Society, is attempting to address the situation. If the Zairian park service can get organized and the small area of Uganda follows, the gorilla population will expand. It could easily reach the level recorded for the area in the 60's of five hundred individuals. That should be a viable enough gene pool to insure the mountain gorillas' long-term survival.

The M.G.P. is also responsible for the habituation of gorilla groups for tourism. This aspect of the project is a great success. Tourism in Rwanda has become the leading source of foreign exchange. The gorilla visits form the backbone of this industry. This endeavor has its critics, however, the M.G.P. has shown that the park is a proven money maker. As long as tourists visit, the area will remain parkland. Rwanda is a very poor nation with heavy population pressures. In 1968, 55% of the Volcans park was excised for cropland. In the late 70's more land was to be removed to be used for cattle grazing. The success of the M.G.P.'s habituation of gorillas for tourists has halted those negative trends, and the government is very supportive of the park.

Another threat to the gorillas exists and it is unfortunately caused by certain unscrupulous zoos. M.G.P. personnel strongly believe that there are several European zoos on the lookout for mountain gorilla infants to add to their collections. These zoos let it be known that they will purchase young gorillas. As a result, poachers in either Zaire or Rwanda will enter the protected areas to take infants. This process almost always results in the destruction of the targeted gorilla groups. Silverbacks and often the infants' mothers are killed. With the silverback gone, group cohesion breaks down. The females are absorbed by other gorilla bands. The infants that they carry are usually killed by silverbacks in the new group. It is theorized that this is done so that the females will enter estrous more quickly. The result of this type of poaching is the destruction of the entire gorilla family group.

I personally see no reason for any zoo to keep mountain gorillas. If the Volcans park was going to be turned into farmland I would be all for an operation that would set up captive breeding groups. However, such actions against the park will not take place in the immediate future. A handful of mountain gorillas in captivity in no way constitutes a viable gene pool.

REFLECTIONS ON CENTRAL AFRICA, Continued

The mountain gorilla belongs in the wild. Any gorilla breeding projects should concentrate on lowland gorillas, a species not as endangered and with a large captive population. Any zoo which involves itself in purchasing mountain gorillas is engaged in an obscenity.

An address for further information:

Office Rwandais Tourisme et des Parcs
Nationaux
P.O. Box 905
Kigali, Rwanda

(Editor's note: Part 3 of "Reflections on Central Africa" will cover Robert's visit to the Akagera National Park in Rwanda.)



Public Education

ZOO CONSERVATION EFFORTS HIGHLIGHTED AT ATLANTIC NATIONAL EXHIBITION

Cherry Brook Zoo would like to thank Animal Keepers' Forum and all those who sent posters, pamphlets, books, etc. to the zoo to include in our display at the Atlantic National Exhibition.

We feel that the week was a success and that many people have learned a great deal about the conservation efforts of zoos and what is involved in this field. The exhibition gave us the opportunity to talk with a great many people on a one-to-one basis and many left better aware of what role zoos play in today's society. We were very careful to avoid the circus type atmosphere and approached it from an educational aspect. Many were interested in what went on behind-the-scenes at our zoo and gave us the chance to discuss nutrition, breeding, animal acquisitions, the sale of animals, etc. and some were surprised to find that most zoos have a code of ethics that they work by. I am sure that some left with concern for the animals that are in our care in zoos and parks around the world. When told of the troubles that some animals encounter in their native habitat and that zoos are a major factor in the survival of some species, many people were unaware of this.

Many hours of work went into this project and it would have been impossible to put it together without the help of enthusiastic staff and volunteers who gave so freely of their time. To these people we send our deep appreciation. It was a long week, for people and animals, but we feel the effort was well worth it. We hope to do it again next year and do an even better job.

---Submitted by Leonard Coltrin, Curator, Cherry Brook
Zoo, Saint John, New Brunswick, Canada
and Lynda Coltrin



AAZK KEEPER TRAINING VIDEO TAPE PROJECT

The goal of the AAZK Keeper Training Video Tape Project is to produce quality video tape training programs suitable to supplement existing in-house training of entry level keepers. These tapes are not intended to be a complete training program in themselves. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes. Two tapes are currently available.

Zoo Keeper Safety; An Attitude Adjustment - This 18-minute program does not attempt to address the numerous variable specifics of this subject. It presents a safety approach to the job of zoo keeping, and promotes constant awareness and personal responsibility for safety.

A Zoo Keeper's Introduction to Feeds and Feeding - A half hour introduction to the complex subject of feeds and feeding of zoo animals. Topics covered include what, when, and where to feed.

AAZK KEEPER TRAINING VIDEO TAPE PURCHASE AGREEMENT RESPONSIBILITIES AND RESTRICTIONS OF THE BUYER

- 1) The tape may not be duplicated or made available to any person or institution for the purpose of duplication.
- 2) The tape may not be utilized for any commercial purpose.
- 3) Should the buyer decide the tape will not be useful to their training program, the undamaged tape may be returned within 14 days of receipt for a partial refund - \$10 for BETA and VHS, \$18 for 3/4 inch.

I, the undersigned, accept the responsibility for the restrictions listed above.

NAME _____ (Type or Print)

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SHIPPING ADDRESS _____

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TAPE TITLE _____

FORMAT:	BETA _____	VHS _____	3/4 INCH _____
	\$25	\$25	\$35

Make checks payable to AAZK KEEPER TRAINING VIDEO TAPE PROJECT.

Mail to: B. Wayne Buchanan
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103

An Encouraging Word.....

FEDERATION WINS REPRIEVE FOR EAGLES

The National Wildlife Federation has won a major victory for the endangered bald eagle. Late in August, the Federation was granted a court injunction requiring that nontoxic steel shot be used instead of lead in 22 counties within five states. If the switch is not made, these areas will remain closed to waterfowl hunting during the upcoming season.

"This is a major step forward on the lead poisoning/steel shot issue," says Scott Feierabend, a Wildlife Resource Specialist for the Federation who has worked on this issue for five years. "This injunction should expedite reductions in use of lead shot for waterfowl hunting."

Restrictions will go into effect immediately in selected counties in Illinois, Oklahoma, California, Oregon, and Missouri. The result should be a dramatic decrease of lead shot in critical eagle habitat.

It is estimated that waterfowl hunters deposit more than 3,000 tons of lead shot into the environment annually. Waterfowl deaths attributed to lead poisoning number in the thousands. Bald eagles are poisoned when they eat waterfowl that have either ingested lead shot or have shot imbedded in their bodies. At least 102 bald eagles have died from lead poisoning since 1966.

Since the early 1970's, the NWF has pressured the Interior Department to require hunters to shift from lead to steel shot in problem areas. To date, however, only two states - Iowa and Nebraska - require the statewide use of steel shot, and the Department has done little to ensure the acquiescence of other states.

As a result of the Federal government's refusal to address the problem of lead poisoning in bald eagles, the NWF sued the Department of the Interior in June for violating the Endangered Species Act as well as several other Federal environmental statutes.

On 26 August, a District Judge granted the Federation's injunction. It is a positive step forward for conservationists concerned with the protection and recovery of our national emblem. (By Laura Lombard)

---National Wildlife Federation's
CONSERVATION'85, Vol. 3, No. 13
13 September 1985



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Atlanta Zoological Park, Atlanta, GA

COMMONLY ENCOUNTERED INTESTINAL PARASITES
(Protozoans)

(Accepted for publication, August 1985)

Of the many species of parasites that constitute the intestinal fauna of reptiles, some cause disease when the host animal is removed from its natural environment and placed in captivity. Once an infected reptile is captive, those parasites having direct life cycles predominate over parasites requiring intermediate hosts. Factors predisposing captive animals to parasitic diseases are stress, improper diet, temperature, light, and humidity, and overcrowding. Symptoms of intestinal parasitism include restlessness, loss of appetite and weight, regurgitation, diarrhea, and blood and/or mucus in stools. Depending upon the parasite in question, some pathogenic effects are loss of nutrients, anemia, respiratory distress, chronic enteritis, ulcerations, necrosis, and ultimately death. There is no known treatment for some types of parasites; but, fortunately, most can be successfully treated. Keepers should always urge inquirers to have a veterinarian perform an examination on newly acquired reptiles; this should always include a fecal examination. If a stool sample is unavailable, the veterinarian can administer a tepid, saline enema.

Most protozoans are relatively harmless. However, a few are highly pathogenic, including Entamoeba invadens. This intestinal ameba is transmitted by ingestion of infective cysts passed in feces. Flynn (1973) and Marcus (1981) reported E. invadens cysts measure 11-20u in diameter, and they contain one to four nuclei. Geiman and Ratcliffe (1936) reported that E. invadens trophozoites range in length from 10u to 34u, in width from 8u to 30u, and have a nuclear diameter of 3.5 to 7u. Several investigators have reported success in treating amebiasis with human amebicides such as metronidazole. Meerovitch (1961) suggested increasing the ambient temperature to 35°C (95°F) during the treatment period. CAUTION: do not allow infected animal to dehydrate. Control of cockroaches and flies will help prevent these mechanical vectors from spreading amebae within a reptile collection.

While Eimeria is the primary coccidian found in reptiles, Caryospora, Isospora, Sarcocystis, and several others are also common. Transmission occurs when an animal ingests sporulated oocysts from contaminated feces or soil. The size of these protozoan oocysts vary. Sodium sulfamethazine has been successfully used in treating coccidiosis; however, Frye (1981) cautions against putting the drug in the animal's drinking water. He reported that administration should be via stomach tube to insure delivery of an effective dose.

Young reptiles, and those with other ailments are more likely to suffer effects of intestinal flagellates than healthy adults. Transmission is by ingestion of the organism passed in affected feces. Diagnosis is best made by direct smear since their movement is easily observed. Treatment has been successful with metronidazole. However, the best defense against spreading any parasite is proper hygiene.

Although mainly found in tortoises, ciliates also affect lizards and snakes. The most common ciliates found in reptiles are Balantidium and Nyctotherus. Balantidium has the potential for being pathogenic, especially when in combination with other parasites or diseases. Nyctotherus has not been reported to be pathogenic. Transmission is through ingestion of the parasites in affected feces. Soulsby (1968) reported treating Balantidium infections with an amebicide and tetracycline.

In next month's issue, discussions on endoparasites will be continued. Those keepers wishing diagnostic photomicrographs of intestinal Protozoa are requested to contact the author.

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Keeper's Alert

OPPORTUNITY FOR EXCHANGE IN AUSTRALIA

submitted by Pat Sammarco, Education Committee Coordinator

Some lucky AAZK keeper may be the winner of a chance to go on a no-expenses paid trip to Australia and work at the Royal Melbourne Zoological Gardens as an exchange keeper.

Mr. Steve Wilson, a keeper at that zoo, has sent word to the Staff Exchange Team that he wants an opportunity to do an exchange in the Unites States. I have no details except the bare fact that there is this opportunity. Interested keepers should write to: *Steve Wilson, The Royal Melbourne Zoological Gardens, Parkville, Victoria 3052, Australia.*



ZOO TOURS OF THE U.K.

are currently engaged in a feasibility study for a tour agency that could provide an organized and informed service for people visiting Great Britain who have a particular interest in zoos and captive animal management. It is our belief that we can offer an inexpensive package consisting of several zoo visits, comfortable overnight accommodations, easy traveling arrangements of relatively short duration between zoos and personal service from a very well informed driver/guide. There would be two kinds of tours on offer and these are outlined below.

Tour I - 14-day Round-Trip Visiting Nine Zoos

Starting out from London where a driver/guide would pick up your tour party (we estimate an average of six persons per tour although carrying capacity is twice that number) from one of the two major airports, Gatwick or Heathrow. From there you would be taken to your accommodations to settle in and rest from your flight. We would hope to provide a fairly flexible timetable to allow for sightseeing, but the basic running order of zoo visits would be first beginning with Howletts Zoo Park in Kent, then the London Zoo, Marwell Zoo, Bristol Zoo, Slimbridge Wildfowl Trust, Bicester Zoo, Twycross Zoo, Cotswold Wildlife Park and finally, Whipsnade Zoo. All traveling would be done first thing in the morning after breakfast and we have devised a route that ensures no more than two or three hours traveling time each day between locations. Included in the trip almost certainly will be at least one day at a nature reserve or wildlife site of special interest. This is an all-in-one package and the cost includes all overnight accommodations, all transportation and admission to all zoological establishments. The price per person is about \$730.00 U.S. and does not include your flight to the U.K. It may be that we will choose to employ a charter service with an independent airline and this would make the price per person around \$1080 U.S.

Tour II - 7-day Tour Based in or Near London Visiting Four Zoos

Working from the Capital or one of its suburbs, this tour is not a round-trip as such and involves traveling from a home base in a hotel each morning to return in the evening. The four collections in question are: Howletts Zoo Park in Kent, London Zoo, Whipsnade Zoo and Marwell Zoo. No more than two hours traveling for each zoo is anticipated and the tour could be structured to allow for traditional sightseeing in addition to the zoo visits. Also, there are wildlife sites worth seeing and the possible inclusion of a trip to the Natural History Museum is something to consider. Certainly, we would wish to provide a degree of flexibility that would accommodate the needs and wishes of each tour party. The all-in-one cost per person including accommodations, transport and admissions is \$380.00 U.S. and does not include the cost of your return flight. Should a charter operation be involved the price would then be around \$730.00 U.S.

Zoo Tours - Finding Out More

The purpose of this announcement is to assess the demand for an all-in-one package tour of zoos and we would very much like to hear from you if an organized trip of this nature attracts you. Please write to us with any suggestions or comments you have so that we can adjust our plans accordingly. If the response to this announcement is suitably encouraging, we would make booking forms available in January or February 1986 and the first available tour would begin on 2 April 1986. The zoo tour season would run from April to September/October taking advantage of the

ZOO TOURS OF THE U.K., Continued

relatively mild spring and autumn we enjoy in Britain. A deposit of one third of the total cost would be mandatory for each tour but PLEASE DO NOT SEND MONEY with your initial inquiry.

Contact: Mike Clark (Mark your envelope ZOOTOURS)
228 Okebourne Road, Brentry, Bristol
BS10 6RA U.K.

ZOOTOURS would be run jointly by two experienced zookeepers, the above formerly of Edinburgh, Frankfurt and Jersey Zoos, and Doug Richardson, formerly of Edinburgh, Bronx and Howletts Zoos.



ENDANGERED BIRDS OF GUAM: A Major Focus at NZP

The National Zoo is taking a leading role in saving two fast-disappearing bird species from the Pacific Island of Guam. At the Front Royal Conservation Research Center, enclosures have been made available in the new Small Animal Facility for breeding Micronesian kingfishers and Guam rails.

Scott Derrickson, Curator of Birds at CRC said, "The problem began when the brown tree snake was inadvertently introduced to Guam in the late 1940's. The current population estimate of this snake is as high as three million. So far, several bird species native to Guam - the Guam broadbill, the rufous faintail and the brindled white-eye - have already become extinct. Other species, such as the Guam rail and the Micronesian kingfisher are rapidly approaching extinction."

In response to this grave situation the Guam Division of Aquatic and Wildlife Resources (GDAWR) and several U.S. zoos, including Philadelphia, Bronx, and the National Zoo, initiated the Guam Bird Rescue Project. The goal of this program is to capture the remaining wild rails and kingfishers before they are killed by the snake in order to establish a captive breeding population. The ultimate goal is to reintroduce the birds to the island when conditions warrant. Only 14 kingfishers remain in the wild, and they are being collected by GDAWR and Philadelphia Zoo personnel.

At the CRC New Animal Facility, 13 Guam rails have already hatched. Although the rails make a very simple nest on the ground, the Micronesian kingfisher must be supplied with rotted palm logs for nesting. Adult birds excavate nest holes in these logs. Derrickson recently reported that two of the three pairs of kingfishers nested successfully. One pair fledged a chick on 2 September, another pair fledged a chick on 14 September, and over the weekend of 21-22 September, two additional kingfishers hatched. The Micronesian kingfishers normally lay 1-2 eggs; the incubation period lasts about 23 days. The chicks are fed in the nest until they are able to fly at about 30-35 days.

---from TIGERTALK
September 1985



OTTER SPECIALISTS MEET IN SANTA CRUZ

By
Judy A. Fritz
Bio-Aide/Marine Mammals Unit
The Seattle Aquarium, Seattle, WA

The Fourth International Otter Symposium was held at the Porter College campus of the University of California at Santa Cruz from 4-10 August, 1985. The conference was coordinated and hosted by the Institute of Marine Sciences (UCSC), formerly the Center for Marine Studies (UCSC). Roughly 150 delegates from ten countries attended the symposium including representatives from countries as distant as Norway, Chile, India and Japan. The symposium began with a reception on Monday and ended with a banquet at the Monterey Bay Aquarium on Friday evening. During the week the delegates attended six sessions and five workshops, as well as a number of informal slide and film presentations on current otter research. There were two sessions on sea otters, one each on North America, South America, and European river otter populations, as well as a session on captive otter management. The workshops consisted of group discussions on captive studies, surveying methods, radio telemetry, re-introduction techniques and results, and public education. Recommendations from the IJCN Otter Specialists Group brought the sessions of the symposium to a close on Friday. The delegates also participated in a nature walk at Point Lobos Wildlife Reserve, boat excursions on Monterey Bay, and tours of the Long Marine Laboratories and the Monterey Bay Aquarium.

Of the 30 papers given at this symposium, only five reported on captive otter populations. Research was presented on captive population studies of Lutra lutra, Hydrictis maculicollis, and Aonyx cinerea: none of the speakers reported on captive sea otter populations. This lack of captive studies reaffirms, once again, the need for more research on captive populations --- a point anticipated and much discussed at last year's AAZK International Conference in Seattle. The papers given at this symposium generally dealt with at least one of three major themes: distribution and status, behavior and energetics, and telemetry and translocation studies. The sea otter papers were thematically diverse and were generally of a more technical nature than those on river otters. The North American river otter papers focused on physiology and management, and translocation and reintroduction programs. South American contributions were dominated by distributional studies. The European papers emphasized non-interferent research techniques and the effects of pollutants and habitat destruction on the management of already reduced populations.

Several of the papers were of interest regarding the captive management of sea otters. Dan Costa (UCSC) spoke on "The Ecological Energetics of Sea Otters". He compared daily gross energetic requirements of wild and captive sea otters and dealt with the 'profitability' of several food items for Enhydra lutris. He also presented comparative data on the 'time energy budget' of the sea otter. Terrie Williams (Hubbs Marine Research Inst.), in a paper entitled "Sea Otter/Oil Spill Mitigation Study", spoke on finding an effective treatment and technique for removing crude oil from the pelage of sea otters. Among the many commercial products tested by the Hubbs group, common dishwashing detergent (specifically 'Dawn'®) gave the best results. The Hubbs' technique involves careful monitoring of repeated washings and rinsings, but it too involved to detail here. Given the virtual certainty that zoo and aquarium workers on the West coast of North America will eventually be faced with oil-fouled marine mammals, this research, in anticipation of the problem, should be seen as both valuable and timely.

OTTER SPECIALISTS MEET IN SANTA CRUZ, Continued

Pat Foster-Turley (Marine World Africa-USA) presented results from her recently completed studbook on Asian Small-Clawed Otters (*Aonyx cinerea*). Data from the studbook emphasized the high incidence of urinary stones in this captive species; an obvious problem in need of further research. Joe Davis (Brookfield Zoo) spoke on "Reproduction in African Spot-Necked Otters (*Hydrictis maculicollis*)". Davis has devised an otter breeding procedure which has produced successful births each year since 1974. Cynthia Bennett (Santa Barbara Zoo) gave a paper on "Activity Profiles and Reproductive Behavior in a Pair of Asian Clawless Otters (*Aonyx cincera*)". She spoke on the social activity, feeding regimen, and common occurrence of urinary stones in this species of otter.

Pat Foster-Turley acted as chairperson for this symposium: the papers, workshops, and field trips were well organized and were of a uniform high quality. Regrettably, the same cannot be said for the daily business coordination of the symposium; for example, promised pre-symposium mailings failed to arrive, events and schedules were poorly publicized, room and board allocations were muddled, and finance coordination was chaotic at best. The sum of these, at times, contributed to a frenzied atmosphere. Even so, this symposium was vital, informative, and stimulating. No zoo and/or aquarium that houses otters should fail to be represented at future meetings of this group. Publication of the symposium proceedings was discussed and details (date and press, etc) should be announced in the future. The Fifth International Otter Symposium, held biennially, is tentively scheduled for India in 1987.



UNIVERSITY RESEARCH EXPEDITIONS PROGRAM

ANNOUNCEMENT

University of California
Berkeley, California 94720
(415) 642-6586



The University of California Research Expeditions Program (UREP) is currently recruiting members for December field teams slated to investigate ant/plant relationships in the pristine rainforests of Costa Rica and to study the behavior of Vizcachas, a ground-burrowing cousin of the chinchilla in the frontiers of Patagonia. No previous experience is needed to join the expeditions, which are led by University of California scholars. Contributions to join the expeditions vary and are tax-deductible. People interested in obtaining a free catalog describing these and other expedition offerings in 1986, should contact University Research Expeditions Program, University of California, Desk D-10, Berkeley, CA 94720 or call (415) 642-6586.

Expeditions are generally two weeks in duration. Contribution for the Costa Rican trip is \$1135; Patagonia is \$1285. A limited number of scholarships are available to students. Contribution covers research equipment and supplies, meals, lodging and ground transportation during the project, preparatory materials, and a portion of the overall costs for program planning and implementation. In February, March and May of 1986, expeditions will journey to the Sea of Cortez to study the brown pelican.



Research.....

Nixon Griffis Fund For Zoological Research Awards Six Grants

The Nixon Griffis Fund for Zoological Research (NGFZR), established in 1984 by New York Zoological Society Trustee Nixon Griffis, awarded six research grants on 25 September 1985.

The recipients were:

Emil Dolensek, D.V.M. and Stephanie Combs, Ph.D., New York Zoological Society: "Vitamin E status of certain ruminants at the Bronx Zoo".

Betsy L. Dresser, Ph.D., Cincinnati Zoo: "Embryo transfer between greater kudu and eland antelope".

Udo Ganslosser, Ph.D., Zoological Institut, Erlangen: "Social ethology of captive macropods".

Katherine A. Houpt, V.N.D., Ph.D., Cornell University: "An international study of social relationships of Przewalski horses".

Mary Kathryn IZard, Ph.D., Duke University Primate Center: "Hormones and reproduction in female mongoose lemurs".

Christine D. Sheppard, Ph.D. and Stephanie Combs, Ph.D., New York Zoological Society: "Determining nutritional requirements of exotic birds".

Nixon Griffis Fund for Zoological Research grants are available to members of the zoo and aquarium community. Fund recipients may be keepers, curators, veterinarians, or research and consulting biologists. Grants, not to exceed \$3000, are awarded semi-annually. Closing periods are January 1st and July 1st. For information about the Fund and grant application procedures, contact John Behler, Coordinator, Nixon Griffis Fund for Zoological Research, c/o New York Zoological Society, Bronx Zoo, Bronx, NY 10460.



NATURE'S WONDER

Weave webs of gold
as nature unfolds
ensnare your prize
with a cryptic guise

Capture with question--
how fast? how much?
Powers of suggestion--
evolve a new touch.

Web of amazement
each strand more compelling
a continuous thread
of the story your telling.



Time after time
rediscover your find
we often ignore
life's perfect design.

Your task is immense
create wonder,
surprise
never stop spinning the
wherefore and whys.

By Norman Gershenz, Animal Keeper
San Francisco Zoo

Chapter News

TOPEKA ZOO AAZK CHAPTER

The World Famous Topeka Zoo AAZK Chapter is pleased to announce the following newly elected officers:

President.....Becky Rogers
Treasurer.....Alice Miser

Vice President.....Valkyrie Kimball
Secretary.....Michael A. Yznaga

The past few months have been busy for our Chapter. A Keeper garage sale was held in August in our Zoo's public parking lot. During the annual "AnimalFair" this past Labor Day weekend, the Chapter had a booth set up and manned by our AAZK Chapter members. A soft-sculpture "Keeper Doll" was offered in a drawing with a suggested donation of 50c per chance. Also offered during the day's activities were 10 "Asian Elephant" acrylic paint footprints for auction (on 15" x 20" composition poster boards). Happily we recouped all costs on all the aforementioned activities and were able to add monies to our Chapter's bank account.

---Submitted by Michael A. Yznaga, Secretary



AAZK REGIONAL COORDINATORS

Vacancy	- ME, VT, NH, MA, RI, CT
Vacancy	- NY
Gene Pfeffer, Philadelphia Zoo	- PA, NJ, MD, DE
Angela Keppel, National Zoo	- VA, W, VA, D.C.
Lee Payne, Detroit Zoo	- MI
Lynne Villers, Indianapolis Zoo	- IN, OH, KY
Larry Sammarco, Lincoln Park Zoo	- WI, IL, MO, MN, IA
Vacancy	- TN, NC, SC
Alan Sharples, Atlanta Zoo	- FL, AL, GA, AR, MS, LA
Vacancy	- TX, NM, CO, KS, NE, SD, ND
Laurence Gledhill, Woodland Park Zoo	- WA, OR, ID, MT, WY, AK
Joanie Stinson, Phoenix Zoo	- CA, NV, AZ, UT, HI
Vacancy	- CANADA



Announcing . . .



AAZK Keeper Education Committee:
A summary of the more common

ZOONOTIC DISEASES
including disinfection,
personnel hygiene and bibliography.

AAZK is pleased to announce the availability of its new publication ZOONOTIC DISEASES. This 56-page booklet details the most common zoonotic diseases, offers guidelines for preventive control and covers personal hygiene and disinfection procedures.

The booklet, a cooperative effort produced by the AAZK Keeper Education Committee, is produced in a 8½" by 11" format hole punched for insertion in a standard three-ring binder (not included).

Copies may be purchased by completing the order form below. Prices are: \$2.00 for Professional AAZK Members; \$3.50 for other AAZK membership categories and \$5.00 for non-members. This price includes postage and handling. Order from: Zoonotic Diseases, c/o AAZK National Headquarters, 635 Gage Blvd., Topeka, KS 66606. Make checks payable to "AAZK".

ZOONOTIC DISEASES ORDER FORM

Please send _____ copy/copies of the AAZK Zoonotic Diseases Handbook to:

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

MEMBERSHIP CATEGORY: P _____ AF _____ AS _____ INST _____ NON-MEM _____

TOTAL AMOUNT INCLUDED: \$ _____

PLEASE ALLOW 4-6 week delivery at Book Rate. NOTE: THOSE ORDERING FROM OUTSIDE THE U.S. AND CANADA SHOULD INCLUDE AN ADDITIONAL \$2.00 FOR AIR MAIL SERVICE.

SEND ORDER FORM AND CHECK OR MONEY ORDER MADE PAYABLE TO "AAZK" TO:

ZOONOTIC DISEASES
c/o AAZK National Headquarters
635 Gage Blvd.
Topeka, KS 66606

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF, 635 Gage Blvd., Topeka, KS 66606. There is no charge for such listings and phone-in listings for positions which become available close to deadline are accepted. Please include closing dates for positions available.

ASSISTANT CURATOR/BIRDS...responsible for daily management of bird collection and supervision of keepers. Requires degree and demonstrated supervisory experience. Will assist in all departmental operations. Salary \$25,399-\$31,674. Send resume/references by 15 November to Personnel Office, Zoological Society of San Diego, P.O. Box 551, San Diego, CA 92112.

PACHYDERM KEEPER...requires several years' experience in handling/training of elephants. A degree is preferred, but experience will be considered in lieu of education. Will work as part of five-person team and participate in training/demonstrations. Additional duties include maintenance of the hippo/rhino/tapir collection. Salary commensurate with relevant experience. Send resume to: Ann Petric, Assistant Curator/Mammals, Chicago Zoological Society, Brookfield Zoo, 3300 Golf Blvd., Brookfield, IL 60513.

MAMMAL KEEPERS...requires two years' keeper experience. Degree in zoology or related field preferred. Positions available for hoofed stock and primates. Responsible for daily feeding, maintenance, health and behavioral observations. Contact: Sam Winslow, Curator of Mammals, Audubon Park & Zoological Garden, P.O. Box 4327, New Orleans, LA 70178 (504) 861-2537.

BIRD KEEPER...requires minimum of two years' avicultural experience with zoo or other major collection. BS preferred. Starting salary commensurate with experience, plus benefits. Send resume to: Larry Shelton, Curator of Birds, Philadelphia Zoological Garden, 34th Street & Girard Avenue, Philadelphia, PA 19104.

EDUCATION COORDINATOR...(position available December 1985) responsible for planning/implementing education program for all ages, participating in the development of interpretive graphics, Zoomobile and training/coordinating docents, also provide care of Education Department's animal collection. Send resume to Executive Director, Ross Park Zoo, 185 Park Avenue, Binghampton, NY 13903.

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MOVING????

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Barbara Manspeaker, Administrative Secretary
AAZK National Headquarters
635 Gage Blvd.
Topeka, KS



AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

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_____ \$20.00 Professional <i>Full-time Keepers</i>	_____ \$15.00 Affiliate <i>Other staff and volunteers</i>
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Work Area _____ Special Interests _____

Fill this application and check or money order (U.S. CURRENCY ONLY PLEASE), payable to American Association of Zoo Keepers, to: AAZK National Headquarters, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

Membership includes a subscription to *Animal Keepers' Forum*. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada.

INFORMATION FOR CONTRIBUTORS

Animal Keepers' Forum publishes original papers and news items of interest to the Animal Keeping profession. Non-members are welcome to submit articles for consideration.

Articles should be typed or hand-printed. All illustrations, graphs and tables should be clearly marked, in final form, and should fit in a page size no more than 6" x 10" (15cm x 25½cm). Literature used should be cited in the text and in final bibliography. Avoid footnotes. Include scientific names. Black and white photos are accepted.

Articles sent to *Animal Keepers' Forum* will be reviewed for publication. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Those longer than three pages may be separated into monthly installments at the discretion of the editorial staff. The editors reserve the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed envelope.

Telephone contributions on late-breaking news or last minute insertions are accepted. However, phone-in contributions of long articles will not be accepted. The phone number is (913) 272-5821.

DEADLINE FOR EACH EDITION IS THE 15TH OF THE PRECEDING MONTH

Articles printed do not necessarily reflect the opinions of the Animal Keepers' Forum editorial staff or the American Association of Zoo Keepers.

Items in this publication may be reprinted. Credit to this publication is requested. Reprints may be ordered from the editor.

PRINTED IN U.S.A.

**American Association
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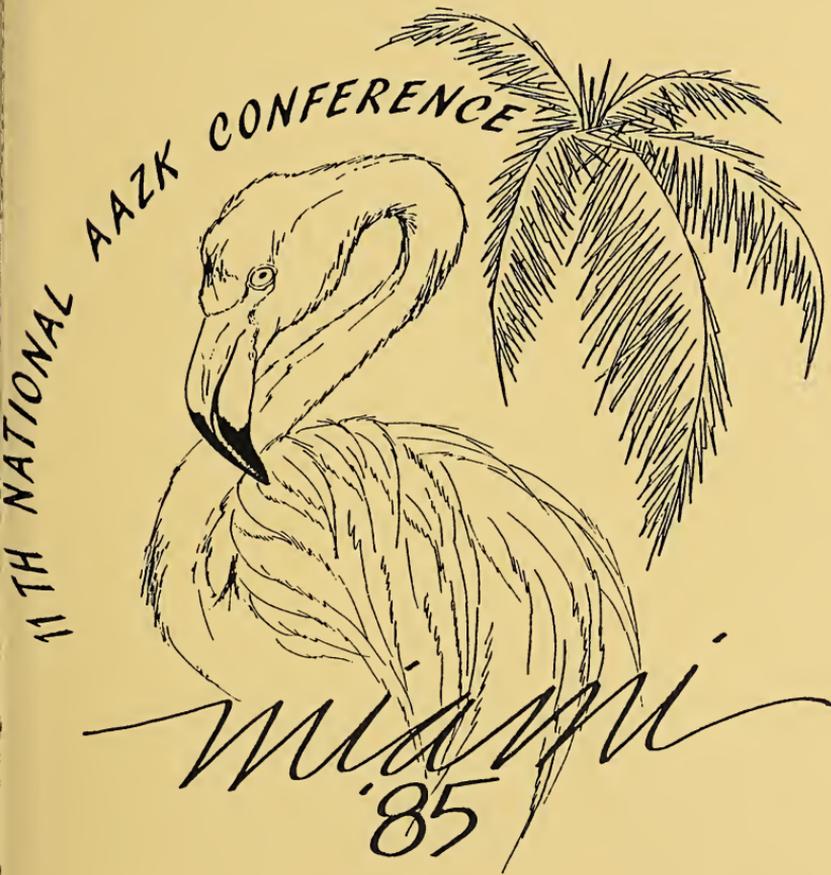


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SPECIAL EDITION
December 1985

Animal Keepers' Forum



dedicated to Professional Animal Care



Executive Editor: Alice Miser
Managing Editor: Susan Chan
Associate Editor: Ron Ringer

DECEMBER 1985
VOLUME TWELVE
NUMBER TWELVE

Animal Keepers' Forum (ISSN 0164-9531) is a monthly journal of the American Association of Zoo Keepers, Inc., 635 Gage Blvd., Topeka, KS 66606. Five dollars of each membership fee goes toward the annual publication costs of *Animal Keepers' Forum*. Second Class postage paid at Topeka, KS. Postmaster: Please send address changes to:

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CO-DIRECTORS REGIONAL COORDINATORS

States East of the Mississippi - Diane Krug, White Oak Plantation, Yulee, FL
States West of the Mississippi - Debbera Stecher, Woodland Park Zoo, Seattle, WA
Individual Regional Coordinators and the states under their oversight are listed elsewhere in each issue of *Animal Keepers' Forum*.

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From The Editor's Desk.....

Dear Members,

The Editorial Staff of Animal Keepers' Forum is pleased to bring you this expanded December issue which contains some of our regular features as well as the proceedings and papers from the 1985 National AAZK Conference held this past October in Miami, FL. An overview of the annual meeting of the AAZK Board of Directors may be found on page 380. We encourage you to read this overview to become familiar with what the Association has been doing during the past year. Should you find areas which are of particular interest to you, we would also encourage you to contact the person in charge of that project or committee and volunteer your time and talents. Keepers working for the betterment of keepers, encouraging professional growth and information exchange, is what AAZK is all about. This can only continue to be a reality when the membership contributes in a positive and productive way. Make this your year to become involved in an AAZK project.

We would also like to take this opportunity to thank all those who have contributed material to AKF during the past year. Without your support and willingness to share information, the Forum cannot grow and mature. In the January 1986 issue of AKF an article on "How To Write An Article For AKF" will be published. We hope this will encourage those of you who have been hesitant to submit material to do so in the future. A number of changes are anticipated for AKF during 1986 - as the journal expands and membership input becomes greater, the staff is continually looking for ways to improve the way information is presented; ways which will hopefully make such information more useful to you. Your suggestions and comments are always welcome and we enjoy hearing from you.

This Special Edition will be sent to all members whose membership was current as of 26 November 1985. A limited number of extra copies have been ordered and may be purchased from National Headquarters for \$6.00 each.

Once again, our sincere thanks for your participation, encouragement and continued support. We wish you all a wonderful holiday season and a New Year that is prosperous and fulfilling.

Sincerely,

Susan D. Chan
Managing Editor

Alice Miser
Executive Editor

Ron Ringer
Associate Editor



CONFERENCE '85.....Final Reflections

CONFERENCE GROUP PHOTO

The South Florida AAZK Chapter is processing the group photo. When the best shot is picked we will calculate the cost of reproducing the film and sending it out to the participating delegates. Anyone wishing to receive a photo (if you are not in the picture) can send requests to:

South Florida AAZK - Group Photo
12400 S.W. 152nd Street
Miami, FL 33177

LAST CHANCE TO BUY MIAMI CONFERENCE T-SHIRTS

If you missed purchasing a T-shirt while attending the 1985 AAZK Conference in Miami, or would like another shirt - DECEMBER 31 1985 will be the last date to order one. After this date no more will be available for sale. The design shown at right is printed in four colors in the following choice of shirts:

Colors Available: White, Lt. Grey and Lt. Tan.

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Cost: Shirts are \$8.50 each plus \$1.25 for postage and handling.

To Order: Send you name and complete mailing address, number of shirts desired, colors desired and sizes needed along with a check or money order made payable to "South Florida AAZK Chapter" to: South Florida AAZK Chapter, 12400 S.W. 152nd. St., Miami, FL 33177.



REMEMBER NO ORDERS TAKEN AFTER DECEMBER 31 1985

hello from Winnipeg,

On behalf of the Assiniboine Park Zookeeper's Association, we would like to congratulate the South Florida AAZK Chapter on their success with hosting the 1985 AAZK National Conference in Miami. In particular, delegates from Assiniboine Park Zoo appreciate and applaud Miami's work and effort in organizing and hosting this important annual event.

The Assiniboine Park Zookeeper's Association, Assiniboine Park Zoo and the City of Winnipeg cordially invite you and fellow zookeepers and associates to make plans now to attend the 1986 National Conference of AAZK next September in Winnipeg.

We intend to host the Conference with the same great enthusiasm and spirit as is the tradition of past AAZK Conferences. Winnipeg and its people have much to offer visiting delegates, and with your help and ours, we will truly have a great "Association of Zookeepers". Be sure and watch for a special pull-out conference survey in the January 1986 issue of AKF. By filling this out & returning it to us, you can make your desires and suggestions for 1986 conference activities known and assist us in our planning.

---1986 Conference Committee



Scoops and Scuttlebutt

FROM THE 1985 AAZK NATIONAL CONFERENCE COMMITTEE

The South Florida AAZK Chapter sincerely wishes to thank all those who attended the 1985 AAZK National Conference held in Miami. A total of 200 delegates representing 56 institutions from 24 states, 2 provinces and 3 delegates from the Netherlands were in attendance. It was a great success and it was your presence that made it one of the best conferences ever! Thanks again, and we look forward to seeing you all next year in Winnipeg!

NEW ADDRESS FOR 'THINK SAFETY' CONTRIBUTIONS

All contributions for the 'Think Safety' column should be sent to Jillian Grade, 1850 W. Wabansia St., Chicago, IL 60622. Mail which was sent to the International Bird House after October 1984 was held there and was neither forwarded nor returned to senders. Please note in membership directories that Jillian Grade is no longer employed at the International Bird House. The Wabansia address is her current residence.

1986 AAZK REGIONAL SITE ANNOUNCED

Andy Lodge, President of the Columbus Chapter AAZK, has announced that the 1986 Great Lakes Regional AAZK Conference will be held in Columbus, OH from 4-7 May. They are already working on their program, and with the help of their excellent staff and volunteers, plan to make this an outstanding conference. More information about this conference will appear in upcoming issues of AKF.

FROM THE LIBRARY RESOURCES COORDINATOR

Library Resources Coordinator Kaci Thompson has brought to our attention that Recent Literature of Mammology, a special publication of the American Society of Mammologists, ceased publication last month. This quarterly bibliography of recent journal articles has proven to be a valuable tool for many keepers. Kaci encourages those who wish to protest the demise of this publication to contact Gordon L. Kirkland Jr., Secretary-Treasurer Vertebrate Museum, Shippensburg University, Shippensburg, PA 17257. Perhaps if enough of us speak up, the publication will be continued.

BOARD OF DIRECTORS ANNOUNCES MEMBERSHIP FEE INCREASES

Inflation is a fact of life, even for non-profit organizations. During the past couple of years price increases for printing, postage, etc. have continued to take a bigger and bigger bite out of the AAZK budget. Due to the increased costs of maintaining the Association at its current level, and hopefully increasing the quality of services offered members in the future, the Board of Directors voted at the 1985 annual meeting to increase the membership dues as follows: After 1 January 1986, Professional annual dues will be \$25.00; Affiliate annual dues will be \$20.00. Associate fees were already increased earlier this year from \$10.00 to \$15.00 and will remain at \$15.00 annually. Contributing member annual dues remain at \$50.00. International member fees, regardless of membership category, are \$25.00 annually. It is hoped that members will recognize the necessity for these fee increases and continue to support AAZK. As a professional organization working hard to achieve the stated goals of AAZK in education and communication, the Association must also live with the economic facts of life and your continued support and commitment are greatly appreciated.



Births & Hatchings



LITTLE ROCK ZOO.....*Debby Nagel*

July through September 1985 B&H include: Mammals - 0.0.3 Rock cavy, 1.2 Geoffroy's cat, 0.0.1 Brown lemur (DNS), 1.3 Bobcat, 1.0 Blackbuck, 0.1 Binturong, 0.0.1 Patagonian cavy (DNS), 0.1 Guanaco; Birds - 0.0.4 Ringed teal (2 DNS), 0.1.6 Roul roul (3 DNS), 0.0.11 Wood duck, 0.0.6 Rhea (6 DNS), 0.0.9 White-face whistling duck (8 DNS), 0.0.1 Umbrella cockatoo; Reptiles - 0.0.3 California kingsnake, 0.0.2 Day gecko, 0.0.2 Cantil, 0.0.1 Cottonmouth, 0.0.16 Corn snake, 0.0.1 Red spitting cobra.

TULSA ZOO.....*Janice Johnson Shores*

B&H from 21 May to 17 September 1985 include: Mammals - 0.0.1 Squirrel monkey, 1.1 California sea lion, 5.1 White-tail deer, 1.0 Diana guenon, 1.0 Giraffe, 0.1 Sicilian donkey, 1.0 Greater kudu, 1.0 Mandrill baboon, 0.1 Grant's gazelle; Birds - 0.0.3 Plush-crested jay, 0.0.2 Eastern wild turkey, 0.0.9 Gambel's quail, 0.0.6 Peafowl; Herptiles - 0.0.1 Cascabel rattlesnake, 0.0.18 Green basilisk lizard, 0.0.1 Arizona mountain kingsnake, 0.0.13 Western diamondback rattlesnake, and 0.0.7 American alligator.

WOODLAND PARK ZOO.....*Harmony Frazier-Taylor*

September 1985 B&H include: Mammals - 0.0.1 Wallaroo, 0.0.1 Sloth; Birds - 0.0.3 Monk parakeet, 0.0.4 Blue-crowned motmot, 0.0.2 Silver-throatedanager (DNS); Herptiles - 0.0.3 Leopard gecko.

HOUSTON ZOOLOGICAL GARDENS.....*Hugo Lahera*

B&H for September 1985 include: Mammals - 1.1 Scimitar-horned oryx, 1.1 Nyala, 1.0 Besia oryx, 1.0 Nubian giraffe, 1.0 Spectacled langur, 0.0.2 Lesser galago, 0.0.1 Tree shrew, 1.0 Llama; Birds - 0.2.1 Gray's curassow, 0.0.3 Red-crested touraco, 0.0.2 White-cheeked touraco, 0.0.1 Violaceous touraco, 0.0.1 Schalow's touraco, 0.0.2 Green-winged dove, 0.0.3 Java sparrow, 0.0.5 Ringed teal, 0.0.3 Fulvous whistling duck; Herptiles - 0.0.4 Elaphe flavivirufa pardolina and 0.0.3 Lacerta lepida.

MIAMI METROZOO.....*Lori Bruckheim*

September 1985 B&H include: Mammals - 2.0 Dama gazelle, 0.1 Nilgai, 1.0 Nyala, 1.1 Eland, 0.1 Sable, 0.1 Slender horned gazelle, 0.1 Cape buffalo, 0.1 Scimitar-horned oryx, 0.1 Bongo (DNS), 1.0 Malayan sun bear; Birds - 0.0.1 White-faced tree duck, 0.0.1 Abyssinian ground hornbill, 0.0.1 Sarus crane, and 0.0.3 East African crowned crane.

SAN ANTONIO ZOO.....*Debi Reed*

B&H for September 1985 include: Mammals - 0.0.1 Gelada, 0.1 Three-banded armadillo, 0.1 Kinkajou, 1.1 Collard peccary, 1.0 Giraffe (DNS), 1.0 Cape buffalo, 1.1 Addax, 0.1 Brindled gnu (DNS), 0.3 Blackbuck (0.2 DNS), 1.0 Speke's gazelle, 0.1 Springbok, 1.1 Aoudad, 1.0 Mouflon; Birds - 0.0.2 Sacred ibis, 0.0.2 Scarlet ibis (1 DNS), 0.0.2 Diamond dove (DNS), 0.0.1 Bartlett's bleeding heart dove, 0.0.2 Lilac-breasted roller (DNS), 0.0.1 Toco toucan (DNS), 0.0.1 Diamond fire-tailed finch (DNS); Reptiles - 0.0.2 Chinese crocodile lizard (DNS - 1st time in collection), 0.0.2 Honduran milksnake; Invertebrates - 0.1 Tarantula, 0.0.1 Atlantic starfish (DNS).

BIRTHS AND HATCHINGS, Continued

Work has begun on our Great Barrier Reef Exhibit, the last phase of the Children's Zoo. It will be ready for our 1986 summer season. The 1985 IWWA/APWS conference that was hosted by the zoo in October went very well, with approximately 150 attendees. Our AAZK chapter sold T-shirts at the conference and made a respectable profit. We would recommend this as a fund-raiser to other chapters and would be glad to provide information.

BUSCH GARDENS/TAMPA.....Susan Rackley

October 1985 B&H include: Mammals -2.3 Thomson's gazelle, 4.1 Nyala, 1.0 Grant's gazelle, 1.0 Scimitar-horned oryx, 1.0 Muntjac deer, 0.0.2 Chimpanzee; Birds - 0.0.3 Chilean flamingo, 0.0.2 East African crowned crane, 0.0.2 Scaley-breasted lorikeet, 0.0.1 Triangular spotted pigeon, 0.0.1 Superb starling.

DALLAS ZOO.....Sandy Upchurch

B&H for September and October 1985 include: Mammals - 1.0 Suni, 0.1 Grevy's zebra, 3.3 Serval, 0.1 Addra gazelle, 1.0 Cape buffalo, 1.0 Addax, 1.0 Klipspringer, 1.0 Greater kudu; Birds - 0.0.1 White-headed piping guan; Reptiles - 0.0.9 Pueblan kingsnake, 0.0.11 Sinaloan kingsnake, 0.0.7 Grey-banded kingsnake, 0.0.3 Jalisco kingsnake, 0.0.1 Poison dart frog, 0.0.5 Trans-Pecos ratsnake, 5.3 Green tree python.

SEDGWICK COUNTY ZOO.....Terrie Correll

October 1985 B&H include: Mammals - 2.1 Guanaco, 0.0.1 Northern waterbuck, 0.1 Alpaca, 0.0.1 Goeldi's monkey; Birds - 0.0.1 Bali mynah; Reptiles - 0.0.2 Sunberg's day gecko. Acquisitions included: 1.0 White-lipped tree viper, 0.0.2 Lilford's crane, 2.2 Red spurfowl, 0.1 Moluccan cockatoo, 0.2 New Zealand gecko, 0.0.2 Blue-tongue skink, 0.4 Snake-necked turtle, 0.0.2 Red-crested cardinal and 1.0 Boa constrictor.

MILWAUKEE COUNTY ZOO.....Carol J. Boyd

B&H for September and October 1985 include: Mammals - 1.0 Springhaas, 0.0. Vampire bat, 0.0.1 Diana monkey, 0.0.1 Mountain fruit bat, 0.0.2 Grass mouse, 0.0.3 Bat-eared fox, 0.0.1 Kangaroo; Birds - 0.0.1 Speckled mousebird.

VIRGINIA ZOOLOGICAL PARK.....Gary D. Ochsenbein

July through October 1985 B&H include: Mammals - 0.2 Gambian giant pouched rat, 2.1 Aoudad (1.1 twins), 2 Bennett's wallaby, 0.1 Muntjac, 0.0.7 Nutria; Birds - 11 Common rhea; Reptiles - 8 Honduran milk snake.



Coming Events

SCHOOL FOR PROFESSIONAL MANAGEMENT DEVELOPMENT FOR ZOO AND AQUARIUM PERSONNEL

February 2-6, 1986

Wheeling, W. VA.

Held at Wilson Lodge, Ogelbay Park. Contact Dora Shell, North Carolina State University, Division of Continuing Education, P.O. Box 5125, Raleigh, NC 27650 (919) 737-2261.

THE FIFTH ANNUAL SYMPOSIUM OF THE NATIONAL WILDLIFE REHABILITATORS ASSOCIATION

February 19-23, 1986

Boston, MA

Hosted by the New England Wildlife Center, the symposium will be held at the Park Plaza Hotel. Symposium will include paper sessions, workshops and open panel discussions. For further information contact: Dr. Vaughn R. Pratt, Executive Director, New England Wildlife Center, 146 A Justice Cushing Highway, Hingham, MA 02043 (617) 749-5387 or 749-1248.

1986 AAZPA REGIONAL CONFERENCES

Southern Regional - Greater Baton Rouge Zoo, 16-18 March, 1986: for more information contact: Barbara Gorman, Greater Baton Rouge Zoo, Box 60, Baker, LA 70714 (504) 775-3877.

Western Regional - Point Defiance Zoo, 13-15 April 1986: for more information contact: Tom Otten, Director, Point Defiance Zoo & Aquarium, Point Defiance Park, Tacoma, WA 98407 (206) 591-5337.

Great Lakes Regional - Milwaukee County Zoological Gardens, 27-29 April 1986: for more information contact: Mary Beth Carr, Milwaukee County Zoological Gardens, 10001 W. Bluemound Rd., Milwaukee, WI 53226 (414) 771-3040.

Northeastern Regional - Mystic Marineline Aquarium, 4-6 May 1986: for more information contact: Laura Kezer, Mystic Marineline Aquarium, Sea Research Foundation, Inc., Mystic, CT 06355 (203) 536-9631.

Central Regional - Fort Worth Zoological Park, 18-20 May 1986: for more information contact: Dudley Brown, Fort Worth Zoological Park, 2727 Zoological Park Dr., Fort Worth, TX 76110 (817) 870-7050.

1986 AAZK GREAT LAKES REGIONAL CONFERENCE

May 4-7 1986

Columbus, OH

Hosted by the Columbus Zoo Chapter of AAZK. Watch upcoming issues of AKF for further information and details.

12TH ANNUAL AAZK NATIONAL CONFERENCE

Sept. 28-Oct. 2, 1986

Winnipeg, Manitoba

Hosted by the Assiniboine Park Zookeeper's Association, a chapter of AAZK.



Regional Coordinator's Report From Miami

From: Diane Krug - R.C. Director of the Eastern Region
Debbera Stecher - R.C. Director of the Western Region

During the Miami Conference we got together and discussed the R.C. positions and what changes could be made to improve the system and create a more involved program for all who participate. The following proposals were formulated:

1. Print-outs of current membership lists will be sent out to all RCs with the following information: (a) name, (b) mailing address, (c) membership category, (d) expiration date for those members in their region.

The print-outs will be sent in the mail to be received by all RCs no later than 1 July and 1 December.

2. RCs will be responsible for two reports due to their directors on 1 February (starting 2/1/86) and 1 August. Reports are to contain the following: (a) what contacts have been made in the last six months; (b) assessments of print-outs (new members/drop-out rates); (c) local chapter projects and activities.
3. Director reports will be due 1 March and 1 September. Each director will receive a copy of the other's report at this time. RCs will receive both reports from Eastern and Western regions some time after 30 March and 30 September.
4. All RCs and directors will receive pre-paid postcards from National Headquarters to be used for easy RC program coorespondence.
5. Animal Keepers' Forum - all RC work phone numbers will be listed in the AKF is a designated area each issue. Home phone numbers will be listed by consent only.

The Directors of the R.C. Program will continue to inform the AAZK membership of current and present changes in the system by placing articles in future issues of the Forum.

6. AAZPA Regional Conferences - RCs or Directors must attend these functions to give a AAZK State of the Association Report and to manage an AAZK membership display table.

The following are the addresses and phone numbers for the Directors of the AAZK Regional Coordinator System:

<i>Eastern Region - Diane Krug</i>	<i>home: (912) 729-5126</i>
<i>White Oak Plantation</i>	<i>work: (912) 225-9559</i>
<i>Route 3, Box 226</i>	
<i>Yulee, FL 32087</i>	
<i>Western Region: Debbera Stecher</i>	<i>home: (206) 745-8198</i>
<i>Woodland Park Zoo</i>	<i>work: (206) 625-5402</i>
<i>5500 Phinney Ave. North</i>	
<i>Seattle, WA 98103</i>	





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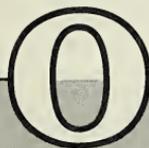
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OVERVIEW OF THE 1985 AAZK
BOARD OF DIRECTOR'S ANNUAL MEETING



Submitted by

*Susan Chan, Managing Editor
and*

Jean Hromadka, AAZK Vice President

The meeting was called to order on 20 October 1985 at 8:25 a.m. by President Kevin Conway. Board members present were: Pat Sammarco, Frank Kohn, Jean Hromadka and Oliver Claffey. Susan Chan served as recording secretary. An additional wrap-up meeting was held on 21 October 1985 with all members present.

It was voted that written reports submitted by project/committee heads would not be read at this meeting but would be accepted into the minutes as submitted by the chairpersons. All Board members received copies of these reports prior to the annual meeting.

NATIONAL HEADQUARTERS - report submitted by Dolly Clark

While membership continue to increase at a modest rate, it was suggested that AAZK mount some type of major membership campaign in 1986. The expansion of projects and their scope entails larger monetary needs and since membership dues are the single most important revenue source, such a drive to increase memberships would allow the Association to pursue its projects with greater financial solvency. National will pursue a follow-up on members who have dropped in recent years to determine why they dropped and encourage their rejoining. The membership count at the time of this report (8-28-85) was 1,883. Avenues for increasing memberships will be pursued utilizing the RC System, zoological society mailings and a possible colleges/university membership and career bulletin board project. While favoring a membership campaign, Jean Hromadka stressed that current projects should be completed before new ones are taken on. National will be pursuing AAZK's reclassification with the IRS so that we may receive fund donations in a manner which will allow the donor to receive a "tax deductible contribution". Barbara Manspeaker was hired in September 1985 to replace Dolly Clark as Administrative Secretary for the Association.

On recommendation from National, the Board of Directors increased the membership fees as follows: Professional from \$20 to \$25; Affiliate from \$15.00 to \$20. The Associate fee, which was raised previously to \$15 remains the same as does Contributing (\$50) and International (\$25). These revised fees go into effect as of 1 January 1986.

The Board voted to continue the insurance policy to cover loss of equipment at National. A more efficient bookkeeping system is being set up and will ease filing required forms with the IRS. The Board voted to assess a \$10 charge for all returned checks to National.

The Board voted to increase the wages for Managing Editor Susan Chan from \$5.50 to \$6.00 per hour. Barbara Manspeaker was hired at a starting salary of \$5.00 per hour.

Discussion on whether the AAZK logo should be redrawn thus offering a clearer, sharper image for reproduction concluded that this project should be investigated by the Board with assistance from National.

AN OVERVIEW OF THE 1985 BOARD OF DIRECTORS MEETING, Continued

In appreciation for her years of service to AAZK, a suitably inscribed plaque was prepared for Dolly Clark. Since she was not in attendance at the Conference, Jean Hromadka will mail it to here with a note of thanks from the Board.

CHAPTER AFFAIRS - report submitted by Lee Payne

There are currently 42 Chapters listed in the active file and chapter formation packets have been sent out to eleven other zoos. Lee has suggested having Chapters pay their renewal fees either in January or July of each year (i.e. A-L in July and M-Z in January). This would make for easier bookkeeping and maintenance of current chapter files. Lee plans to publish a list of current Chapters in an upcoming issue of AKF, to continue reporting Chapter News for the publication, and to try and get input from keepers/chapters on how they handle keeper apathy and what to do about it in regards to participation in AAZK and the local chapter. Expenses of approximately \$25 were logged for 1985 which Lee has donated to AAZK. A budget for \$50 for 1986 was requested and approved. President Conway stressed the need to coordinate mutual goals and concerns of Chapter Affairs Coordinator and the Regional Coordinators.

INTERNATIONAL AFFAIRS- no report submitted

Connie Cloak has resigned a International Affairs Coordinator and replacement candidates for this position were suggested. Kevin will contact the proposed individuals to ascertain their interest and commitment. This project's primary function is to keep in contact with our international members and to coordinate the exchange of information and mutual assistance between AAZK and our sister organization ABWAK and ASZK. A copy of this State of the Association statement will be sent to these organizations. A budget of \$50 was approved to cover postage and miscellaneous expenses.

NOMINATIONS & ELECTION COMMITTEE - no report submitted

Lynne Villers served as chairperson for this committee during 1985. The committee solicited nominations for the election of two new board members and coordinated the mailing of ballots to all professional AAZK members. The committee then tabulated the ballots, which were notarized, and announced Kerry Hoffman, Arizona-Sonora Desert Museum and Susan M. Barnard, Atlanta Zoo, as the newly elected members. A lack of nominations by the 1st deadline proved a problem this year and it was decided by the Board that the N&E committee should be instructed to allow for more lead time for individuals to place their nominations prior to an election. The need for a more standardized form to be used by nominators was also discussed and Pat Sammarco will check into one which had been used in the past and advise the committee of its content in preparations for the 1987 election. This should alleviate the problems of discrepancy of information provided National for ballot preparation. Frank Kohn suggested that a new N&E committee be selected and become active 1 January 1986. This committee will consist of four members and a chairperson. This committee needs to be in close contact with both the AAZK President and National. They will be required to notify the president with the election results no later than 9/20/87 and to submit a full report to the Board no later than 10/1/87. By having the committee activated in a non-election year, much of the ground work for the upcoming election can be completed allowing more time for verification of the qualification of candidates etc. It was approved by the Board to have at least a chairperson in place by 1 January 1986. The following would be the proposed schedule leading to the 1987 election: June '86 - call

AN OVERVIEW OF THE 1985 AAZK BOARD OF DIRECTORS MEETING, Continued

for nominations in AKF; December '86 - second notice for nominations; January '87 - final notice for nominations; Candidate verification by April '87; voting in June '87; notification of winners by 1 August '87. This timetable would hopefully allow for newly elected board members to make plans to attend the national conference where they could sit in on the meetings prior to taking up their posts effective 1 Jan. 1988. A budget of \$50 for 1986 was approved to cover correspondence and postage costs.

REGIONAL COORDINATORS - report submitted by Debbera Stecher

The Regional Coordinator system is being reorganized under the co-chair of Debbera Stecher and Diane Krug. Debbera is coordinator for those states west of the Mississippi and Diane for those states east of the Mississippi. Debbera stressed the need to set yearly obtainable goals and to have a defined list of responsibilities for regional coordinators to follow. Lack of communication between RCs and members in their regions was cited as a major problem. Debbera requested a twice-yearly print-out from National showing members names, addresses, zoo affiliation, years as a member, renewal date, chapter offices held, etc. While this information is not all currently available on the computer, National will attempt to process such and make it available to the RC coordinators. Pre-metered postcards will be made available to RCs to use in contacting members in their areas. RCs will be required to submit semi-annual reports to both the Board of Directors and the RC Coordinators. Debbera is checking into obtaining a low-cost long-distance package to enable coordinators to handle some business by telephone. The RC co-chairs have requested that the listing of RCs in AKF be standardized and will include both the work and home phone numbers of participants unless an RC requests that this not be included. Nearly all the RC positions are filled and an updated listing should appear by the January AKF. Regional Co-Chairs will encourage AAZK participation in regional AAZPA conferences and at President Conway's suggestion will maintain close contact with Chapter Affairs Coordinator Lee Payne. A budget of \$150 was approved for 1986.

CONTINUING KEEPER EDUCATION COMMITTEE - report submitted by Pat Sammarco

Board members continue their oversight of the various projects within this committee and Pat Sammarco continues as Coordinator.

Zoo/U List - the list currently stands at 35 institutions offering classes or courses directly related to captive wild animal care. This list is now available from National for a 39¢, legal-sized, self-addressed envelope. Updates are printed in AKF. Budget request of \$22 for 1986 approved. Pat also asked that a volunteer be found to continue this project with occasional updates now that it has been established.

Staff Exchange - Coordinator Elandra Aum reported that 54 institutions are now enrolled. This committee plans to complete during 1986: (1) a survey of the registered institutions to discover what exchanges have taken place; (2) update the registration of member institutions; and (3) send out a solicitation mailing to those institutions not already registered. The Board stressed the need for the Staff Exchange Program to be made highly visible through AKF to let members know what it is, how it works and to get reports of keepers who have participated in exchanges published. Elandra was instructed to send updates on the project both to the Board and to National, including upcoming survey results. Elandra had proposed trying to get Australian zoos into the registry but it was suggested by Pat Sammarco that the Australian zoos should set up and maintain

their own staff exchange system independently and then both groups could share information and results of their efforts. A budget of \$250 was tentatively approved if priority guidelines are followed as per Board request.

AAZK/AAZPA Liaison - has been valuable and productive with Brandy Pound leading AAZK to contact with the International Zoo Educators and the Zoo Library Group. Again this year there was an AAZK session scheduled within the AAZPA National Conference to present our staff education efforts and materials, and to encourage the development of staff training programs at zoological institutions. We received a good response and much interest from the showing of the "Feeds and Feeding" videotape. Brandy has been in communication with AAZPA about coordinating our efforts in staff training so that we compliment rather than duplicate each other's projects. No budget was requested for 1986.

Continuing Keeper Education Column - submissions have been fairly regular to AKF and have been used to keep our members aware of committee activity, and the availability of educational opportunities. She will continue to solicit individuals to write articles on continuing education for this column.

Manual Review - Chairperson Beth Poff reports that this committee has been renamed to more accurately reflect the scope of its activities. It will henceforth be known as the Keeper Training Materials Identification Project. The committee is currently working with gathering materials including manuals, video tapes and films on keeper training. Through direct correspondence and a survey printed in AKF, the committee has identified what types of materials are available and what these materials cover. The whole committee reviews each piece of material and then one committee member is selected to maintain updates etc. on that particular phase of the project (i.e. manuals, video tape etc.) As different phases of the project are completed information on them will appear in the Forum. A budget of \$75 for postage and copying fees was requested and approved.

Library Resources - Chairperson Kaci Thompson reports that this project has been expanded from maintaining a list of special interest libraries to making keepers more aware of how to utilize libraries and locate printed sources of information. The AAZPA Librarians Group will work cooperatively with the AAZK Library group on future projects which will benefit both groups. The committee is also working on compiling a recommended personal library book list for keepers. The final list would then be published in AKF. Plans for the future also call for articles on Inter-Library loans and specific zoo library collections. The Library Resources Project and the Reference Search Project will now serve as cooperative liaisons for making information sources known to members. A budget of \$350 was tentatively approved and will be available to this committee if justification for the expenditures can be shown. If not, a \$50 budget to cover correspondence and postage will be given.

Zoo Keeper Husbandry Fundamentals - Co-editor Pat Sammarco reports that this project is taking longer than originally anticipated to complete but is progressing well. Associate editors are continuing to research and to write their sections. Expanded outlines for the various sections are being fleshed out and it is hoped within the next year that the assembled material will be ready to put into manuscript form in preparation for publication. The proposed manual has been retitled An Approach To Zoo Keeping and is intended to present basic concepts, attitudes and techniques of the profession. Pat reported that Mike Coker, Topeka Zoo, has resigned as associate editor for the small mammals section and a re-

AN OVERVIEW OF THE 1985 BOARD OF DIRECTORS MEETING, Continued

placement for this position will be solicited. Pat reported that Santa Fe Teaching Zoo has expressed interest in the manual once completed and this could prove a ready made market for its distribution. The possibility of distribution through a zoo book service will also be considered. A budget of \$150 was approved to cover costs of postage and miscellaneous expenses related to the project.

In final remarks concerning the Keeper Education Committee, Pat Sammarco reported that CAUZA (the Consortium of Aquariums, Universities and Zoos) has requested an endorsement by AAZK. Until research of what the implications of such a statement of endorsement may mean for AAZK, Pat suggested a letter of support be sent them and that we maintain a liaison with this group. The Board voted to approve Pat as liaison with CAUZA. A general expenses budget of \$50 was approved for administering the Keeper Education Committee.

Public Education Committee - this project has been moved out of the Keeper Education Committee oversight and into that of Information and Related Services. Chairperson Jay Jasan proposed the names of those individuals to serve on the committee and they were approved. The purpose of this committee remains to explore, define and promote the role of keepers in formal education programs for the public. Projects which the committee is currently working on include: (1) a Zoo Question Booklet which would provide answers to commonly asked questions; (2) a Zookeeper Display to be used at career fairs; (3) a Program Directory which would list and briefly describe programs involving keepers in public education. Jay stressed the need for information input from the membership for the successful completion of these projects. Frank Kohn proposed that the Public Education Committee work with the RC program in promoting membership in AAZK. He suggested the use of some type of membership display bulletin board at colleges and universities. Jay will investigate the possibilities of this proposal. Kevin Conway suggested that the proposed Zookeeper Display might be more effective if done in a videotape format rather than a static display. He encouraged Jay to confer with Wayne Buchanan, AAZK Keeper Training Video Tape Coordinator, to explore the possibilities for such a video. A budget of \$52.80 to cover the committee's postage expenses was proposed and approved.

Program Library - according to Program Librarian Anne Payne, the purpose of this project is to collect programs (scripts, slides, videotapes) and have them available for rental to Chapters and others wishing programs for meetings. There are currently eleven programs in the library and more are due to be added soon. Anne also reported that she will be contacting those individuals presenting papers at the Miami conference to encourage them to supply a copy of their program to the Library. She has set up a special checking account to handle reimbursements to such individuals for copying fees. Rental fees for programs are \$5.00 plus postage fees. A complete list of available programs can be received by contacting Anne at the Detroit Zoo. She anticipates publishing a list of these programs in an early 1986 issue of AKF. A budget of \$75 to cover reimbursement costs was proposed and approved.

Keeper Training Videotape Project - project coordinator Wayne Buchanan reported that this project has been very successful with many requests for both the Safety and Feeds and Feeding tapes. Orders for 14 copies of the Safety tape and 33 copies of the Feeds tape have been filled as of 8-15-85. Funds generated by the sale of these videotapes is available to financially assist others in producing more tapes. A video program on "How To Make A

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"Training Video Tape" is being prepared and will be available for a rental fee of \$5.00 to assist those who would like to try their hand at this medium. Wayne reports that the project is financially sound and no budget for 1986 was requested.

In a related matter, Bob Debets of the 1986 Winnipeg Conference Committee is proposing that the proceedings of that conference be videotaped. These tapes could then be used by Chapters for programs. Distribution would most likely be through the Program Library. Bob reported that he was seeking technical assistance and hoped that this project could be funded by either chapter or conference revenues. Wayne Buchanan suggested that funds from the Keeper Training Video Tape Project could be used if Winnipeg needs financial assistance. The Board approved this project and has asked to be kept informed on costs as conference time approaches.

Professional Standards Committee - Chairperson Jan McCoy reported that this committee has completed its initial goals and have completed a final report on survey results. This will be published in an upcoming issue of AKF. The committee's response from institutions surveyed was very good and the results have been made available to those institutions. No budget was requested for 1986. President Conway proposed that this committee now be dissolved since its work has been completed but that it still be maintained on the AAZK Administrative List as an information resource. This was approved by the Board.

Infant Development Notebook - under the new chairmanship of Steven Wing, this project is redefining its goals and methods for completion. Kaci Thompson has been appointed to the committee and others will be added as the work load necessitates. Pat Sammarco, in relaying the history of the project's original intent, noted that the notebook was to be formatted in a loose-leaf binder so that periodic updates could be easily added. It would include primarily keeper observations on techniques of mother-rearing. The Board approved a bulk mailing of a data collection form to institutions and individuals to gather needed information. Steven will draw up a composite form to get the project started and a sample of this form will appear in AKF. Since costs for this project are unknown at this time, no budget was requested, but the Board approved an initial \$50 budget to cover postage and miscellaneous expenses.

Membership Services Brochure - the initial printing of this brochure has been completed with copies sent to National and made available at the Miami conference. A major problem with the brochure is that information on project heads, prices etc. is in constant flux and this makes it difficult to keep it up to date. Because of this factor, the general intent of the brochure will be changed before the next printing. It will now cover only a general description of projects and committees giving their scope and projected goals and will not include specific names, addresses etc. It will reference National as a source of this specific information. Beth will be submitting an article to AKF explaining the brochure, where to get it and cutoff dates for revisions. A budget of \$200 was approved for 1986.

AAZK Logo T-Shirts - this project is handled by the Phoenix Chapter of AAZK and the report was submitted by Chapter President Joanie Stinson. The project is going well and continues to prove a popular accessory item. In the three years since Phoenix took over the project, they have sold 350 shirts and have split after-expenses profits with National. Due to recent price increases the shirts will now sell for \$7.00 rather than \$6.75. This price includes postage. The Chapter is also able to provide

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"large order" service on orders of one dozen or more for the reduced price of \$6.50 per shirt. In addition they are able to custom order the Logo T's in assorted size lots of three dozen in a wide range of colors and it is hoped that Chapters will make use of this added service. This project is self-sustaining and no budget was requested.

AAZK Logo Stickers - no report submitted by the Memphis Chapter which handles this project. Susan Chan reported that \$56.11 had been sent to National as its 50% profit split for the preceding nine months. President Conway noted that there have been some recent problems with orders being placed and not filled and correspondence concerning this problem remaining unanswered. He suggested that the Board investigate whether Memphis Chapter wishes to continue this project or whether it should look for another Chapter who wishes to handle this accessory.

Keeper Care Buttons - no written report submitted but Larry Sammarco was in attendance. Larry noted that since the Lincoln Park Chapter has been basically inactive, it might be better to have either another Chapter or National handle the sale of this item. If the Lincoln Park Chapter does not reactivate, these options will be explored. National will contact Larry on obtaining a supply of buttons to fill orders until this decision can be determined.

AAZK Logo Baseball Caps - Atlanta AAZK Chapter President Alan Sharples reports that 22 caps have been sold and that the Chapter needs to sell at least 25 to cover their initial outlay. Unless sales increase, the Chapter plans to discontinue the project. More exposure in AKF was requested to boost sales of caps.

AAZK Logo Belt Buckles - this accessory is being handled by the San Diego AAZK Chapter. Jeff Turnage reported that the original lot of 49 brass belt buckles have been sold and another lot of 50 ordered. It was decided by the Board last year that the 50-50 split with National would not take place until after all initial costs to the Chapter were met. It was determined that the San Diego Chapter and National will split profits on this project on a semi-annual basis now that a profit is being achieved. President Conway praised the project for offering such a high quality item to the membership and encouraged its advertisement and/or availability at AAZPA and AAZK regionals. This item will be added to the AAZK Accessory Order Form which National sends out. Debbie Hewitt is currently in charge of this project for the San Diego Chapter.

ADTForms - a written report submitted by project coordinator Bernie Feldman shows another positive and productive year for the ADTForms. They are being requested and used by more and more zoological institutions and this gratis service of AAZK remains available to all interested parties. Bernie runs regular notices of the Form's availability in both AKF and the AAZPA Newsletter. He reports he has had many first-time requests during the past year. It should be noted that Bernie is no longer at the Topeka Zoological Park but has moved to the Burnet Park Zoo in Liverpool, NY and orders for the forms should be sent to him there. A budget of \$600 was approved for printing of forms as needed and to cover postage expenses. The Board praised Bernie for his excellent handling of this project and for the positive image it has achieved for AAZK.

Exhibit Design Form - project head Diane Forsyth reported that the form went into distribution in 1985. The following is a list of the means of distribution: announcement of availability in AKF and the AAZPA Newsletter; distribution by Turtleback Zoo to all participants in the

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Otter Symposium; presentation of a paper at the Great Lakes Regional discussing the Exhibit Design Form, and therefore paper publication in the Regional Conference Proceedings, AAZPA, 1985; poster presentation at the Annual AAZPA Conference in addition to distribution of form during special AAZK sessions. Requests for the Exhibit Design Form are now coming in at a rate of about eight per month, a modest but steady beginning for the project. Goals for 1986 include continued distribution of the form with quarterly reports to AKF; follow-up letters to 1985 Exhibit Design Form users asking them to critique the form; continued presentation of articles to AAZPA Newsletter; contact of several architectural organizations to inform of the Exhibit Design Form's availability. A budget of \$375 for reprinting of the forms in 1986 was requested and approved.

Awards Committee - a written report was submitted by chairperson Mike Crocker. Mike has expressed his desire to resign as chairperson since he has been promoted at his facility and is no longer in the Professional membership category of AAZK. This was accepted by the Board and Jean Hromadka recommended Rachel Rogers as the new chair for this committee. She has accepted the position. President Conway sees the Awards Committee being revamped and to be made up of all Professional AAZK members (i.e. full-time keepers). This suggestion received Board approval and the Board will work with Rachel on staffing the committee. It was also decided that the Board member with oversight for the Awards Committee should serve as an ex officio member of the committee. Guidelines for nominations have been established and the committee was instructed to set controls on qualifications of recipients. Although no budget was requested, the Board approved \$100 to be used for certificate preparation and framing of awards for 1986. This expense had previously been paid by National.

Diet Notebook - report submitted by Brett Bannor of the South Florida AAZK Chapter. Brett reported that Anita Cramm is the new coordinator of the mammal diet collection center at the Sedgwick County Zoo. Approximately 200 responses have been received thus far and more are anticipated. The committee hopes to have enough material gathered by summer 1986 to publish a first edition. Like the Infant Care Notebook, the Diet Notebook will be in loose-leaf format so that updates and revisions may be added as warranted. A budget of \$50 was requested to cover postage and miscellaneous costs. This was approved. President Conway requested a breakdown of what areas data has been collected in and also for a cost projection on the project's proposed publication. Frank Kohn, who has Board oversight for this project, has been instructed to work with Brett on securing this data and will coordinate with National.

Membership Directory - editor Pat Sammarco submitted a written report and was present at the meeting. She proposed a three-tier pricing structure for the 1986 directory: free to Professional members, \$3 for other membership categories, and \$5 to non-members. This was approved. While National had requested a price-breakdown for the various aspects of the Directory, this appears impossible under the present typesetting arrangements but Pat will attempt to keep track of time logged etc. for such a breakdown. The importance of members filling out completely the Directory Information portion of their renewal cards was stressed. This and keeping National and Pat informed of changes in zoological affiliation will help to make the Directory more up to date and current upon publication. This year, an attempt will be made at a January information cutoff date with publication in early spring. President Conway suggested that members be listed with last name first in the index for ease of reference. Pat will incorporate this change in the upcoming edition. The Membership Directory is funded through the Publications Budget.

AN OVERVIEW OF THE 1985 AAZK Board of Directors Meeting, Continued

ANIMAL KEEPERS' FORUM - Managing Editor Susan D. Chan submitted a written report and was present at the meeting. Susan reported that all is going well with AKF as continued membership support provides more material for publication. Suggestions from the AKF survey taken last year are being implemented as possible and will include in 1986 the following: a revamped B&H section, publication of biographical sketches of board members, restructuring of the Legislative News section to cover more conservation and ecology issues since keeping current on many aspects of pending legislation without an onsite stringer are impossible. Staff changes during 1985 included the replacement of Bernie Feldman as Associate Editor with Ron Ringer of Topeka Zoo. Becky Rogers, also of the Topeka Zoo, will help coordinate conservation/environmental news. Because of some problems during the past year with articles submitted by persons who were not the true authors, an article explaining the strict guidelines for article submission will be published in the January issue of AKF. Two proposals were suggested by National/AKF: (1) that all project heads who anticipate a publication coming from their project/committee submit a proposal to Susan on the anticipated completion date and projected costs and; (2) that profits realized from publications currently in distribution be earmarked to assist in the production costs of future publications. Since some of the costs of other AAZK publications have been coming out of the 50% of membership fees which was originally designated for AKF production, this has put a strain on maintaining the level of the monthly journal. The proposed profit-to-future publications proposal should lessen this problem. These were approved by the Board.

In other related publications matters:

Zoonoses Handbook - this publication is now available from National Headquarters for \$2.00 for Professional members; \$3.50 for other AAZK membership categories and \$5.00 to non-members. An initial printing of 1000 copies was done and reprints will be completed as needed. This publication was funded by a grant from the Research Grants Committee and put together by Bruce Clark under the auspices of the Keeper Education Committee.

Biological Values for Selected Mammals - the first edition of this publication has sold out. The Second, expanded and revised edition has been received by National and anticipated publication is set for January or February 1986. Details of its availability will be made available through AKF. This project was put together by keepers, volunteers and other staff at the San Francisco Zoo under the direction of Larry Brainard.

Zookeeping As A Career brochures - this four-color brochure continues to be a very popular item and has gone into its fourth printing. These are distributed by National to RCs, Chapters, Career Counselors etc. for use in promoting the profession and AAZK. This publication has probably done more than any single item to get AAZK's name and purposes out to the general public.

RESEARCH/GRANTS COMMITTEE - a written report was submitted by Frank B. Kohn and accepted. Frank was also at the meeting and reported the following: (1) grant given to Kathy Wallace for research on elephant nutrition has been abandoned due to time and resources not being available; (2) a one year extension has been granted to Harmony Frazier-Taylor to complete research findings preparation on orangutan parasites; (3) the Seattle Plant-Animal Interaction project has been completed with results published

AN OVERVIEW OF THE 1985 AAZK BOARD OF DIRECTORS MEETING, Continued

(4) the Committee has taken the Reptile Parasite Atlas project (Susan M. Barnard, Atlanta) as far as the established guidelines will allow. Portions of Susan's research are currently being published in AKF; (5) Biological Values II as per AKF report.

Frank has proposed the redevelopment of the research grant proposal forms to insure that adequate information is obtained by the committee before grants are approved. This was approved by the Board.

Frank also requested that a co-chair be established to handle the work of the committee. Kaci Thompason was proposed and approved for this position.

Frank also proposed offering two \$500 grants per year instead of 4 \$250 grants as has been the practice in past years. He feels having a larger amount available may be advantageous to certain types of proposed research. This was approved by the Board.

Frank remains as the liaison with ZOO BIOLOGY, receiving the journal gratis, reviewing manuscripts and being listed in the masthead. He feels this is an important recognition factor for AAZK.

A budget request of \$1100 to cover grants and postage and miscellaneous expenses was proposed and approved.

KEEPER DATA SURVEY - no report submitted by Mary Slaybaugh, chairperson. Jean Hromadka suggested that this project be put on the back burner until the Board can find someone who will really work on it. The Board voted to inactivate the committee at this time.

AAZK HISTORY - no report submitted by project head Larry Sammarco but he was in attendance at the meeting. Larry expressed his desire to resign from this position and recommended that a new historian be found. Pat Sammarco suggested the San Diego Chapter take this on since AAZK had its origins in San Diego and much of the necessary records and information remain there with the original founders. 1987 will mark the 20th anniversary of the Association and the Board would like to see as complete a history as possible put together by that time. Jean Hromadka will pursue this with the San Diego Chapter. No budget was requested at this time as there is no way at this time to anticipate expenses.

REFERENCE SEARCH - no written report submitted by co-chairs Liz McLaughlin and Jenny Rentfrow. Pat Sammarco, who is Board overseer for this project, reported that Jenny has purchased a printer for generating reference search requests. This project compiles and stores bibliographies of printed material and makes such lists available to the membership. Pat reported that they have lots of information on line and members are encouraged to write to them on their specific needs. A budget request of \$100 to cover the cost of computer paper was approved.

BOOK REVIEWS - a written report was submitted by Diane Forsyth. This project has once more been activated and Diane is contacting publishers to acquire books to review and also individuals are being solicited to review the books. It is hoped that this will once again become a regular feature in AKF. A budget request of \$70 to cover cost of mailing books, postage and miscellaneous expenses was proposed and approved.

NATIONAL CONFERENCES - Steven Wing of the Milwaukee Conference Committee proposed that the bids presented by the Chapters vying to host a national conference should be presented early during the conference schedule to allow members to consider the information presented before voting takes place during the Annual Membership Meeting. Board member Oliver Claffey proposed that the bid presentations should be early in the conference schedule and the vote should be by secret ballot rather than a show of hands as has been done in the past. Alan Sharples of Atlanta proposed that the bids should be conducted through AKF allowing all members, not just those attending a particular conference to vote. The Board voted to approve the proposal that bids be given on the first day of each annual conference and that the vote be taken by secret ballot.

Jean Hromadka presented the Board with a proposed list of guidelines for conference planning committees. She proposed a "Conference Book" be compiled with guidelines/suggestions for future conference committees. It is hoped to have such a book completed within a year. A committee to compile this book was approved and will consist of: Jean Hromadka, Oliver Claffey, Frank Kohn, Debera Stecher and Phil Pennock. A \$50 contingency budget was approved for this project.

Alan Sharples of the Atlanta Zoo AAZK Chapter made a number of comments to the Board on how conferences are selected, the problem of rising costs for conference attendance etc. The Board suggested that the Atlanta Chapter submit a bid to host a national conference with suggested ways to cut cost and still secure the needed facilities for meetings, banquets etc. The possibilities for alternate, less expensive lodging for delegates needs to be explored. Frank Kohn noted that AAZK needs to maintain our professionalism in our conference demeanor and committees need to plan accordingly. President Conway thanked Alan for his input noting that the Board operates for the good of the membership and needs input such as Alan's in making decisions that affect the entire Association.

PROPOSALS - President Conway, noting the ever-increasing amount of business which the Board is required to deal with, proposed that the Board of Directors should meet both Saturday and Sunday prior to the conference to conclude all necessary business. This will hopefully alleviate the need for wrap-up meetings during conference week which keeps Board members from fully participating in conference activities. This was approved and the Board of Directors will be directed to reconvene on the Saturday prior to the 1986 annual conference in Winnipeg (i.e. 27 September 1986).

The Detroit Zoo Chapter of AAZK has proposes the sale of AAZK license plates as a Chapter project. The plates will sell for \$2.00 each. Approved.

The Milwaukee Zoo Chapter of AAZK proposed the sale of AAZK logo coffee mugs as a Chapter project. Approved.

The Board of Director's has requested a budget of \$350 for 1986 to cover costs of administering the business of the Association. Approved.

The President has requested a budget of \$250 to administer the duties of this office for the Association. Approved.

ELECTION OF OFFICERS - Jean Hromadka was elected to succeed President Kevin Conway as President of AAZK effective 1 January 1986. Frank Kohn was elected to serve as Vice President of AAZK effective the same date.

OVERVIEW OF THE 1985 AAZK BOARD OF DIRECTORS MEETING, *Continued*

Retiring Board Members include Kevin Conway and Pat Sammarco. New members taking up Board positions effective 1 January 1986 are: Kerry Hoffman, Arizona-Sonora Desert Museum and Susan M. Barnard, Atlanta Zoo. Board members Frank B. Kohn, Jean Hromadka and Oliver Claffey will continue service on the Board of Directors until the 1987 election. Retiring Board members and former Board members Mike Carpenter and Verona Barr (who resigned prior to completing their terms of office) were presented with pewter AAZK logo paperweight inscribed with their terms of office in appreciation for their dedication and hard work on behalf of the Association.

Minutes of the 1985 AAZK General Membership Meeting

This meeting was held on 24 October 1985 and was called to order by President Kevin Conway at 2:30 p.m. President Conway gave an overview of the Association's status and committee/project head gave brief reports on their activities and future plans. These reports are covered in more detail in the Overview of the Board of Directors Meeting. Greetings to Miami delegates and a State of the Association from the Australian Society of Zoo Keepers was read by President Conway. The dates for the 1986 AAZK National Conference to be held in Winnipeg, Ontario Canada were announced as 28 Sept. to 2 Oct. The Riverbanks Zoo in Columbus, OH will host an AAZK Regional 4-7 May 1986. New officers for the Association were announced: Jean Hromadka, president and Frank B. Kohn, vice president effective 1 January 1986.

Bids to host the 1987 AAZK National Conference were presented by San Diego and Milwaukee AAZK Chapters. The membership voted to accept Milwaukee's bid to be host in 1987.

The 1985 AAZK Excellence in Zoo Keeping and Meritorious Achievement Awards were presented by newly-elected Awards Committee Chairperson Rachel Rogers. The AKF Excellence in Journalism Awards were presented by Managing Editor Susan D. Chan.

President Conway addressed the issue of professionalism in relation to activities by AAZK members. Several incidents occurred during the past year which do not meet the standards of professionalism espoused by AAZK. Individuals involved in these activities will be contacted by the Board for possible disciplinary action. President Conway stressed the importance of maintaining the high level of professionalism for which AAZK has always stood and how such incidents reflect poorly on the image of AAZK within the zoological community. AAZK has come a long way in nearly 20 years of existence and as projects reach fruition the goals of the Association continue to be reached and expanded. The future of AAZK as a professional association for all those involved in captive exotic animal care is bright and with the membership's support will continue to provide essential services and avenues of communication and professional growth for all zoo keepers.

The meeting was adjourned at 4:30 p.m. to reconvene in Winnipeg in 1986.



Elephantulus rufescens
AT THE NATIONAL ZOOLOGICAL PARK

By

Angela Keppel
Department of Zoological Research
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There are fifteen species (four genera) of elephant shrew, ten of which are long-eared elephant shrews. Elephantulus rufescens belongs to this group. It is native to East Africa, living in dry woodland and grassland areas. Its range is from southeast Sudan and northeastern Somalia to central Tanzania (Koontz and Roeper, 1983). This monogamous elephant shrew is very small and is active during the day. An adult's head and body are approximately 130mm and the tail length is approximately 100mm. They can weigh between 50 and 90 grams, with each animal maintaining about the same weight, with a one to three gram fluctuation, on a weekly basis. The soft fur on their backs is grey-brown and they have a light colored underbelly. Their most distinguishing feature is their long, narrow, flexible snout with nostrils at the tip. They produce two audible sounds: foot-drumming, which is made by stamping their feet rapidly when they are disturbed; and a scream which they make when roughly handled.

HISTORY

It has been very difficult to breed elephant shrews in captivity in the past, although several extensive attempts were made. In 1948, the U.S. Navy caught 104 E. rufescens in the Sudan to use as laboratory animals to study malaria and found it was impossible to get them to breed (Hoogstraal 1950). H.R.H. Tripp captured four species of elephant shrew, but was also unable to establish a colony (Tripp, 1972).

In the 1970s, Galen Rathbun did a field study on elephant shrews in East Africa and felt justified in attempting to establish a captive breeding colony at NZP since he knew how they lived in the wild. In 1976, he captured 29 E. rufescens in Kenya and shipped 24 of them in cloth bags tied to the sides of woven baskets to NZP. Five animals died during the adjustment period in Kenya and two died on the trans-Atlantic flight (Rathbun et al., 1981). The remaining 22 settled down and bred well in captivity. We have now had over 358 births and seven generations of elephant shrews from the original stock.

HUSBANDRY AND MANAGEMENT

In Kenya, elephant shrews establish territories and construct a complex system of trails through the underbrush. They use specific spots in their territory for sandbathing and scent-marking (Rathbun et al., 1981). At DZR, a single animal lives in a wooden cage with a screen lid that is 91cm long, 61cm wide, and 46cm high. Pairs occupy double that amount of floor-space. We provide singletons and pairs with a nestbox, tunnel, and sand pan apiece. We use wood chips and hay for ground substrate which the elephant shrews rearrange to make pathways. The sand pans are used for defecation and urination. The nestboxes and tunnels become hiding places during the day, although in Kenya wild elephant shrews do not build any form of shelter or burrow.

A wild elephant shrew's diet consists mostly of insects. At DZR we feed them a varied diet. In the morning, each animal gets ten mealworms and a

fresh bowl of spring water. In the afternoon, each animal gets a mixture of finely chopped kale, carrot, and sweet potato; a little bit of apple; some crumbled Marmoset diet; a teaspoon of meat mix which consists of $\frac{1}{2}$ cooked horsemeat and $\frac{1}{2}$ Feline diet; and two crickets in a petri dish. A teaspoon of $\frac{1}{2}$ condensed milk and $\frac{1}{2}$ spring water is provided in a separate dish.

Some of our elephant shrew pairs have been housed in stainless steel cages with wire mesh fronts and tops which measure 114cm wide, 122cm long, and 122cm high. These were located in a room with large windows to let in fresh breezes and natural lighting. Some of our elephant shrews have lived in wooden cages in a climate control room. Right now our collection of 18 elephant shrews live in our main holding room in the basement of the hospital. Our light system is set up to give the animals 12 hours of day and 12 hours of night. From 3:00 a.m. to 3:00 p.m. it is daytime with fluorescent lights on. From 3:00 p.m. to 3:00 a.m. it is nighttime with blue lights on simulating moonlight.

We weigh the elephant shrews once a week, putting them in a cloth bag during the procedure to keep them calm. The bag enables us to hold an animal securely while examining different parts of its body. We also use cloth bags for shipping, putting crickets and mealworms in the bag with the elephant shrew and attaching it to the side of a wooden crate.

REPRODUCTION

An introduction between a male and a female elephant shrew is a gradual process at first. Since they are monogamous, it is important to find a pair that is compatible. Sometimes a pair will be getting along well together, but the female does not get pregnant. By exchanging the male for a different one, breeding success usually ensues. We first set the elephant shrews up in adjoining cages and let them get used to their new enclosures for a week or so. Then we remove the barrier between the cages and let them explore each other's territories and meet each other. This takes place during the day so we can keep an eye on them. We separate them for the night when they are fed, around 2:30 p.m. After a week to ten days of this, if there are no signs of aggression and there is no significant weight loss (more than a couple of grams), they are allowed together overnight. They are still checked visually daily, but now there's the possibility of a pregnancy. If there is a significant weight loss after the first week they are together, we separate the elephant shrews and leave them apart until they return to their normal weight and then try the introduction again.

The gestation period for *E. rufescens* is from 57 to 60 days. We usually notice a significant weight gain (five grams or more) twenty days before birth. As the female's appetite increases we give her additional meat mix with her afternoon feed. At this stage we also increase the number of nestboxes in the enclosure, giving the female time to get used to them and several places for her young to hide. The female does not build a nest for her young. We use three different nestboxes: a closed tunnel where the animal can see out and be seen; an L-shaped nestbox where the animal can see out but cannot be seen; and a rectangular nestbox with an opening on the long side which enables the animal to hide and not see out or be seen.

The female gives birth to one or two precocial young which they hide. Newborns weigh around ten grams. Parents do not stay with their young, and nursing is limited to short periods, with minimal contact between mother

and offspring (Rathbun and Redford, 1981). Parental aggression toward their young can be very serious. Each newborn is inspected closely by the keeper to make sure its tail and/or legs are not being chewed on. Topozone, a topical antibacterial spray, applied on a chewed tail tastes bad and may be a deterrent to further abuse. Increasing the cage space and the number of nextboxes helps to eliminate this aggression by keeping the young out of sight. If a female has harmed previous offspring we take extra precautions, removing the male before the birth so she will have fewer distractions.

Hand-rearing a baby elephant shrew is a delicate, time-consuming job, but it has been done successfully (E. Maliniak, per. comm.). Juvenile elephant shrews are weaned around the 25th day, and we move them to a cage of their own at 30 days. This is the time when they would be chased out of their parents' territory in the wild (Rathbun and Redford, 1981).

We have had wild-caught as well as captive-born elephant shrews that have given birth to over 24 offspring in a period of five or six years (Fig. 1). They started producing young when they were six months old and kept producing until they died.

HEALTH PROBLEMS

We have had problems with ears and tails over the years. In some elephant shrews their ears and/or tails become inflamed and necrosis occurs (Hoopes and Montali, 1980). In an effort to control the condition our veterinarians trim the crusty, hard ear tips and amputate the dead tail tip. We found that improving the air circulation in the cages helped reduce these problems, so we modified the cages, replacing the plexiglass with screen to allow better air flow. We also found that increased humidity and temperature helped to alleviate the problem so we moved the elephant shrews to the end of our large main holding room closer to the warm air vent. We had a humidifier installed in the center of the toom to raise the humidity to an acceptable level. Our humidity now stays around 60% and the temperature is between 75° and 85°F.

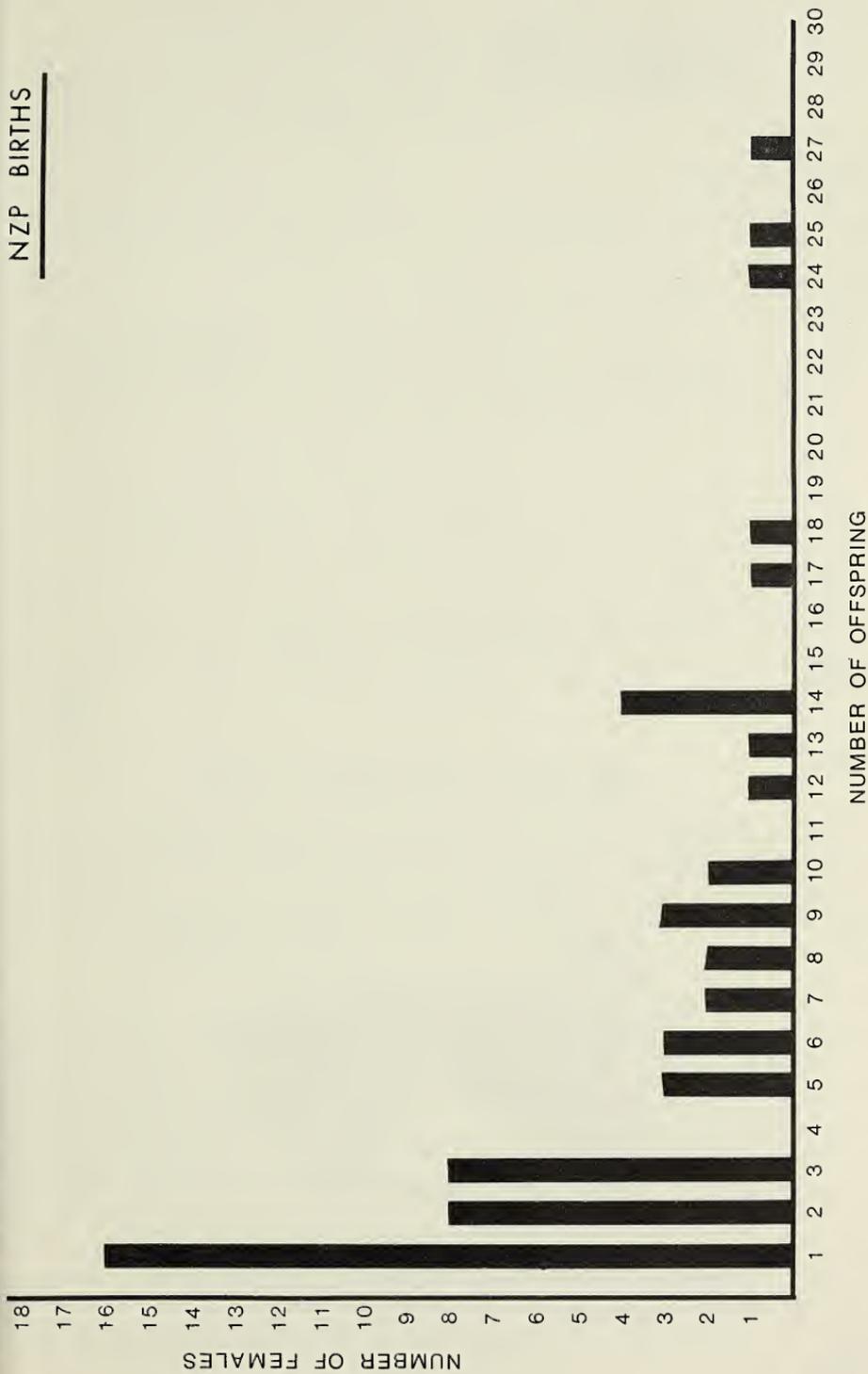
We have also had a number of elephant shrews developing cataracts in one or both eyes. This does not seem to greatly affect their lives. Even when they have cataracts in both eyes they move around their enclosures confidently once they get used to the change in their sight, although they are almost blind.

RESEARCH

Much research has been done with E. rufescens at DZR. Galen Rathbun studied elephant shrews in the wild and in captivity and got his Ph.D. Fred Koontz did his Ph.D. dissertation on elephant shrew biology. Nancy Roeper got her Masters degree studying elephant shrews. Drs. Hoopes and Montali studied the ear and tail problem and published their findings. Rathbun and Redford found that young elephant shrews, from 12 hours to 30 days old climbed on their parents' backs and proceeded to rub their feet vigorously in the fur. Their study led them to believe that this initial scent exchange may function in "olfactory imprinting". There have been other papers and studies done on elephant shrews at DZR.

I certainly enjoy working with elephant shrews and find them fascinating. They seem rather nervous, the way they scurry around their enclosures, but they are very curious just like most other animals, wiggling their noses to take in all the variety of odors wafting through the air.

NZP BIRTHS



Products mentioned in the text:

Zu/Preem Feline Diet and Zu/Preem Marmoset Diet: manufactured by Hill's Pet Products, Inc., PO Box 148, Topeka, KS 66601, USA.

Topozone (Topical Antibacterial): manufactured by Norwich-Eaton Pharmaceuticals, Division of Morton-Norwich Products, Inc., Norwich, NY 13815, USA.

Acknowledgements:

I am thankful for the assistance of E. Maliniak and M. Roberts in preparing this paper.

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Chapter

News

RIVERBANKS ZOO AAZK

The Riverbanks Zoo AAZK Chapter is pleased to offer their Polar Bear Safety Poster for sale. Measuring 10" by 15", it is a good size for your bulletin board at work. The price per poster is \$2.00 plus 50¢ postage. Send your orders to:

Pat Hook
Riverbanks Zoo AAZK
500 Wildlife Parkway
Columbia, SC 29210



PUGET SOUND CHAPTER (Seattle, WA)

Officers for the coming year were announced at our September meeting. They are:

President.....Phil Pennock
Vice Pres.....Harmong Taylor-Frazier
Sec/Treas.....Nanette Taniguchi

We are also in the process of doing a survey to find out how people feel about our chapter, and what they would like to see the chapter do in the future. We are looking forward to seeing the results of the survey and taking steps to make our chapter even more effective by implementing the best of the suggestions.



Information Please

The Reid Park Zoo is looking for information regarding thyroid normals (specifically T3 and T4 results) in Malayan Sunbears. Thyroid normals in any Ursidae species would also be of help. Please send any information to: Ed Hansen, Reid Park Zoo, 900 S. Randolph Way, Tucson, AZ 85705.

The Columbus Zoo will be doing some landscape renovations on its hoofstock yards within the next year. We would like information on any type of vegetation (grass, trees, shrubs, flowers, weeds, etc.) that have been successfully maintained in any type of hoofstock exhibit. We are particularly interested in mixed-species exhibits, but we would also welcome information on single species displays. Please send to: Carl Gyarmaty, c/o Columbus Zoo, 9990 Riverside Dr., P.O. Box 400, Powell, OH 43065.

Anyone with experience in the treatment of heartworm disease in big cats is asked to contact Lynn Moredock, Director of Animal Collections at the N.C. Museum of Life and Science, 433 W. Murray Ave., Durham, NC.



EDUCATING THE PUBLIC WITH SMALL MAMMALS

By
Melba M. Shields
Small Mammal Keeper
National Zoological Park, Washington D.C.

In my presentation today I would like to share with you an ongoing attempt by the staff of the Small Mammal House at NZP to enlighten the public on the valuable contribution of small mammals. Through informal classes held at the SMH we demonstrate with live animals, pictures and animal artifacts the conservation and preservation of small mammals.

We call our demonstration "Meet A Mammal". It is an outgrowth of the District of Columbia school program put on by the education department at NZP. "Meet A Mammal" is organized and orchestrated by keepers. We feel that it is a good educational tool because it enables the general public to have close contact with an animal keeper. Animal keepers are often the first impression of zoos. "Meet A Mammal" gives the public the opportunity of interactive education as opposed to undirective education such as signs and non-animal persons who may give out misinformation.

The "Meet A Mammal" demonstration is relatively simple. The equipment consists of a large cabinet with several drawers for holding artifacts. On top of the cabinet is a large, 3-foot by 2-foot acrylic holding area for the larger, more active animals. For the less active, smaller mammals we use small plastic carrying cases in which the animal may be viewed at close range. We have an attached microphone so that our hands are free and we can be heard over large crowds. During the summer months "Meet A Mammal" is moved outside under a tent. At this time of year there are also Bird and Reptile demonstrations held at this central location.

Of those animals that are considered for the program, some have been hand-reared, some have not. For those that have been hand-reared it is usually unintentional due to being abandoned or for reasons of health. The non hand-raised animals are handled so little that there is little reason to acclimate them. The same animals are generally used, but only one or two times a week. These animals are used to crowds and noise. We try to make it less stressful for the animals and never do we allow the public to touch the animal. Normally three animals are used per demo. The animals we have to use in the demo are: A Fennec Fox (*Fenecus zerda*), House shrew (*Suncus murinus*), Spiny mouse (*Acomys dimidiatus*), Tenrec (*Echinops telfairi*), Chinchilla (*Chinchilla laniger*), Hairy-footed hamster (*Phodopus*) and Three-banded armadillo (*Tolypeutes tricinctus*). During the demonstration we talk about what makes a mammal a mammal, social structure, habitat and what it may eat - basically its role in the ecosystem.

Why do it? For one, it allows the public, especially children, to learn first hand about a very interesting and diverse group of animals. It allows the keeper to interact with the public and also allows the public to ask questions about not only small mammals but other aspects of the zoo.

While "Meet A Mammal" has been in operation only one year we have seen it become more sophisticated. Keepers are able to present themselves in a professional manner and we feel the public comes away with a better understanding of the role of the small mammal.



By
Susan M. Barnard, Senior Keeper
Dept. of Herpetology
Zoo Atlanta, Atlanta, GA

COMMONLY ENCOUNTERED INTESTINAL PARASITES
(Metazoans)
(accepted for publication, August 1985)

In review of last month's discussion on protozoans, it must be emphasized that keepers should always urge inquirers to have a veterinarian perform a physical check-up on newly acquired reptiles, including a fecal examination. Remember, some parasites cause disease when the host animal is removed from its natural environment and placed in captivity. Good hygiene practices, reduced stress, proper nutrition, environment and housing can offer wildlife a chance for a relatively long, healthy life in captivity. As zoo keepers, it is our professional duty to promote this concept to the public, as well as practicing it ourselves.

Two types of trematodes affect reptiles, those requiring only a single host (the monogenic flukes), and the more numerous digenic flukes. Digenic trematodes must parasitize two or more hosts before completing their life cycle. The monogenic flukes primarily inhabit the host animal's urinary bladder, but may also be found in the oral cavity, pharynx, nasal passages, lungs, esophagus, stomach, and intestine. Digenic flukes may inhabit the host's lungs, liver and gall bladder, circulatory system, genital tract, or may be found free within the coelomic cavity; however, they are primarily found within the intestines. Larval forms locate in the host animal's muscle, bile duct, skin and various other tissues. Transmission of flukes with indirect life cycles occurs when the reptile ingests intermediate hosts such as amphibians and crayfish. Digenic fluke eggs are gold to dark brown in color, and Kiel (1975) reported that they measure 20u to 40u long. To avoid transmission of digenic flukes, intermediate hosts should be frozen prior to feeding to reptiles. When adult flukes are observed in the host's mouth, they should be mechanically removed. Jacobson (personal communication) suggested the use of praziquantel in the treatment of some fluke infections (spirorchids and the renifers).

Marcus (1981) reported that cestodes (tapeworms) affecting reptiles are hermaphroditic. Frye (1981) reported these parasites to be non-host specific and stated that some species can infect humans when contaminated material from their hands are rubbed into their eyes. Transmission to the reptile is by ingestion of such intermediate hosts as ticks, copepods, fish, frogs, tadpoles, and other reptiles. Also, cockroaches have the potential to be intermediate hosts as well as mechanically transferring cestode infections. Larval cestodes can cause subcutaneous and intramuscular lumps (sparganosis), and the only means of treatment is surgical removal of the larvae by a veterinarian. The eggs vary greatly in form and size. Common treatments have included bunamidine, and niclosamide.

Trematodes vary in pathogenicity from virtual harmlessness to severe illness and death. Many compete for the host's nutrients, can produce necrosis in the brain, lung, intestine, and skin, and can cause secondary bacterial

infections as they migrate through the host's body.

Based only on egg size and description, the nematodes in the genera Rhabdia (lungworms) and Strongyloides (threadworms) are impossible to tell apart solely on microscopic examination of the feces. Positive identification for Rhabdias may be made by observing the eggs microscopically in wet mounts from bronchial washings. Both genera have direct life cycles (require only a single host), and transmission is by the host ingesting the eggs, infective third stage larvae, or possibly by penetration of the infective larvae through the host's skin. Both genera can survive for several generations outside of the host animal. Therefore, it is important that cages be thoroughly disinfected during and after treatment. Rhabdias infection causes respiratory distress; Strongyloides infection primarily causes diarrhea; however, larval forms can also cause respiratory disease as they migrate through the host's lungs. Both can reduce the host's appetite, and may cause death. The eggs are thin-walled, larvated, and vary in size. No treatment to date for Rhabdias has been positively successful. However, Strongyloides has been successfully treated with thiabendazole.

Hookworms affect reptiles worldwide, and their appearance is similar to those affecting other animals. Most, if not all, may have a direct life cycle, but life cycles are unknown for most of these parasites. Kalicephalus is a very common hookworm affecting reptiles, and it is transmitted through ingestion of the eggs, infective third stage larvae, or possibly by penetration through the host animal's skin. Symptoms of hookworm infections may vary, but anemia and intestinal obstruction is always a threat. Hookworm eggs are thin-walled, but generally larger than the previously discussed nematode eggs. Ortlepp (1923) reported that Kalicephalus eggs measure from about 55-100u in length by about 42-50u wide. Treatment for hookworms includes dichlorvos, fenbendazole, mebendazole, pyrantal pamoate, or thiabendazole. Thiabendazole is the treatment of choice for reptiles at the Atlanta Zoo.

Generally, oxyurids are non-pathogenic. However, heavy pinworm infections may cause intestinal impaction and death. Some herpetologists have questioned the possibility that pinworms may cause intestinal irritation. Oxyurids have a direct life cycle and inhabit the host's colon. Adults may be observed in the stool, but more frequently diagnosis is based on microscopic demonstration of eggs. Usually, no treatment is indicated; although, thiabendazole has been the treatment of choice at the Atlanta Zoo.

Discussions on nematode parasites will be continued in Part 19.

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REFLECTIONS ON CENTRAL AFRICA

Part 3

*Robert Berghaier, Senior Keeper
Philadelphia Zoological Garden
Philadelphia, PA*

AKAGERA NATIONAL PARK

Akagera park is located in Eastern Rwanda along the Tanzanian border. It is predominately a savanna park. However, it also contains a gallery forest,apyrus swamps and several large lakes. The park is 970 square miles in size and, unlike other African parks, encompasses a complete ecological unit.

Located next to the northwest sector of the park is the Mutura hunting area. In this zone of 115 square miles, sports hunting is allowed. Only eighty hunters are licensed a year. They are held to a bag of one each of male buffalo, impala, waterbuck, topi, and zebra. The hunters are allowed to keep their trophy head, plus the animals' hide. The Rwandian safari corporation keeps the meat which is sold locally. The hunters are charged a \$200 license fee for the privilege of using Mutura. The concept of having a hunting area next to a national park is a sound one. The habitat of Mutura instead of being turned into farmland, is preserved. The licensing fee provides the economic justification for this. The sacrifice of the targeted surplus males is a small price to pay.

The wildlife of Akagera is as varied as its habitats. There are some notable gaps compared with other East African parks. Giraffes are not found here. Rhinos and elephants are being reintroduced and their numbers are slowly building up. Vast herds of other ungulates abound. Large herds of buffalo of over a hundred head are common. Topi and zebra were often in sight. The buffalo and zebra found in Akagera are some of the largest recorded in Africa. Impala number in the thousands. Reedbuck, waterbuck, kudu and bushbuck are sure to be seen in a visit of one or two days. Other antelope found here include roan, oribi and sitatunga and these are not often seen in other East African parks. Hippos are common in the lakes of the park. I saw all of the above-mentioned antelope and the hippos in a five-day visit. All the major African carnivores are present but I only saw a lion. I did, however, hear hyena every night, plus leopard on one occasion. Smaller mammals that I saw were: African civet, side-striped mongoose, cape hare, banded and dwarfed mongoose, vervet monkey and baboon.

Because Akagera is so varied, birdlife is prolific. The larger birds I noticed were darter, longtailed cormorant, hammerkop, heron; purple, grey, blackheaded and night, cattle and snowy egrets, bittern, glossy ibis, open-billed stork, spurwing and egyptian geese, hooded vulture, eagles; fish, longcrested and martial, helmeted guineafowl, crowned crane, hoopoe, silver puraco, lilac-breasted roller, grey hornbill, kingfishers; pied, grey-headed and blue-breasted. I also saw crocodile and Nile monitor.

Located in Akagera is Lake Ihema. You can take boat rides on this large lake on a vessel that looks rather like the "African Queen". Along the lake shore I saw during my trip not only aquatic bird life, but also impala, bushbuck, zebra and baboon. It was a novel method of viewing mammals.

There are two types of accommodations in Akagera for visitors. Two excellent hotels are there - The Gabiro Lodge in the north and the Akagera Hotel in the south of the park. The Akagera Hotel is situated on a hill-

REFLECTIONS ON CENTRAL AFRICA, Continued

top which overlooks one of the most beautiful vistas in all of Africa. On one side is Lake Ihema and views the hills on the Tanzanian border. On the other side is the game-filled Nyamwashama Valley. With a good pair of binoculars you can watch game by the hundreds move across its expanses. One the hotel's grounds is a saltlick that nightly attracts impala, zebra and waterbuck. A baboon troop roams about during the day along with the occasional crowned crane and fish eagle. Since the hotel sits up so high, raptors riding the thermals at your eye level are a common sight. Packaged tours to the lodge or car rentals are easy to arrange in Kigali, the capital. It is possible to camp in the park. One must be self-sufficient in food, plus have a rented vehicle for this. To drive in Rwanda a knowledge of French is essential.

Except for some recent rhino poaching, Akagera National Park is doing well. Its chief conservator, a Belgium national, is performing a fine job. Game numbers are good and the animals are easily approached by vehicle. The elephant reintroduction project has recently produced its first baby elephant. A potential future problem may result from Ugandan refugee camps encroaching on the northern borders of the park.

An address for further information is:

Office Rwandais Tourisme et des Parcs Nationaux
P.O. Box 905
Kigali, Rwanda



EVALUATING ANIMAL EXHIBITS AND HUSBANDRY
WITH DAY-LONG OBSERVATIONS

By
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zoos are continually striving to improve the quality of captive care, and zoo research is an invaluable tool for evaluating the adequacy of husbandry techniques. However, large-scale, detailed investigations involving a great deal of manpower and specialized equipment are unfeasible for many zoos. Still, zoos with limited resources have a need to assess their animal management and exhibit design. Utilizing volunteers to conduct continuous, day-long observations of animal exhibits is a simple, inexpensive method of gathering preliminary information on animal husbandry.

Initially, day-long, ad-lib observations were begun at Mill Mountain Zoological Park in Roanoke, VA as a way of gaining familiarity with the daily activities of various animals. Volunteers were recruited to keep constant watch over a group of animals and to record their observations in an informal, unsystematic manner. Observations were typically conducted between 8 a.m. and 5 p.m. At 5-minute intervals, the observers were instructed to record the behaviors of the animals and their positions in the exhibit. The observers were asked to make their notes as specific and descriptive as possible. An excerpt from an observation sheet detailing white-nosed coati (Nasau narica) behavior follows:

8:30 a.m. - Iggy bit Maggie's back legs and sniffed her. Iggy and Hershey swatted each other for a few seconds, then Hershey sat down and Iggy climbed the tree. All engaged in snapping, chasing and barking. Then Iggy and Maggie were swatting, barking and twittering. Iggy climbed the tree and rubbed his belly.

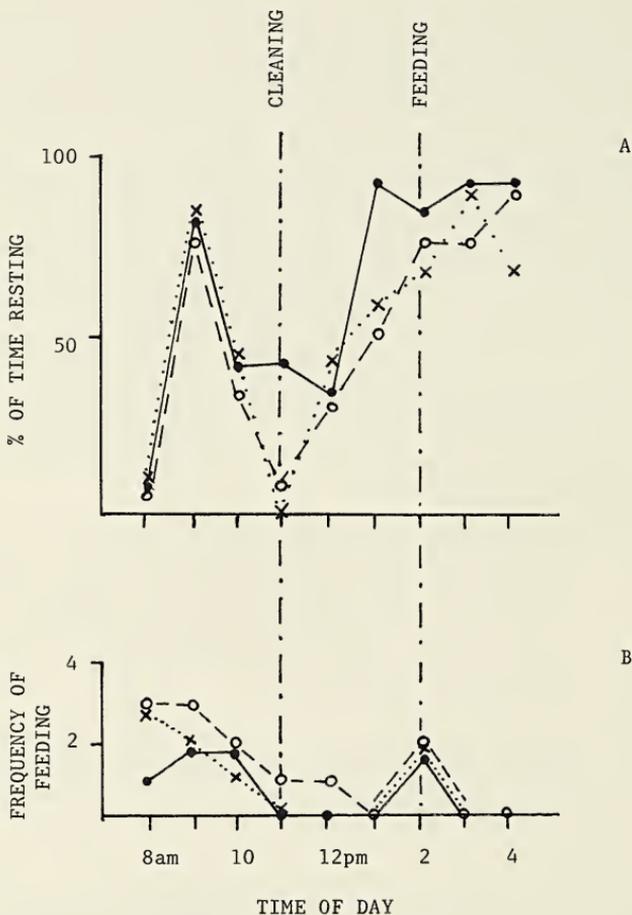
Analyzed, the observations provide very general information which is of limited usefulness. However, simple analytical techniques can be applied to extract more detailed information concerning animal activity, spatial preferences and behavioral problems.

ACTIVITY

Activity was analyzed by grouping behaviors into various functional categories. For example, observations on rainbow lorikeets (Trichoglossus aematodus) were categorized into vocalizing, preening, feeding, courtship and aggression. In addition, an "other" category was created for behaviors which could not easily be assigned to a functional category. Behaviors which could be considered single events, such as aggression, were analyzed by counting the number of occurrences per hour for each animal. The duration of behavioral states, such as resting, was estimated by determining the number of 5-minute intervals in which the behavior occurred.

Activity cycles for behavioral events were constructed by graphing the frequency (number of occurrences per hour) by the time of day (Figure 1B). Similarly, behavioral states were plotted as the percent of time spent engaged in that activity by the time of day (Figure 1A).

Figure 1. The percentage of time spent resting (A) and the frequency of feeding (B) by time of day in coatis.



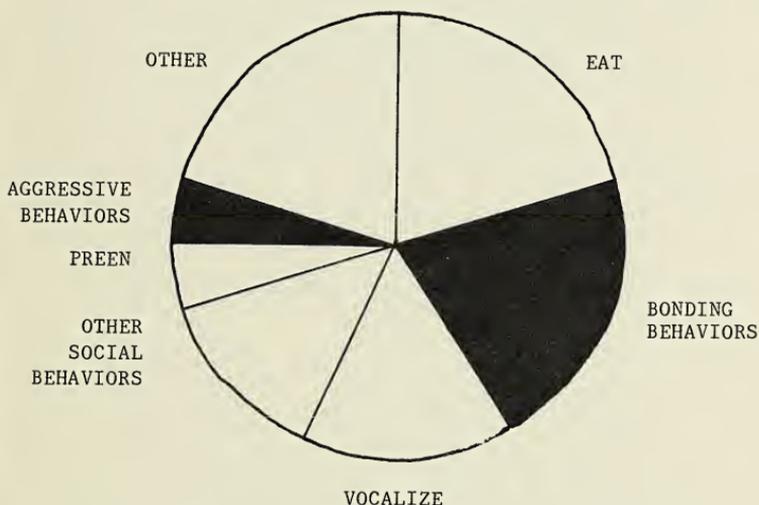
The timing of husbandry routines was then evaluated by comparing the time at which certain behaviors were most likely to occur to the times at which daily keeper routines were carried out. The frequency of eating among coatis at Mill Mountain Zoo tended to decrease throughout the morning, with a sudden sharp peak at 2 p.m. when the animals were fed their daily ration (Figure 1B). However, during these afternoon hours, the coatis were otherwise spending virtually 100% of their time resting (Figure 1A). This indicates that the feeding peak at 2 p.m. did not reflect a true increase in interest in feeding but rather was an artifact of introducing food at this time. The coati feeding time was subsequently adjusted to more closely coincide with their activity rhythms.

This approach can be extended to constructing time budgets for individuals or groups of animals. In this case, the number of 5-minute intervals in which categories of behavior occurred throughout the day was divided by the total number of 5-minute intervals in the observation day to get percentage of time spent engaged in each activity:

$$\begin{array}{l} \text{\% of time engaged} \\ \text{in behavior A} \end{array} = \frac{\begin{array}{l} \text{\# of 5-minute intervals where behavior A} \\ \text{is exhibited} \end{array}}{\begin{array}{l} \text{(total \# of hours observed) (12)} \end{array}} \times 100\%$$

The result can then be visually expressed as a pie diagram where the percentage of time engaged in each behavior is indicated by the width of each wedge (Figure 2).

Figure 2. Rainbow lorikeet time budget.



SPACIAL PREFERENCES

Spacial preferences were evaluated by recording the amount of time spent in each area of the exhibit. Again, time was estimated by determining the number of 5-minute intervals spent in each location by each animal. For example, within the coati exhibit (Figure 3), the observer recorded when each animal was on the platform, in the nestbox or climbing on the branches. The amount of time on the floor was then obtained by subtraction. As for activity, spacial preferences are easily expressed as pie diagrams (Figure 4) or graphs (Figure 5).

Spacial preferences for each animal were used to determine whether exhibit furniture was being utilized and whether areas of the exhibit were being monopolized by particular animals. In the coati study, all three animals were utilizing exhibit furniture, however there were clear individual differences in spacial preferences (Figure 4). This indicated that some exhibit features, particularly the platform and nestbox, were perhaps being monopolized. Graphs of animal locations over the course of a day

showed no monopolization of the platform (Figure 5A). When platform utilization was high, all three animals were sharing the platform. However, one animal apparently was being excluded from the nestbox, showing consistently low levels of nestbox usage (Figure 5B). This problem was remedied by adding a second nestbox to the exhibit.

Figure 3. Diagram of coati exhibit at Mill Mountain Zoo.

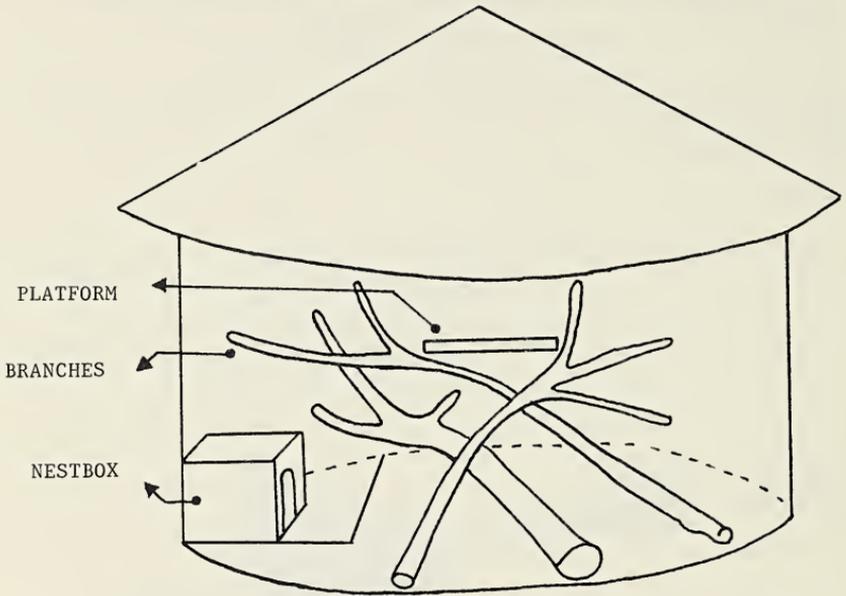


Figure 4. Coati spatial preferences.

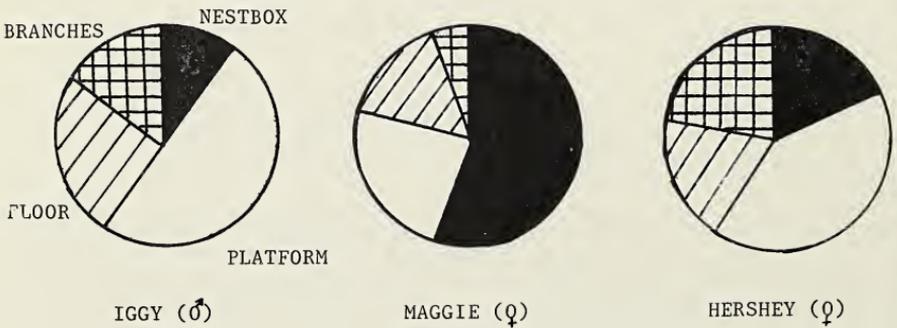
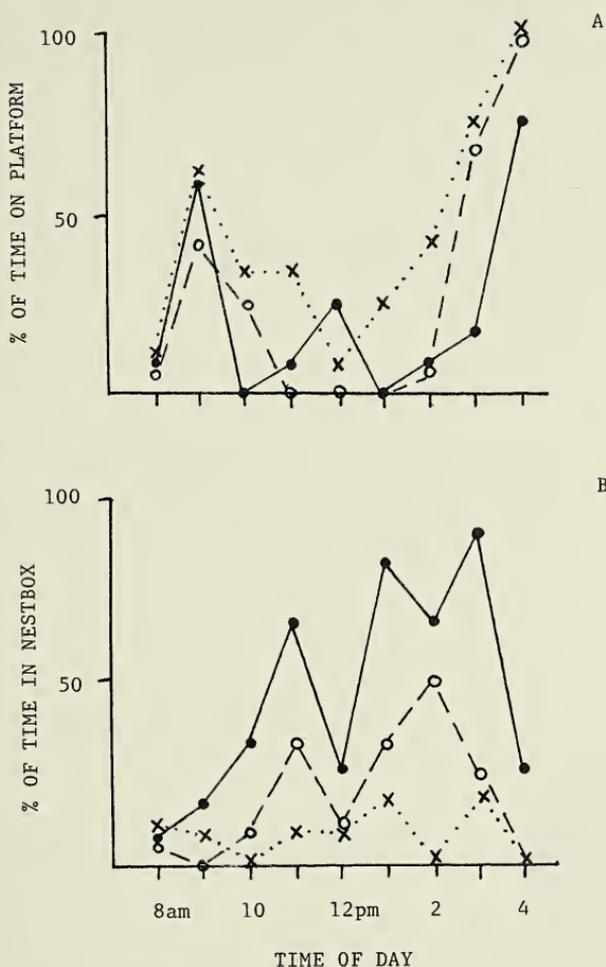


Figure 5. The percentage of time spent on the platform (A) and in the nestbox (B) by time of day in coatis.

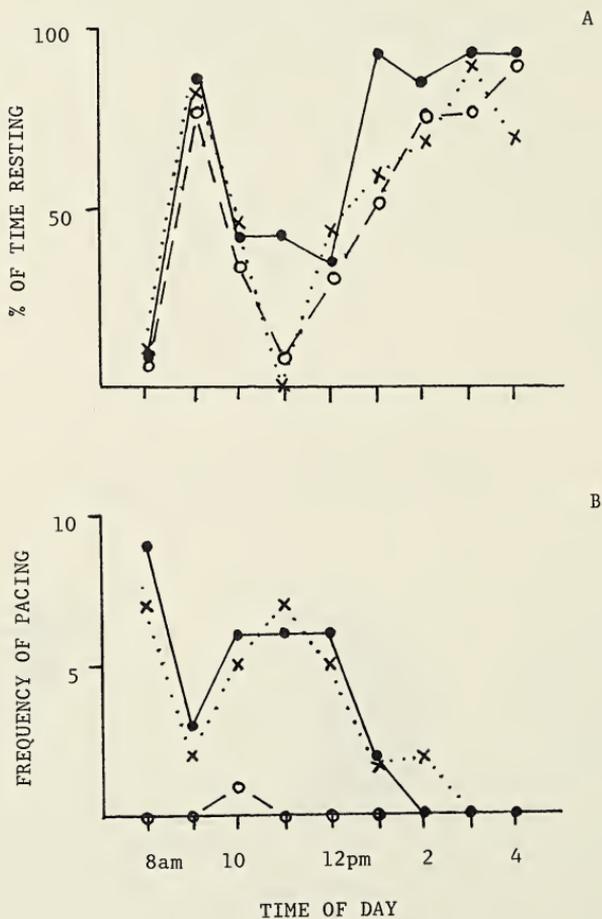


BEHAVIORAL PROBLEMS

Another potential use of this technique is the identification of behavioral problems. Time budgets and spacial preferences can be evaluated to determine whether the animals are exhibiting behaviors appropriate for their species, age and reproductive condition. In addition, the extent of stereotypic behavior patterns can be determined. For example, coati spacial preference diagrams (Figure 4) indicated that two of three coatis were spending far too little time climbing on branches than would be expected for a species with arboreal tendencies.

The problem of stereotypic behaviors is further indicated by a comparison of the amount of time spent resting with the frequency of pacing (Figure 6A,B). During the times of day when the coatis were active, two of three coatis spent a great deal of time pacing. This suggests that further exhibit modifications might be necessary to alleviate boredom. In this case, a "sandbox" filled with loose dirt was added to the enclosure. Crickets were periodically scattered on the dirt to encourage exploratory behavior.

Figure 6. The percentage of time spent resting (A) and the frequency of pacing (B) by time of day in coatis.



DISCUSSION

Analysis of informal observations is a simple, inexpensive technique for obtaining information useful in making husbandry improvements, but it is not without its limitations. First, it must be assumed that the observation day was a "typical" day for the animals. Therefore, when scheduling observation sessions, care should be taken that the day selected is representative of what the animals normally experience. No departures from the typical daily routine should occur on this day. Second, an assumption must be made that the presence of an observer has no effect on the behavior of the animals. In a zoo setting, where animals are constantly being viewed by the visiting public, this is generally not a problem. Species particularly sensitive to the presence of observers, such as primates, often begin to ignore the observer after a brief acclimation period. Finally, the technique lacks the precision of rigorous scientific investigations.

These limitations considered, this type of informal observation analysis has broad applicability. It is adaptable to a wide variety of species and exhibits, and can be used to answer many different types of questions. It is inexpensive, requiring only a minimum of personnel, time and equipment. It does not require specially trained observers or complicated analytical techniques. In addition, it can be used as a starting point for further in-depth investigation. The analysis of ad-lib, day-long observation is a very useful method of investigating basic questions about the adequacy of animal exhibits and husbandry.



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ASIAN SMALL-CLAWED OTTERS

By
Susie Watts, Animal Keeper
Santa Barbara Zoo, Santa Barbara, CA

The Asian small-clawed otter (*Aonyx cinerea*) is the focus of current research at the Santa Barbara Zoo.

We know very little about the Asian small-clawed otter. Yet this otter species will play a vital role in the understanding and preservation of endangered otter species as well as in the improved husbandry and management of otters in general.

The smallest of the world's otters, the Asian small-clawed otter rarely reaches a weight of ten pounds. These otters have hand-like paws with reduced nails and are remarkable for their manual dexterity. It appears that very strong pair-bond relationships are formed. Gestation is approximately 60 days with litters containing one to six young.

This otter does not seem to be very well represented in either the wild or captivity. The wild status is virtually unknown and captive animals in the United States are represented by only 58 specimens (25.26.7) in 14 facilities.

In 1982 the status of the Asian small-clawed otter in captivity was changed by its adoption to the Species Survival Plan SSP of the American Association of Zoological Parks and Aquariums (AAZPA). This otter was adopted as a model species because of its similarity to endangered or threatened otter species such as the Giant Brazilian otter (*Pleconura brasiliensis*) and the African smooth otter (*Aonyx capensis congica*) in reproductive physiology and social structure.

The importance of keeping, maintaining and reproducing these animals have prompted the Santa Barbara Zoo to take a great interest in them from different aspects such as, exhibit design, behavioral and medical research and husbandry.

The Santa Barbara Zoo Asian small-clawed otter exhibit had been built in 1973 with a total donation of \$500.00 which was spent on materials. The actual construction was done by staff and volunteers. This original exhibit was inhabited by one pair of Asian small-clawed otters. Behaviorally, the otters had some bad habits there. They seemed to spend a great deal of time in an upright stance which was interpreted as a begging behavior (from their exhibit they can see the kitchen where the keeper picks up the diets). On hot days they would occasionally swim but also spent a lot of time either in the moat or in the next boxes, off-exhibit.

The original exhibit was a simple, circular structure measuring approximately 40' in diameter. It was surrounded by a 6' block wall with a 3' deep planter on the front half of the circle. Attached to the rear by short tunnels were two 3' x 3' block den boxes with plywood tops. The otters used one to sleep in and one to defecate in.

In the center of the exhibit was an irregular shallow pool. The pool was attached to an inactive sand filter. Flagstone sections paved the exhibit broken up only by a few large sandstone boulders.

ASIAN SMALL-CLAWED OTTERS, *Continued*

Despite the shortcomings of the old exhibit and because the otters are naturally curious and active when visible, it was a favorite among zoo visitors. When drawings of our "dream" renovation were made public, late in 1983, the otters' foster feeder became interested and pledged \$10,000 for the renovation.

We did not have alternative housing for the otters during construction, nor did we want to take these popular animals off exhibit for any longer than necessary. Temporary den boxes were placed inside the exhibit and construction began in the back area by taking out the original boxes and building a series of four new block den boxes measuring 4' x 4' x 4'. They are set 4' below the grade of the exhibit and are connected upward to the display by two 4" PVC pipes. All four dens have connecting guillotine doors. Each has a sliding roof section allowing access to any box and two have plexiglass skylights.

An additional block wall was built around the rear of the exhibit creating a 12' wide service area where the den boxes are. A 10' x 10' structure was built on the west side of the exhibit to hold a deep pool.

When everything that could be done with the otters on display was finished, they were moved into the den box system to await the completion of their new habitat. They spent a total of about 4½ months in the back area.

The new deep pool was connected to the original pool by a shallow stream. A waterfall feeds the deep pool which in turn overflows the shallow pool. That pool overflows directly into the moat drain which is then sand filtered and pumped back into the waterfall with a turnover of 12 minutes.

All the structures were covered by artificial rock. Two 3' x 2' glass sections to allow small children to look into the exhibit without climbing on the railing and allowing the otters to look out without being constantly in an upright stance, were fitted into the front moat wall. A 6' x 6' sheet of laminated glass forms a viewing window for the large pool.

The flagstone was removed and replaced with top soil and St. Augustine grass. Sandstone boulders were placed in the stream and a large log was angled down into the deep pool to give the otters a gradual descent into the water.

In September 1984, the exhibit officially opened. For over an hour the otters spent most of their time huddled together at the mouth of the tunnel, taking short journeys to the grass, stream and shallow pool. Within a day they were exploring the exhibit, but only within the boundaries of the original. It took a few weeks for them to venture into the new area and much longer before they would go into the new deep pool.

The behavior of the otters noticeably changed in the renovated habitat. Most of their old bad habits diminished although they were not extinguished. The otters spent a great deal of time foraging in the rocks and grass and seemed to spend more time swimming or just laying in the stream. Before renovation, the otters would usually retreat to the den boxes to sleep during the day, now they seemed to enjoy napping comfortably on the grass. The den boxes are used for defecation and urination (one of two den boxes) and the other two are used for nest boxes.

The renovation of the exhibit, the fact that the otters are listed as SSP animals, and the problems they have with kidney stones prompted the Zoo to apply for an Institute of Museum Services Conservation Grant in

ASIAN SMALL-CLAWED OTTERS, *Continued*

1984. A grant of \$11,700 was awarded with matching funds being provided by staff and volunteer time.

This long-term research project, conducted by our veterinarian, Dr. Donald Gillespie and our research curator, Cynthia Bennett, was designed to: (1) Catalogue behaviors and develop activity profiles for the pair of otters; (2) Determine the estrus cycle of the female through urinalysis; and (3) Identify behaviors indicative of estrus by correlating behavioral and hormone cycling data.

Using a stenograph, the otters' behavior in sequence and duration was recorded for two/30 minute sessions, five days a week for an eight month period. The behaviors were catalogued and activity profiles constructed from approximately one million data points.

Approximately 70 urine samples were collected over a six-month period. Estrogen and progesterone levels were analyzed and estrus cycles charted.

Three key behaviors (mounting, female solicitation and female initiating contact), were used to identify behavioral estrus.

Results from this research have revealed some correlation between behavioral and hormonal fluctuations that hopefully will be helpful in the captive breeding of these otters.

The husbandry of this otter is fairly straight-forward. Our basic husbandry is daily cleaning of exhibit and den boxes (the two nesting boxes are cleaned and material replaced at keeper's discretion). Pools are maintained as needed. Our feeding schedule has been increased from two to four times daily (which has seemingly reduced begging and aggression levels). Our diet has had various changes but now includes commercial dry cat food, thawed fish with vitamin supplement. Occasional commercial carnivore diet is also given. Foods such as eggs, fruit and crustaceans are also occasionally given and are usually played with more so than eaten.

In July of 1985, it was decided that removal of our otters' kidney stones should be undertaken. Unfortunately during the closing of the surgery our male died. Our female recovered nicely and in August we received another male and introduced the two with virtually no problems.

Within months we plan on acquiring two additional pairs of otters. With these otters we would like to involve mate selection, additional urine studies and repeating the behavior research under the same and different conditions.

Although much is still unclear about the reproduction of Asian small-clawed otters, the situation seems much more optimistic today than it has for many years. It is hoped that the research, both medical and behavioral being done, will provide some much needed answers and the successful breeding of this SSP animal will be the ultimate outcome.

Many thanks to Cynthia Bennett, Donald Gillespie, Nancy Hollenbeck, Susan Engfer and Fred Marion for all of their written and spoken input.



ESTABLISHING A WOLF PACK
AT THE FRESNO ZOO

By
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Fresno Zoo, Fresno, CA



When we opened our new Wolf Woods exhibit in October 1984, we did not know if we could put all nine of our wolves in together. They were all related, but had been housed separately for over 20 years so we knew there might be trouble. The first year of the wolves' residence in the new exhibit would prove difficult for both the wolves and the staff. After a year of juggling individual wolves in and out of the exhibit, we feel we may always have problems managing these wolves.

We began on the morning of 11 October 1984, by putting Willie and Tala, the parent wolves, into the exhibit. In the afternoon, we added their two-year-old daughters, Virginia and Neka. For a few hours, Tala retained a position as alpha wolf. Then Neka challenged her, backed up by Virginia. Two days later, at the official dedication, the public saw one bloody-faced mother wolf, usurped by her equally bloody daughter, Neka.

The struggles for dominance took place mostly at night unseen by us. By the fourth day, Virginia, the wolf who had hung back, gained her confidence and took over completely. In the process she left Neka bloody and maimed. We had to remove her and stitch her up. Neka healed well, but never returned to the exhibit again.

Over the next week, Tala and Virginia fought occasionally. We had hoped that Tala, as the oldest wolf, age seven, and the mother, would be the alpha wolf. But Virginia was too strong and established herself at the top of the social order. Willie just stayed out of it, often hiding behind trees when the females fought.

On 24 October we added Virginia's sister, Lucy, who has not seen her sister or her parents since she was six months old. Virginia quickly put Lucy in her place. But Lucy was able to dominate Tala and achieve beta status. By now Willie and Virginia were a team and were equally top dogs.

At the same time, we had a vasectomy performed on Homer, half-brother to Virginia. (Willie had been vasectomized immediately after the birth of the litter of ten that he had sired.) We chose vasectomy in order to maintain normal breeding behavior without more births. We were later to regret encouraging normal breeding behavior.

Homer was introduced into the exhibit. Willie and Virginia immediately teamed up to dominate him. Whether they were the ones who injured him severely, or whether Homer tore open his original incision himself, we were never to know. But he had to be removed to save him. Five days later, in his hospital cage, Homer ripped himself open and had to be stitched again. This led us to speculate that maybe he had done it to himself the first time, making himself very vulnerable to Willie and Virginia's attacks.

At the end of November we added the female, Jumper, to the exhibit. This brought the total number of wolves in the exhibit to five. We did not know it then, but five would be the largest number we would ever reach in Wolf Woods, and would prove to be too many wolves.

Jumper had always been the most nervous of all the wolves and was easily

ESTABLISHING A WOLF PACK AT THE FRESNO ZOO, *Continued*

relegated to the bottom of the social order. Tala moved up one rung on the ladder. Soon each wolf staked out its own territory. Tala paced the moat at the east end. Jumper had the south end of the moat, sneaking up to the pool for occasional quick drinks. Lucy had the northeast corner and the den. Willie and Virginia took the top of the hill -- a sort of "king-of-the-hill" social order.

In order to maintain status as top dog, Virginia had to keep harrassing the lower-ranking females. Lucy got bitten in the foot, requiring treatment. Because we did not want to disturb the precarious social order by pulling wolves out unless absolutely necessary, we treated her in the exhibit with oral antibiotics.

Willie and Virginia worked well as a team. Virginia would bite Lucy or Jumper on the left hip, and Willie would bite the right hip at the same time. Tala remained off to one side, occasionally getting a few facial cuts. She did challenge Lucy sometimes, once dragging her across the exhibit by her back leg.

Meantime, we had put the brothers Bruno and Eric in the two, old wolf cages. We had, to our embarrassment, thought Eric was female and he had previously been named Ethyl. Both Eric and Bruno would play very aggressively. Eric showed obvious tendencies of aggression toward male staff members. Since we enter the exhibit daily to clean, we decided none of us wanted to face Eric or Bruno in there.

Luckily, about this time, we finally found zoos that wanted wolves. Bruno and Neka were placed at Applegate Zoo, Merced, CA. Three other wolves were to go to Zaconga Zoo in Toluca, Mexico. This would bring our population down to manageable numbers.

In addition to dealing with battles for dominance, we had other difficulties establishing routine in the new exhibit. Within a month of the opening, the wolves had destroyed all the new landscaping. We had to replant trees and install protective cages around them. The wolves kept digging up the sprinkler system repeatedly. Until repairs could be made, we often had to drag 200 feet of hose in to hand-water trees. When the sprinklers work, the wolves enjoy playing in the water.

They dug holes everywhere. Most were minor, but some were major tunnels. They couldn't dig through the floor of the metal conduit pipes that were the base of the two dens. So they bypassed it, digging under the rock next to the north den. They dug their own den twelve feet long and three feet deep, exposing water pipe and major tree roots. We finally thwarted that by filling it with dirt and rocks. Then they tried to tunnel into the hill next to the south den, undermining a huge rock. Eventually we had to dig down and collapse the rock into the hole.

Next they started a tunnel next to the west wall. In four days they tunneled nine feet horizontally and nearly four feet down. Fortunately, the moat walls are buried seven feet. But this taught us we couldn't allow a day to go by without refilling such holes.

In spite of these spurts of digging their own dens, the wolves do use the dens we built which is gratifying. Too often wolves do not use the dens provided in new exhibits.

In their running around the exhibit, the wolves managed to shift over two feet of depth of dirt from the top of the hill down the sides. This under

ined new trees, and worse, undermined two huge boulders at the top of the north den. These rocks collapsed, blocking the den entrance -- the rocks were later shifted aside. But we were very fortunate that the rocks did not collapse on a wolf, or on us going into the den to clean.

As a result of this massive change to the contours of the hill, we had to relandscape the exhibit. In late summer of 1985, we used most of our staff and many hours to terrace the hill with logs to retain soil, and we replanted more trees. This greatly improved the appearance of the exhibit and made maintenance easier.

Daily maintenance of the exhibit requires two keepers so there is emergency back-up. Cleaning is done in the early morning, and feeding in the afternoon. At first, one keeper would guard and the other did the work. Now we find that one can pick up feces while the other cleans the pool. We have found that only a few of our staff feel comfortable working with the wolves, and these are the primary keepers.

Our methods of feeding have changed with the circumstances. At first we put each wolf's ration of meat on different rocks so each had its own territory in which to eat. But in December 1984 they started burying their meat in large amounts. If we didn't find the caches, flies quickly became a problem. Now we feed each wolf small amounts of meat at a time so they are inclined to swallow all of it. Jumper catches hers in mid-air. Lucy gets hers on a rock by her den, and Homer eats by the pool. When they start to bury any meat, we assume they are full and discontinue feeding that wolf.

Because they were getting fat, we had to restrict the males' intake. When they got extra hungry, they got dangerously bold, so all the wolves are now fed from above, outside the exhibit.

Our biggest continuing problem has been the establishing of the wolves' social order. The first few months the challenges and fighting occurred almost daily. When breeding season began in February, we called a conference of wolf keepers, zoo management, and veterinary staff to discuss the problem. We called Hal Markowitz, animal behaviourist, and consulted with him. We consulted with other zoos. The final result was a decision to spay all of the females, starting with the most aggressive, Virginia. We hoped it might subdue her some and give Tala a chance.

At the same time we reintroduced Homer, hoping that having another male in the exhibit would distract Willie from harassing the females. Homer immediately challenged Willie for male hierarchy supremacy. Homer spent his time walking stiff-legged with his hackles up, and soon Willie acquired a wound in his side and had his back legs bitten.

Tala then came into heat and challenged Lucy, wounding her severely. Lucy was removed for stitching and was spayed. She went back into the exhibit within two weeks. It was decided that, even spayed, Virginia was still too aggressive, so she was kept out.

meantime, Homer had taken over as top male dog, and Tala was now top female. Willie was so intimidated he couldn't drink water unless we guarded him from Homer. Tala solicited both Homer and Willie which caused them to fight even worse. So on 27 February, we pulled Tala out to spay her. Unfortunately, by one of those freak accidents that are always a risk, the tranquilizer dart hit an artery. Tala's death was a severe shock to all of us.

ESTABLISHING A WOLF PACK AT THE FRESNO ZOO, Continued

Jumper was spayed in March and returned to the exhibit in early April. Willie continued to be harrassed by Homer. At the end of April his leg was wounded so badly the tendons were exposed and he had to be removed. (Remarkably, after weeks of application of scarlet oil to his wounds, the flesh filled in so well that you can hardly tell he was ever injured.)

This left three wolves in the exhibit. Lucy and Jumper challenged each other often, but without major injury, until both received facial wounds in May. Over the next three months the situation remained remarkably peaceful. It was unclear at this point as to whether Lucy or Jumper was top female. By August the subtle differences disappeared and it was evident that Lucy had become alpha female. In fact, by October, Lucy became very dominant over the other wolves, male or female.

We intended to return Willie to the exhibit when he was healed. Willie was a favorite of zoo visitors and staff. But it was obvious that the two males could not get along together. Many of the staff felt Homer was aggressive. So in late August the two were switched. Willie quickly dominated the group. Willie and Lucy together harassed Jumper who retreated to the front den as her defense point. Within two weeks, Jumper received a four-inch slash in her side, requiring her removal for stitching.

Willie has been hand-raised and was extra bold with people. After being put on food restriction in Mid-September, Willie startled the keepers by charging when he was very hungry. His actions were the reason we started feeding from outside the exhibit walls.

Again we had to re-evaluate the situation. It was felt that either male tended to be bold. We considered the fact that past experience with Homer indicated he might be less likely to interfere in the females' squabbles. So, consensus of staff and management was that Homer might be the more manageable of the males. Homer was returned and Willie removed.

Shortly afterward, Jumper was returned to the exhibit and again some jockeying for position took place. It is still too early to judge if we have chosen the right grouping of wolves, but this is our final choice and we will have to do our best with it.

Now that we are down to three wolves, it may be presumptuous to say that we have established a wolf "pack". But three wolves seems to be all that we can handle in the exhibit with any degree of peacefulness. However, we do not believe that even then, we will ever have a static or stable situation. We know that their behavior can change at any time. It is fascinating and educational to watch these changes. But the most important aspect from a keeper's standpoint is that we must maintain constant vigilance of each individual whenever we are in the exhibit.

We have achieved our original desire -- that of taking our wolves out of their skimpy, scattered pens into decent new homes. Our remaining three wolves dig in the dirt, sleep in their dens, relax on their hill, or howl in the night. They finally have their beautiful open exhibit.

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A TAMANDUA REPRODUCTION PROJECT: FURTHER PROGRESS

By
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Very little is known about the reproduction of Tamandua tetradactyla. The lesser, or Collared Anteater is native to the forests of Mexico, Central and South America, and apparently lives singly. In captivity they have proven that it can be at best dangerous and sometimes fatal to house a pair together in limited space on a permanent basis. Little is known of their reproductive cycles and behaviors and captive births are rare.

In April of 1984 a formal research project was started in the Edentate Lab in Lincoln Park Zoo to try to determine the female tamandua's reproductive cycle, and to further develop the husbandry techniques necessary for long-term captive propagation. Observation of behaviors and physiological changes are being noted, and urine is being collected for hormone analysis. The zoo's consulting reproductive physiologist, Dr. Nan Schaffer, is coordinating the urine collection and analysis that will include a full hormonal assay to determine which components may indicate the ovulatory cycle and pregnancy.

Since its beginnings, the Edentate Lab has produced valuable information on the biology and husbandry of various armadillos, sloths, and anteaters. These studies have reflected the commitment to these and other Tropical American animals by Lincoln Park Zoo, and especially our Assistant Director, Dennis Meritt, who has been studying them in native habitats as well as in captivity. Successes in the Lab have produced a number of rare births, one of these yielding twin tamanduas. Nutritional research has led to the development of diets to allow these specialized feeders to thrive in captivity, and the current study should enhance reproduction.

The Edentate Lab now holds 2.5 tamanduas, and data for the study includes a sixth female, now deceased. Both males are four years old; Jose is the surviving twin of our birth of 17 February 1982; Coletto was found in the wild in October 1982 as a ten-day-old infant, hand-raised for nearly a year, then donated to the zoo. Coletto has been used as the focal male in the study since his quarters are large enough to allow introductions of females. He has been shown to have viable sperm, and he is interested in the females. So far, Jose has shown no interest in the females, and has only recently moved into a cage that is large enough to allow proper introductions. Four of the females are eight years old, one is over fifteen years of age, and the sixth was less than three years old at death. All of these are wild caught, except the last, who was born at Seattle's Woodland Park Zoo. Two of the females have produced young, one being the mother of Jose. All are housed singly, except for periods of observed introductions that last for up to eight hours per day.

The project is dependent upon keeper routine, and time available for observations. Data is taken ad libitum, mostly during the cleaning routine, since the cages are positioned so as to be seen during the first two hours of run work, and are within earshot of the entire Lab. The project has evolved, using what has been learned to adjust procedures to enhance the future of the study. Initially, notes were taken only on female vaginal appearance, in hopes of finding a simple indicator of sexual status. Tamanduas show amber and rusty-colored vaginal stains, but recording these suggests no pattern that would be useful. Some females' genitalia are nearly always clean, others are normally dirty, and the colors of the stain

A TAMANDUA REPRODUCTION PROJECT: FURTHER RESULTS, *Continued*

are not predictable. However, daily inspection, with manipulation of the labia, shows that there is cyclicity of approximately 35 days (\pm 3 days) to the discharge of true bloody secretions.

Tamanduas tend to be, but are not exclusively, nocturnal. They are usually observed sleeping throughout the day, but females show periods of increased activity and restlessness that coincide with their bloody periods. A large part of this study is observing interactions between male and female tamanduas, hoping to be able to relate behavioral receptivity to ovulation then proved through hormone analysis of urines.

Because these animals have the potential for doing a great deal of damage to each other with claws and strength designed for tearing trees and termite nests apart, initial contact was limited and carefully observed. The male, Coletto, is housed in a wood framed mesh cage measuring 3' x 6' x 6' (.9m x 1.8m x 1.8m) and appointed with branches for climbing, and tree-tearing displays, as well as a hanging bucket sleeping chamber. Since this is an off-exhibit area, it allows for putting smaller "howdy cages" adjacent to the male's home, and provides for female contact through the mesh walls. This sort of contact is allowed almost daily, keeper routine permitting, and notes are taken on interaction between Coletto and the females. Initially, one female at a time was used. Later three cages and three females were given simultaneous access to the male, allowing him to choose the females most appealing to his attention. Female activity and interest in the male is somewhat cyclical; male interest was drawn to female activity, and returned interest, but most dramatically to urine. Tamanduas urinate, then roll in the fluid, scenting themselves with what seems to be a bodily fluid rich in pheromones. Males and females show this behavior with their own urine, and will roll in a cage previously anointed by another tamandua, even after the cage has been washed. Coletto responds similarly to female urine scent as well as to the urine of the other male, Jose. Time of female cycle seems to have no effect on this behavior nor on its intensity.

After six months of watching "howdy cage" interactions, the first barrierless introduction was tried. Coletto and the female, Henrietta, were mutually interested at the mesh of the cages, and the introduction in Coletto's cage proved peaceful and stimulating. The encounter consisted of gentle mutual inspection, independent rubbing of cage furniture, and alternating leaders in trailing each other, as well as gentle boxing, and cuddling in various positions, including a laidback ventro-ventral position that may have been breeding. This first encounter lasted for about an hour ending as the pair started to wander the cage separately, and time was no longer available for continued observation, and possible intervention should behaviors become hostile.

Since that time, each of the females has been allowed access to the male on a regular basis. Decisions to try introductions have been based on mutual interest, or excitement, exhibited at the howdy cage, and later in the confidence that behaviors could be predicted. Coletto is apparently flexible and responsive to the moods and needs of the females. He is always interested in contact, sniffing, grooming or following the female as she allows. If the female is willing, play develops, often at female initiation, sometimes in response to the male. If the female is unwilling to accept Coletto's intentions, she will exhibit hostile behaviors, ranging in intensity. The male retreats from any hostile act. To illustrate the range of aggression, Henrietta, the gentlest female, when unwilling to accept Coletto's attention, taps him on the nose, and each tamandua then wanders the cage independently, avoiding contact, she often going to his nest to sleep. Henrietta may be left in the male's cage while hers

s being serviced, confident in the knowledge that each will ignore the other and injury is unlikely. Terry is the most aggressive female. Except for receptive days, she immediately roars, slashes at and chases the male. At introduction, the keeper retains hold of her tail for the first few seconds which tells the mood of the day. Even on receptive days, Terry is very rough, and Coletto has received scratches from her in play. When this female proves aggressive, she is immediately removed. All of the females seem to become very restless during the bloody period of their cycle, and are most receptive of the male at the end of this week-long period.

To learn more about the tamandua's potential as a social animal, multiple females have been simultaneously introduced into the male's cage. All but Terry interact peacefully, usually ignoring each other, sometimes engaging in grooming and play, often centered around the male. Frequently, two or three females curl up together in the nest and sleep. Play may develop between the male and any of the females; the presence of the others does not seem to inhibit breeding activity, nor has female competition for the male's attention been seen thus far.

The collection of behavioral data has been time consuming, but relatively easy; urine collection has proven to be the challenge. Three females are housed in cages with stainless steel floors and straw bedding. Urine collection in these is easy on days when food and water have not contaminated urine samples. Tamandua food is the equivalent of a meat milkshake. Feeding behavior includes tearing at the container, and spillage results. Using clips to hold food bowls in place has helped somewhat. Urination often occurs in the early morning, and is often lost to the animal's body as she perfumes herself by rolling in it. Tilting the cages, and drilling small holes in the floors has allowed collection of the urine as it drips through. Two of the females are in cages with necessary substrate that does not allow for collection, and samples are obtained from these animals only as they urinate in the howdy cage, and when the keeper is quick enough to get it before the tamandua anoints herself.

Samples are collected by syringe or pipette, transferred to plastic vials, refrigerated immediately, and soon frozen for storage. The samples of eighteen months of collection are now at the University of Tennessee, Knoxville, for analysis by Dr. Clinton D. Lothrop, Jr. Hopefully, a way to track the ovulatory cycle will be found, and the laboratory results will correlate with the behavioral observations. This information will then help us plan introductions of tamanduas for breeding success. If an accurate pregnancy test can also be found, we can then prepare for the remaining challenge of additional predictable successful births and maternal care.

Suggestions for those caring for Tamanduas:

- 1) Watch for cyclic, restless periods in females.
- 2) Note vaginal discharge; manipulate labia if possible.
- 3) Expect females to be receptive at the end of the bloody period.
- 4) Allow plenty of room for introductions; observe carefully; be prepared to intervene.



HAND-RAISING A HIMALAYAN BLACK BEAR

By
Ellen Bradfield, Keeper I
Zoo Atlanta, Atlanta, GA

The Himalayan Black Bear (*Selenarctos Thibetanus*) pair, Bill and Maude, at the Atlanta Zoo had produced several cubs, but none had survived longer than 68 days. Most of the cubs died within four days of birth as a result of maternal abuse. It is believed that maternal abuse results largely from improper cubbing facilities. Ideal facilities would include isolation from the male, with special attention being paid to olfactory cues. Since ideal facilities were not available, it was decided that future cubs would be removed immediately after birth.

The newborn cub, Tenzing, was first noticed at 1540 hours on 24 December 1984 when Maude was seen carrying him in her mouth. He was estimated to be less than two hours old. The cub was taken from its mother, cleaned, and given a general examination by the veterinarian. The cub then received 5cc of American Black Bear Serum subcutaneously. An additional 10.6cc of serum was added gradually to equal parts of boiled water and evaporated milk and fed until gone. Tenzing weighed 232 grams and was in good physical health. His stomach, lower lip and anal area were reddish and tender, so baby oil was applied. This condition had diminished within a week. His umbilical cord detached after five days; also, at about this time, Tenzing began making vocalizations described as "motor-boating" and "putting".

A bear team was established which consisted of four keepers under the guidance of the assistant mammal curator and the veterinarian. A quarantine situation was maintained which consisted of minimal handling of the cub, Betadine® (Purdue Frederick Company), washing before and after handling, and sterilization of all feeding apparatus after use.

DIET

A basic formula was chosen that consisted of boiled water, evaporated milk and cream. The cub was fed on an ad lib schedule until six weeks of age. Then it was decided that the cub should be fed once every five hours, and that he should be awakened if necessary. An ad lib schedule resulted in twelve feedings on Day One. At the end of the two weeks, Tenzing was receiving eight feedings per day. The amount of formula offered at each feeding depended upon weight gain and consumption. If Tenzing's stool was irregular or dry, then corn syrup was added to the formula. Vitamins were included after the first week in the first feeding each day. Liquid pediatric multivitamins such as Poly Vi Sol® (Mead Johnson) and Vi Daylin® (Ross Laboratories) were used. At ten weeks of age Tenzing began to lose some weight. Strained beef was added to the formula to supply more protein to his diet. At fourteen weeks, ZuPreem® Omnivore (Hill's) biscuit powder was added. This addition helped acclimate Tenzing to a later diet of Omnivore alone. A few days later C/D® dietary animal food (Hill's) was added. This was chosen as a balanced food that would also add more solidity to the formula. Omnivore powder was later replaced by whole biscuits. Gradually the biscuits were increased so that by seven months of age Tenzing was receiving only dry Omnivore biscuits. Apples were used as treats and rewards.

Although Tenzing had a low birth weight in comparison to other cubs (Roeding Park, Houston Zoological Gardens, personal communication), his

daily volume intake was comparable. A sample of Tenzing's volume intakes are shown on Graph One and his weight gain can be seen on Graph Two. The numbers used in the monthly averages seen on Graph Two are: February 20, March 20, April 10, and May 3.

BEDDING AND PLAY AREAS

The size of Tenzing's bedding and play areas depended upon two factors. To keep Tenzing warm, smaller areas were used. But of course, as he grew, the size of his enclosure was increased. Secondly, as he became more active his play area grew.

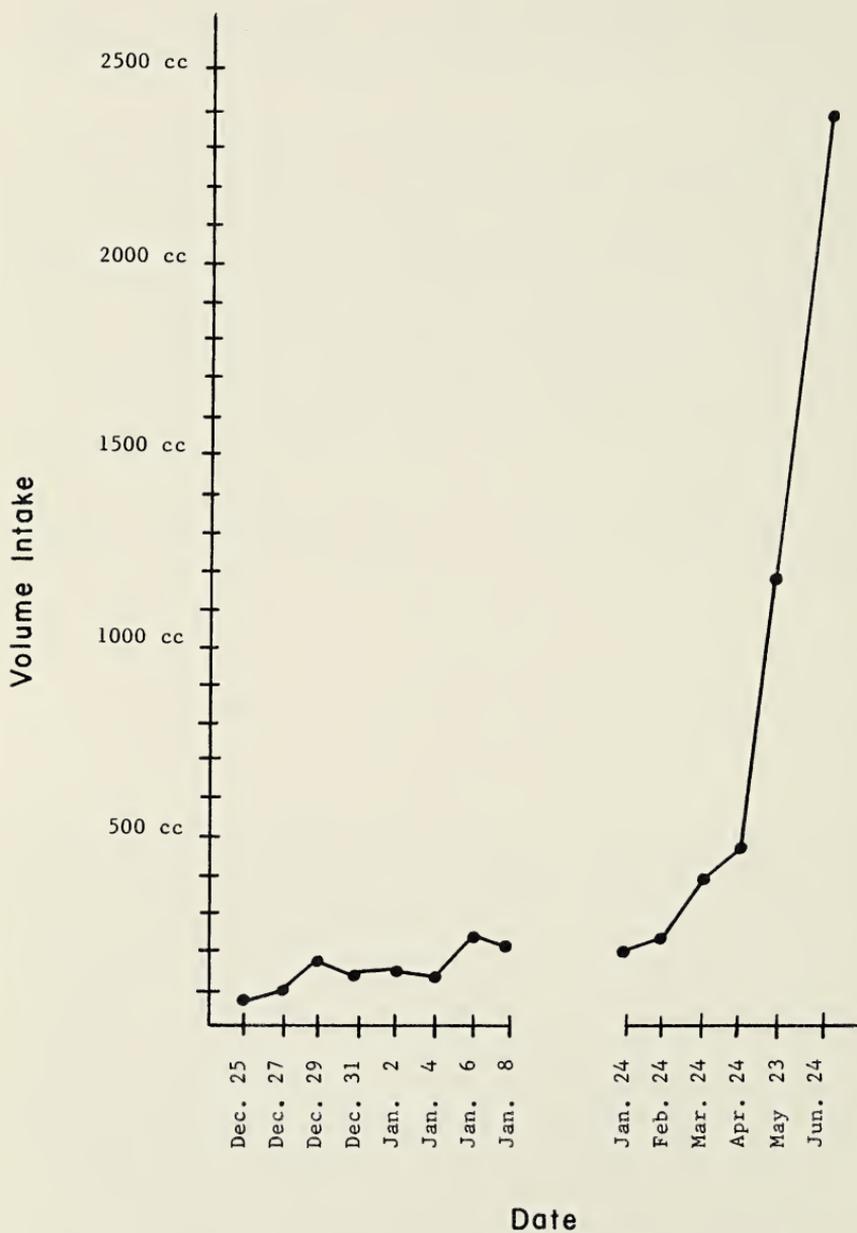
Tenzing was placed first into an incubator, but it appeared that he was not staying warm enough. He was then placed in a round container (diameter 25.4cm) with several sheets of fleece and a heating pad to centrally locate the heat. After a few days, he was moved to a larger area (.3m x .5m). When Tenzing was able to climb out of this container at four weeks of age, he was moved to a wooden playpen (1m x 1m). The sides were fitted with plywood and styrofoam-filled mattress pads to prevent him from getting through the original wooden slats. At eleven weeks of age, he was able to climb up the sides, so the mattress pads were removed. After a few days, however, Tenzing could climb up the plywood and get out of the playpen. He was then moved to a larger wooden enclosure measuring 4m x 3m. At four and a half months of age, he could get out of this enclosure and was then placed in a room which measured 6.6m x 9.3m. At this time Tenzing was also spending a couple of hours a day in the Children's Zoo in a 5.3m diameter Behlen cage. At five months of age he was moved to a larger (8m x 4.3m) Behlen cage for these sessions, but still spent the rest of his time in his inside room. After a month of commuting between the two areas, Tenzing was left in his Children's Zoo area full-time.

Tenzing's earliest playthings were a variety of plastic toys, balls, a swinging "dummy" made of fleece, and other objects. These were discontinued in favor of more naturalistic objects such as logs, straw, and pine cones. A standard animal carrier was used as a "nesting" area and as a transport box.

HEALTH

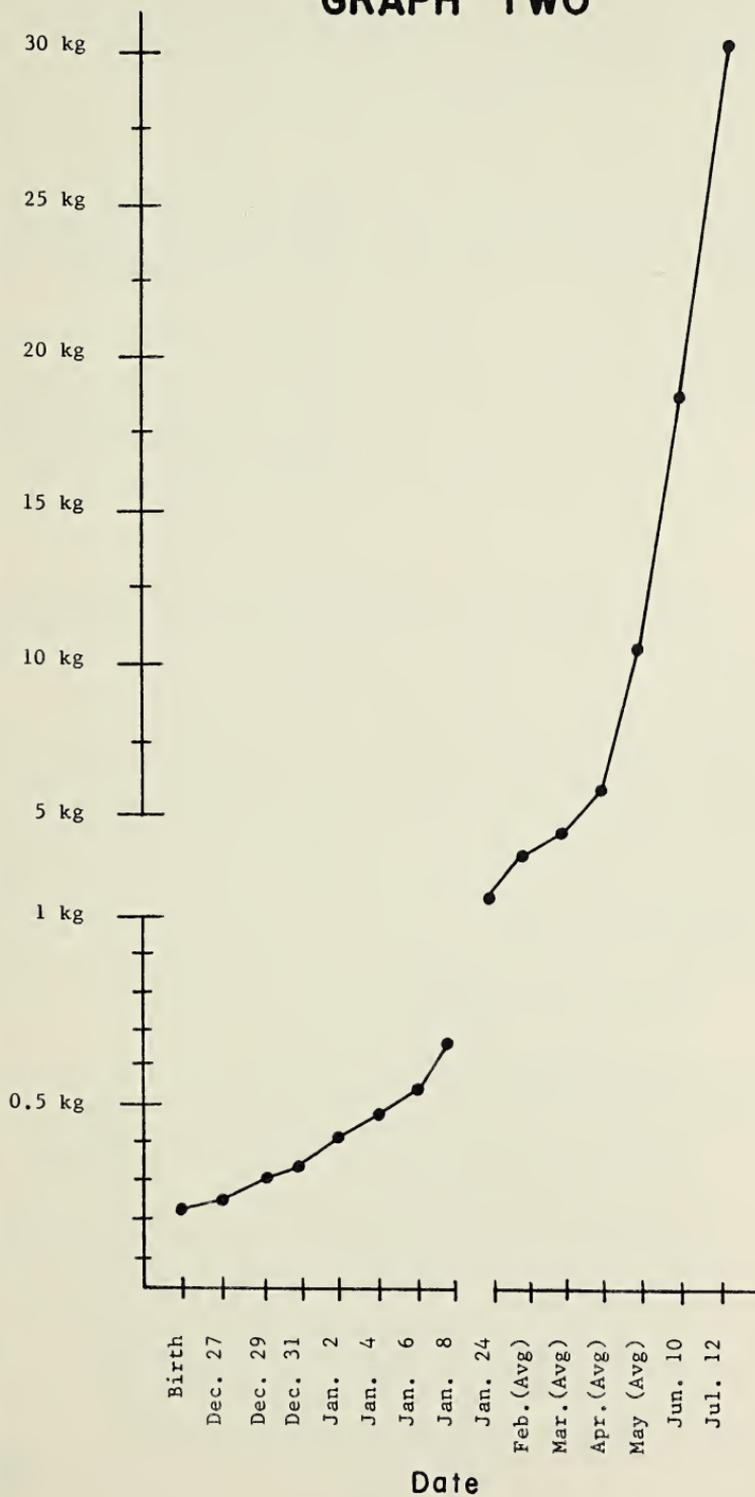
Tenzing had few health problems. He had to be stimulated to urinate and defecate until he was capable of having regular bowel movements on his own. This was done by gently patting on his lower back. His bowel movements were carefully monitored in order to assess if changes in the diet were necessary. His teething periods (6 weeks and 8-10 weeks) were mildly disruptive to his feeding schedule. Children's Cherry Tylenol[®] syrup was administered if signs of pain were evident. Pacifiers and teething rings were of little interest to Tenzing. At three and a half months of age, Tenzing developed a fairly common penial sheath infection. Treatment involved an intensive routine consisting of stimulating to urination, rinsing with hydrogen peroxide, and applying Betadine[®] ointment. This infection reoccurred periodically. At four months, Tenzing developed some bone pain/strain. This was also considered to be quite common in young growing animals. His formula consisted of strained beef, corn syrup, water, evaporated milk, cream, Omnivore powder, C/D[®], and liquid vitamins at this time. The beef was eliminated and the amount of C/D[®] was increased. The liquid vitamins were also eliminated in favor of tablets such as Uni Pet[®] (Upjohn). In addition, Tenzing began to spend time outdoors.

GRAPH ONE



GRAPH TWO

Weight



HAND-RAISING A HIMALAYAN BLACK BEAR, Continued

Although Tenzing's size and weight fall behind those of other cubs, his physical and motor development seem to be on schedule (Little Rock Zoo, Roeding Park Zoo; personal communication). Table One shows Tenzing's physical and motor development.

TABLE 1

<u>AGE</u>	<u>EVENT</u>
5 days	First "motorboating"
39 days	Both eyes fully open
6½ weeks	First teeth breaking in
7 weeks	Lift up on legs
7½ weeks	1st bear "swat"
8 weeks	Upper canines in
9 weeks	Four-legged walk, lower jaw teeth, upper teeth, lower canines all in
13½ weeks	Standing upright

Currently Tenzing is ten months old and his weight is estimated to be 50kg. He eats 2kg of Monivore a day, and is a healthy, playful bear. A search for a new home for Tenzing is underway, where it is hoped he will have a companion.

ACKNOWLEDGEMENTS

I would like to thank Dr. Terry Maple for the opportunity of helping to raise a Himalayan Black Bear, Dr. Rita McManamon and John Croxton for their guidance and support, and Ruth Visscher and Gary Roesinger for their observations and input. Special thanks to Constance Noble and Sue Barnard for their advice and dedication, and to Jeanette Griggs for her patience.

PRODUCTS MENTIONED IN THE TEXT

Betadine	Manufactured by Purdue Frederick Company, Norwalk, CT, 06856, U.S.A.
C/D	Manufactured by Hills' Pet Products, Inc. Topeka, KS 66601, U.S.A.
Poly Vi Sol	Manufactured by Mead Johnson and Co., Evansville, IN 47721, U.S.A.
Tylenol	Manufactured by McNeilab Inc., Fort Washington, PA, 19034, U.S.A.
Uni Pet	Manufactured by Upjohn, Kalamazoo, MI 49001, U.S.A.
Vi Day lin	Manufactured by Ross Laboratories, Columbus, OH 43216, U.S.A.
ZuPreem Omnivore	Manufactured by Hill's Pet Products, Inc. Topeka, KS 66601, U.S.A.



HAMADRYAS BABOON RESEARCH
AT THE RIVERBANKS ZOOLOGICAL PARK

By
Tony Vecchio
Carnivore/Primate Keeper
Riverbanks Zoological Park
Columbia, SC

From February 1982 through December 1983, the hamadryas baboon (*Papio hamadryas*) group at the Riverbanks Zoo was the subject of a keeper-run research project. This research focused on many aspects of hamadryas social behavior; two of which will be discussed in this paper.

The first question to be examined is whether or not the presence of the alpha male has an effect on the female dominance hierarchy and, if so, what is this effect. To answer this question we had to perform some manipulations on the group. After getting an idea of the dominance hierarchy by studying grooming preferences and the outcomes of aggressive encounters we removed the male baboon from the group. For seven weeks we again recorded grooming preferences and the outcomes of aggressive encounters to determine the new hierarchy. At the end of this seven-week period the male was returned to the group and observations carried out for six more weeks.

This experiment yielded some startling results. With the male present, the females' perception of their own hierarchy was very similar (though not identical) to the male's perception of their hierarchy. After his removal there were some dramatic changes. One of the low ranking females moved up in the hierarchy and became the dominant female. Not only did she begin to receive more grooming than any other female, she also began winning all agonistic encounters in which she was involved. Upon the return of the male this female returned to her original lower status not only in the eyes of the male, but also in the eyes of the other females.

Apparently, this very aggressive female is suppressed by the presence of the male. With her unable to force her dominance on the other females, they consider her of lesser status and groom her accordingly less. Without the male to suppress her she begins to dominate the other females and they respond by making her their preferred groomee. So, from the grooming preferences and the outcomes of agonistic encounters, it is obvious that the male exerts a strong influence on the females' hierarchy.

The second question to be examined is much more speculative in nature. The hamadryas social system is different from that of the other *Papio* species. Hamadryas display a one-male harem type of social organization. What we attempted to determine was whether or not the hamadryas social system evolved from the typical baboon troop system.

Researchers studying troop-forming baboons and macaques have found that these animals have evolved an interesting system to handle the natural competition for mates that would occur in a group with many males and females. When females come into estrus, males attempt to form a consort relationship with them. This involves leading the female away from the core of the troop and keeping her around by placating her with increased grooming. The male attempts to maintain close proximity with the estrus female while keeping other males away.

Obviously, a male hamadryas, not having to worry about competition with other males, would not need to form consort relationships with his female. Also, hamadryas researchers have found that when more than one male is present, they respect each others' ownership of females and they do not attempt to steal each others' females. With this knowledge available, we speculated that if hamadryas do form consort relationships it could be taken as evidence that this behavior is a remnant behavior that was necessary in their earlier troop-like social system.

To determine whether or not hamadryas form such relationships we recorded grooming preferences and also monitored the states of the females' estrus cycles to see if there was any correlation. We also used nearest-neighbor maps to study the proximity of the male to estrus females to see if this too might correlate positively.

The results of this study were quite striking. The male had a favorite female that he groomed only slightly more when she was in estrus than when she was in anestrus. For the other three females the vast majority of male grooming that they received came when they were in estrus (83%, 89%, and 91%). The nearest-neighbor data also showed a strong correlation between proximity and the state of the females' estrus cycles. The male spent the most time in contact or within one meter of estrus females; females that were greater than five meters from the male were usually in anestrus. Both of these results offer compelling evidence that hamadryas males do attempt to form consort relationships with estrus females. The formation of consort relationships can be taken as evidence that the hamadryas social system has evolved from the more common troop social system.

Two important aspects of primate behavior were discussed in this brief paper. This project shows that the zoo can be an ideal place to do serious ethological research. The results from such research may not only be valuable to zoo personnel but may help researchers who are studying similar phenomena in the field or in the lab.

Acknowledgements:

This research was supported in part by an AAZK grant and in part by a Sigma Xi grant-in-aid-of-research. The Riverbanks volunteer staff was an invaluable aid in securing much of the data that were used in this study.



POLAR BEAR REPRODUCTION AT
THE RIVERBANKS ZOOLOGICAL PARK

By
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Riverbanks Zoological Park

Zoo managers, in general, consider zoo animals to fall into one of two categories: those that breed readily in captivity and those that are difficult or impossible to breed in captivity. Most animals fit easily into one category or the other. There is, however, a third category; some animals breed regularly at some zoos yet the same species will not breed at all in other zoos or will breed at irregular, unpredictable intervals leaving zoo personnel to wonder what they did right or what they had been doing wrong.

The polar bear (*Ursus maritimus*) is one of these puzzling species. Though polar bear births are not terribly uncommon, the captive population has been declining precipitously for the past several years. Deaths greatly outnumber births and there are many zoos that have had little or no success in breeding this species.

For the first ten years of its history, Riverbanks was one such zoo. There were cases of aborted, stillborn, mother-killed, and mother-rejected cubs, but no successful births. Finally, in 1980, after the death of one of our female bears in the cubbing dens, the staff got together for a soul-searching meeting. Riverbanks's director, mammal curator, zoologist, veterinarian, and carnivore keepers sat down and debated whether or not we should continue to exhibit polar bears and, if so, whether or not we should attempt to breed them. It was at this meeting that Riverbank's director, Palmer Krantz, expressed his conviction that "as long as polar bears are being removed from the wild and numbers are declining in captivity Riverbanks has an obligation to make every possible effort to breed them."

With this fiat in mind, the staff attacked this problem with renewed vigor. We approached this challenge in two ways. First, we re-examined the scientific literature to evaluate what was known of polar bear behavior in the wild and in captivity. Secondly, we had to re-examine what we knew about our individual female to perhaps understand why she had not been successful to this point.

The literature search brought out some interesting facets of polar bear behavior. Female bears den in incredibly inhospitable areas, sometimes hundreds of miles from their normal hunting grounds. When the hungry female and her cubs do emerge from the den in early spring, they do not go off immediately in search of food. Instead, the mother spends two weeks watching over her cubs as they romp and play in the immediate vicinity of the den.

These puzzling aspects of female polar bear behavior, denning far from food and not immediately going in search of food, can be explained simply enough. The biggest threat to young polar bears is the adult male bear. By breeding far from good hunting grounds the females lessen the likelihood that males will encounter their dens. By giving the cubs two weeks to grow, strengthen, and improve their speed and coordination, the female bear increases the likelihood that her cubs will be able to keep up with her when a male bear threatens.

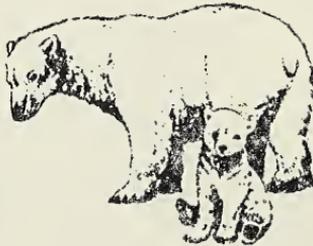
We were already aware that the male is a threat to cubs, but we may have been underestimating the seriousness of that threat. Riverbank's cubbing area is in the same barn as the daily used back-up cages and, though individual dens are made of concrete, the cubbing area is separated from the rest of the barn only by 2" steel mesh cage work. So a bear in the back-up cages could easily be seen, heard and smelled from the cubbing area. The solution to this problem involved a mammoth undertaking by our maintenance department. Using the old steel cagework as support, they built frames and poured concrete to construct a solid wall between the two halves of the barn. In essence, they built a barn within an already existing barn to truly isolate the cubbing den area.

The next problem that we needed to overcome was not one that was discovered in the literature but one that was uncovered by keepers having a good knowledge and understanding of their individual animals. The keepers noticed that our female bear had never settled down when locked in the den. Though we went to great pains to construct dens the same size as natural dens, our high-strung female did not seem to appreciate this fact. But now, after the construction of the concrete walls, this became an easy problem to overcome for now we could allow the female to have access to the entire area and still have her effectively isolated.

So, in 1984, we incorporated these two major changes into our normal management routine. In August we began increasing the female's diet so that she would gain enough weight to survive a several month fast. In November we moved the female into the new concrete cubbing area; but now, instead of locking the female bear in a den, we allowed her access to the entire cubbing area. She wandered freely in this area without showing signs of stress until the last day of November. At that time she moved into one of the dens and did not come back out. On 1 December, after ten years of waiting, we heard the unmistakable sound of baby bears crying.

The next few months were to bring many problems; each day brought us into territory that we were totally unfamiliar with. Through common sense and relying heavily on the female bear to solve most of her own problems with as little interference as possible we were able to exhibit, in April, Riverbanks' first mother-raised polar bear cubs.

Many people and departments at Riverbanks (not to mention the bears themselves) can share the credit for this important success. Yet more important than any one idea or contribution was the management technique itself blending research and knowledge of the species with an empathy and understanding of the individual animals. With this technique no animal-related problem in the zoo will be unsolvable.



EUTHANASIA AS A MANAGEMENT TOOL:
A CASE HISTORY

By
Anne Payne, Zookeeper
Detroit Zoological Park, Detroit, MI

The Detroit Zoo has euthanized seven Siberian tigers in the past three years.

In the fall of 1982 a decision was made at a meeting, which included the director, veterinarian, curators of mammals and education, zoo registrar, and tiger keepers, to euthanize four of our eight Siberian tigers. Three of these tigers were in poor health, and the fourth was of such an aggressive temperament that she could not be allowed physical contact with any of the other tigers. Another meeting was held the next day, and the director advised the keeper staff of the decision to euthanize these four tigers. Euthanasia was not new to our zoo, but the fact that the tiger keeper was involved in the decision and that such a decision was then relayed to the staff by way of a meeting were two things that were new to our zoo.

The decision to euthanize these tigers was then picked up by a reporter from a local newspaper which had recently published a portion of an interview with our director which dealt with culling overcrowded herds ofoudads and sika deer.

The article on the tigers did mention the fact that three of the tigers had serious health problems but placed the major emphasis on the earlier statements about culling overcrowded animals. The news of the planned euthanasias brought about a very negative response from the general public, due in large part to the information that was given in the newspaper article, which led them to believe these tigers were going to be killed because there was no room for them.

The phone calls came nonstop for two days following the article, all in protest of the euthanasia. Many callers became much more reasonable when the health conditions of the tigers were explained to them. Letters also started pouring in, many of which were from out of state, as the wire services carried the story without mention of the health problems. All letters with names and addresses were answered. Several persons wrote back apologizing for their actions after receiving complete information on why the decision had been made.

A Detroit resident filed a million-dollar lawsuit against the zoo, on behalf of the tigers, accusing the director of acting in an arbitrary, capricious, and malicious manner. An injunction was then issued by a Circuit Court judge barring the zoo from carrying out the euthanasias until a court hearing could be held. By the time the hearing date came up, the plaintiffs also included The Fund for Animals headed by Cleveland Amory. At the hearing the judge allowed the plaintiffs to call in outside veterinarians to examine the tigers, after which he would make his decision.

The next six weeks were stressful. The director made several local TV and radio appearances to explain the decision and answer questions from the general public and media. Some favorable responses were starting to emerge locally as well as out of state. Some of the media personnel were beginning to respond in support of the zoo.

EUTHANASIA AS A MANAGEMENT TOOL: A CASE HISTORY, Continued

Responses pro and con were starting to even out. Considering that people are more likely to make an active negative rather than positive response, it was felt that the majority of the local response was in favor of the zoo. Most of these responses were turning around because the public was getting a chance to learn of the reasons behind the decision: three of these animals were in poor health; two of the tigers had severe hip dysplasia and the other had a chronic debilitating kidney problem.

On 3 November 1982, the final court hearing was held with both sides presenting their arguments. The judge then reached his decision: the zoo had not acted in an arbitrary, capricious or malicious manner. Whether or not the tigers were ill was immaterial. What mattered was that the euthanasia decision, which was made by professionals in the field, was reached through a reasonable process. The decision made by the zoo was made in a reasonable manner and therefore the court decided not to set that decision aside.

Though the injunction was lifted for the three ailing tigers, the injunction on the fourth tiger was left intact. A curator who had not attended the first meeting suggested that we exhaust all possible alternatives to euthanasia. The zoo had decided to cancel euthanizing her, at least temporarily, and the decision was made before the lawsuit, so the injunction did not affect her. In light of the lawsuit and the judge's final decision, however, the feeling of the general public was that she had been "saved" by the public outcry and the zoo was only being allowed to euthanize the three ailing tigers.

On 10 December 1982, the judge reaffirmed his earlier decision. He made clear that as long as the zoo's management decisions were made in a reasonable manner, their professional judgement could not be challenged in court. The injunction barring euthanasia of the fourth tiger was also lifted.

Letters to the editor continued from time to time but died out as time went on and attention was turned to more current matters.

The zoo was left with five tigers. Only one, a female, had lineage that could be traced and was accepted in the Siberian Tiger SSP program.

The Detroit Zoo only has holding capacity for two breeding pairs. The decision to be made now was whether to utilize that space for two breeding pairs or to continue exhibiting non-reproductive animals.

Beginning in April 1983, efforts began to relocate the four non-SSP animals. These animals were advertised in the AAZPA Animal Exchange "gratis" 17 times with no suitable relocation sites being found.

In May 1983, a male in the SSP program was brought to Detroit on breeding loan to be paired with our SSP female. Unfortunately, our female died of a heart condition in September 1983; she was then replaced in April 1984 with a breeding-loan female.

A decision was made to obtain a pair of 1984-born cubs designated by SSP. If the four non-SSP animals could not be relocated, the decision to euthanize them would be more easily accepted if younger, reproductive animals were already in the collection.

In February and March 1985, year-old cubs from two different zoos were brought to Detroit on breeding loan. We now had eight tigers and the crowded conditions were undesirable for both the animals and the staff.

EUTHANASIA AS A MANAGEMENT TOOL: A CASE HISTORY, Continued

All options for relocation of the four non-SSP animals appeared to have been exhausted and on 27 March 1985, they were euthanized for management reasons. Prior to the euthanasia date the SSP coordinator was informed of the decision and final recommendations were made for tissue and organ placement into research projects affiliated with SSP.

Due to the previous experience with the planned euthanasia of three ailing tigers, staff involvement was kept to a minimum. Only the director, curator of mammals, head veterinarian, and one head zookeeper were aware of the decision. Although the keeper staff was generally aware of the collection changes and the ultimate goal of the zoo, only four staff members and the exhibit keeper (who became aware of the impending date a few days in advance) knew of the planned euthanasia date.

The inevitable news leak did occur and late in the afternoon on the day after the euthanasia, the director began to receive phone calls from the media. He emphasized to all callers that the tigers had been healthy and that this euthanasia was quite different from that involving the three seriously disabled tigers in 1982. He stressed the zoo's desire to once again take part in the effort to breed Siberian tigers, both to provide the public with tiger cubs to see and to help stave off the possible extinction of Siberian tigers.

Only one major Detroit newspaper and one suburban newspaper reported the euthanasia. Two TV stations also reported it. All media reports presented the facts in an unbiased manner and quoted the director on the reasons for the euthanasia. Maybe even more important in showing support of the zoo by the media was that one of our two major Detroit papers and one of our three major TV stations did not even report on the euthanasia.

This was in great contrast to the 1982 euthanasias where the zoo received hundreds of angry phone calls and more than 150 letters within two weeks. The 1985 euthanasias brought approximately 15 phone calls and five letters in the first weeks that followed.

Education of media personnel plays a tremendously important role in how euthanasia at a zoo is presented to the public, which in turn has a strong impact on the public's reaction. The media have to understand the zoo's position on euthanasia as a management tool and the reasons behind the decision. When the 1985 euthanasias were carried out, the media gave the zoo the opportunity to present its reasons and thus the emotional outburst against the zoo was avoided.

The Detroit Zoo is proud to present one of the newest additions to our collection: the first Siberian tiger cub born at our zoo in 11 years arrived on 19 September 1985.

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ASIAN ELEPHANT BREEDING PROGRAM
AT THE SAN DIEGO WILD ANIMAL PARK

By

Jean Hromadka, *Elephant Keeper*
San Diego WAP, Escondido, CA

Primarily due to habitat loss in its natural habitat, the Asian elephant's numbers are rapidly declining. A status report issued in the late seventies indicated that between 25,000 to 36,000 Asian elephants remain in wild populations but there is no indication that the numbers have increased since. Not only have herds been fragmented which makes it impossible for them to socially interact with other herds, but migration routes have also been disrupted. Due to economic and agricultural needs of an ever-increasing human population, not to mention the continued isolation and fragmentation of the herds, the future of the wild population remains grim.

In May 1984, the San Diego Wild Animal Park began the construction of its long-awaited Asian elephant breeding facility. By October 1984, the completion of the \$360,000 facility was made possible through private donors and members of the Zoological Society of San Diego. The construction of the isolation yards and barns for the Asian and African bulls had previously been completed in the first phase of this project. Besides providing seclusion for male elephants in musth, the specially constructed bull yard can be used to regulate births by isolating the male from females at appropriate times.

With a square footage of 3,745, the new breeding facility can comfortably accommodate ten cows. The barn is divided into four main areas. The isolation stall allows for sick or new animals to be housed separate from the herd. The largest area of the new barn is the center stall which holds the majority of healthy animals not yet impregnated. At the south end of the barn is the maternity stall. This stall will be equipped with three video cameras which will assist in monitoring all future births. Three observation windows were also included in the construction so that keepers could survey the animals from staff quarters without disturbing them. To prevent the calf from venturing from its stall, the steel pipes surrounding the maternity stall were installed eleven inches apart. Throughout the rest of the barn the pipes are set at twenty-four inches apart. Directly behind the maternity stall is the access chute. This stall can be used to offer additional space to both mother and calf, but also serves as an access to the combined bull and maternity yards located on the opposite side of this stall. Flehmen or sniff tests can be conducted here as well.

On 25 February 1985, the breeding program was under way with the introduction of our eighteen-year-old cow, Carol, to our nineteen-year-old bull Ranchipur. Out of a total of eight Asian cows, Carol was chosen because of her aggressive approach towards the male which was noted months before the introduction. These observations were made possible by removing two metal plates on the gate that separates the bull from the cow yard. Ranchipur took up residence at the Wild Animal Park in 1981 but, since he had no previous exposure to a herd of females, we were uncertain of his reaction. At first both animals were very inquisitive of each other which later led to Ranchipur eventually attempting to mount Carol on numerous occasions. Unfortunately, due to lack of experience and the unacquainted status of their relationship, an air of frustration and anxiety inevitably turned into aggression. Although Carol and Ranchipur to this date have not successfully bred, a stable relationship between the two gradually is taking shape and changes in their daily behavior are recognized and recorded.

On 8 April 1985, the second phase of this project initiated the introduction of a second cow. Cookie, a thirty-year-old female was chosen for the project because of her secure disposition towards the bull. It is our hope that if the bull was exposed to more than one cow, it would induce an additional sexual stimulus. Curiosity was Ranchipur's initial reaction towards Cookie, but his attachment to Carol remained steadfast. Ultimately, as weeks passed, numerous mountings were observed between Cookie and Ranchipur but, once again, no successful intromissions.

Every May for the past few years, Ranchipur has come into his annual musth period which usually lasts about three months. Whatever the explanation may be for the state of musth, it is not a condition directly associated with sexual activity, for elephants with inactive glands are frequently observed copulating and bulls in musth do not necessarily show interest in females. There is, nevertheless, a marked increase in the level of testosterone, the male sex hormone, in the blood of elephants in musth. Attitude and approach remained comparable towards both cows during this unpredictable time. It has been suggested from certain researchers that only captive bulls become aggressive while in musth. Ranchipur, on the contrary, displayed very little behavioral change to what even may be considered an apathetic presence around the females on countless occasions.

Since the bull demonstrated that he could be trusted while still in musth, two new cows were admitted on 23 July. Carol and Cookie were released into the cow yard from the bull yard by eleven o'clock in the morning. Immediately following the removal of those two cows, Cindy and Jean were allowed to enter. Due to her frantic reaction to the male, Cindy was extracted from the bull yard only an hour after the introduction. Instantly, Jean and Ranchipur established a healthy attraction for each other. Less than a week later it was decided to test the bull out in the cow yard. Investigation of other captive breeding programs led us to believe that it is imperative that the male and females are given the opportunity to familiarize themselves with each other before actual copulation can successfully occur. Most all of the known propagation projects that have produced Asian elephant calves also have a history in which the animals breeding were practically raised together or at least had time to become comfortable around each other.

Hopefully by allowing the bull access to the cow yard on a regular basis, the elephants will slowly build natural bonds between each other and, in turn, encourage spontaneous breeding. Initially when the bull was first let out with the cows, it ignited a series of hysterical repercussions which were shortly followed by affectionate rumblings. Originally, Ranchipur visited the cow enclosure two to three times a week during which time he spent the majority of his visit exploring the exhibit. Eventually each cow was inspected before the day was concluded with the bull being coaxed back into his enclosure by the keepers. At this point, a bucket of apples was enough to entice him back into his yard. Although there was a period here we found ourselves baiting him back home with a favorite cow and on occasion it took as much as a harem to get him to cooperate. Presently, he is out in the main exhibit which expands over a acre and a half five days a week. Fortunately, we are able to enter and exit the yard without any interference from the bull. Retrieving show and ride animals in his presence is easily accomplished. Additional caution was exercised around the bull after mid-August which marked the decline of his musth period. Ranchipur's behavior changed from a lacksdaisical, often oblivious attitude, to his typically alert, overwhelming personality.

ASIAN ELEPHANT BREEDING PROGRAM AT SDWAP, *Continued*

Those few days a week spent in his exhibit are usually shared with Jean and occasionally with Cha Cha, who was recently introduced. Ranchipur continues to attempt to mount Jean in his yard, but due to Jean's lack of maturity, she misinterprets his advances as innocent roughhousing. From the very first day in the cow yard the bull was frequently performing flemen test on every female he encountered on a daily basis. Sometimes the test initiates a precopulatory chase with the desired female which in turn stimulates him to strive for copulation. Mary, Jean and Carol appear to be his favorites, but interest is displayed towards the other females on specific days. Most of the bull's attention has been on Mary during the latter part of September. The majority of the behavior observed resembles mostly courtship in nature which involves leaning against each other, entwining each others trunks together and laying their trunks across the top of each others heads and backs.

Finally, on 29 September, after eight months of manipulating animals and exhibit space, Ranchipur successfully mounted Connie whereupon full penetration was witnessed. It is interesting to note that Connie was the only female to actively pursue the bull on the first day of introduction and had continued to present herself to him by constantly backing into him. During the first couple of weeks of Connie's persistent attention toward him, Ranchipur, for the most part, ignored but tolerated her unceasing, obnoxious flirting. Quite a few weeks passed before any concrete interest was directed from the bull to Connie. At the young age of twelve, she posses a remarkable insight into the mating procedure. Possibly her exposure to a male that previously was housed at the Wild Animal Park years ago helped her to obtain an instant composure towards Ranchipur.

On that eventful Sunday the bull exhibited unequivocal excitement whenever he was in close proximity to her. Startled by his uncontrollable badgering, Connie hastily sought refuge among herd members. Provoked by her actions, Ranchipur retaliated with the induction of the precopulatory chase. Desperately she managed to elude the bull for only a short time, using the herd animals as shelter and clusters of tree stumps which sufficiently obstructed him from achieving the necessary stance for a successful mount. After the fourth and final race across the length of the enclosure, Connie stopped suddenly and stood patiently as if she had resigned herself to the fact that there was no escaping him. As she calmly stood with her body facing downhill, without hesitation the bull positioned himself behind her and gracefully mounted her with very little effort. Of course inserting the penis into the urino-genital canal for the first time in his life took some practice. From start to finish the whole procedure took less than two minutes. Actual penetration required less than thirty seconds to complete but, with this being Ranchipur's first intromission, only about a fourth of the length of the penis was allowed to penetrate. Full penetration is imperative for the copulation to be considered successful. Immediately following the first intromission, both animals gently probed each other with their trunks especially around the genital area. Slowly they moved off together to another part of the enclosure as they continued to display courtship-like behavior. Several cows kept an inquisitive vigil on the breeding couple with Nita and Jean showing the most concern. Almost a half an hour later, the bull once again mounted Connie, this time on top of a dirt mound. Unlike the first mount, the second attempt was obviously executed on a poor site which not only caused Connie to buckle slightly under his tremendous weight, but, due to overexertion, prevented Ranchipur from regaining momentum to correct his awkward position. Earnestly, Ranchipur and Connie strolled to the far end of the yard next to the entrance of the show ring work area. Since the ground was a bit more level and the bull positioned

SIAN ELEPHANT BREEDING PROGRAM AT SDWAP, Continued

himself more accurately, the third attempt resulted with Ranchipur accomplishing his first successful copulation. Full penetration lasted under a minute which was postdated with affectionate gestures between the two elephants.

Before the animals were separated and brought in for the evening, three intromissions were recorded. Two of them occurred in the afternoon while the last interaction took place late in the evening. Since activity between the two elephants remained intense, we purposely kept them together as long as possible to encourage them to continue their courtship. Blood was taken from Connie that afternoon and a semen sample was collected after the third copulation. These were turned over to the park's hospital for evaluation. That evening, after sharing a few hours in the bull barn so that we could make sure both animals were eating, the pair were once again released, this time in the bull yard. During those extra four hours allotted them, Ranchipur mounted Connie a final time before we separated them for the evening.

Hopefully in three months we will be able to determine if Connie is pregnant. If she is, the bull will be kept isolated from the herd for six months. Then once again he will be allowed to interact with the cows and continue to propagate our Asian herd.

In order to obtain a clear understanding of the female elephants' estrous cycle, behavioral research is presently being conducted. For the first three months of the breeding project, 20 cc's of blood was taken three times a week from both Carol and Cookie. Also collected on a daily basis is 5 milligrams of urine from the same two cows. Presently the only definite way of determining estrous is by way of serum testing or radio-immunoassay. Zoo endocrinology is also conducting daily urine tests from the samples collected to look for rises in progesterone/estrogen levels. Recently, by the samples collected, we have been able to pinpoint estimated times when the two individual cows were ovulating. By examining Cookie's and Carol's hormone profile, we have discovered that Cookie was ovulating at the end of June and Carol was ovulating during mid-July. What's even more exciting is that it was also the same time when mating was attempted by the bull. Much is still unknown about captive breeding of Asian elephants, but hopefully through concentrated efforts we will be able to ensure the status of these magnificent mammals in today's zoos as well as in the wild populations.



Keeper's Alert

ZOOLOGICAL MICROCOMPUTER USER'S GROUP BEING FORMED

Purpose of the group is the exchange of ideas and techniques used in microcomputing. Plans are for on-line bulletin board and newsletter. All interested parties should contact: Richard Mazza, 46 Barrington Road, Bronxville, NY 10708.

SUCCESSFUL SEMEN COLLECTION FROM
A HAND-REARED CHEETAH (*Acinonyx jubatus*)

By
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San Diego Wild Animal Park
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INTRODUCTION

The South African cheetah (*Acinonyx jubatus*) is an endangered species whose wild population is reported at 5,000 to 10,000. Recognizing the cheetah as a species in trouble, zoological facilities worldwide have been attempting to create viable breeding populations that might offer a stronghold of cheetahs in captivity so their future existence is ensured. Although there has been limited success at a few facilities, the cheetah remains a very difficult species to breed in captivity, and researchers are looking for new methods to increase the captive reproductive success.

Artificial insemination is one method that may offer hope. One potential means of achieving this, being pursued at the San Diego Wild Animal Park, involves the collection of semen from a male cheetah, regularly and without sedation. A second possible means involves the freezing of the semen, producing a viable sample when thawed for use in future artificial inseminations. These procedures are being done by animal handlers and researchers with the cooperation of a hand-reared cheetah.

One important aspect of this entire project was the recognition by his keepers and handlers that the possibility of semen collection even existed. Certainly, other requirements in implementing the project were the researchers' knowledge and expertise, the creativity to try different techniques and the patience to see it through.

PARTICIPANTS

Pesach, the cheetah used for semen collection, is a three and a half-year-old male, born at the San Diego Wild Animal Park, rejected at birth, hand-raised as the sole survivor of the litter, and placed in the care and training of animal handlers for use in various education programs offered by the Wild Animal Park. He is a tractable, command-trained, leash-trained cat and works with the aid of positive food reward of beef heart and Monterey jack cheese. Hand-raising was chosen for Pesach due to the fact that he was the only one in the litter to survive and had no siblings with which to grow up. As a result, he was not considered a favorable cat for breeding. To our knowledge, no hand-reared cheetah has ever produced offspring.

There have been a total of six handlers, all female, who have worked with Pesach during his first three and a half years. Four of these handlers have been with him two years or more, and two have worked with him less than one year. Of the six, five have participated in the semen collection to date. It should be noted that only his handlers have physical contact with him and perform the collection procedure.

Dr. Barbara Durrant, a reproductive physiologist and a member of the Zoological Society of San Diego Research Department, is the lead researcher on the project. Dr. Durrant processes each sample, determines the important data, develops the diluent, the medium in which the semen is frozen, and executes the freezing of the sample. She is assisted by Susan Millard, a research behaviorist.

SUCCESSFUL SEMEN COLLECTION FROM A HAND-REARED CHEETAH, Continued

INITIATION OF PROJECT

From the age of four to five months, Pesach started exhibiting displaced sexual behavior. The recipients of this behavior were one of his handlers (a small woman with very light blonde hair), and certain of his "toys" -- cardboard boxes and rubber tires. Periodically, when in contact with this handler or offered these specific toys, he would attempt to mount them. This was an off-and-one sexual arousal continuing until he was about a year of age, at which time the tire and box became the primary stimuli to elicit sexual behavior. This occurred whenever they were in his cage, and Pesach would carry out the proper vocalizations associated with breeding activity, such as chirping and stutter-barking, mount the objects and even achieve complete ejaculations. Steps were taken with Pesach to discourage sexual behavior toward the blonde handler and results were favorable, although to this date he still exhibits sexual arousal in the presence of small, blonde women in uniform.

In October of 1984, after realizing the potential present with Pesach's behavior, Dr. Durrant set out to devise a method by which his semen could be collected. Many ideas and avenues were pursued, the most elaborate being the construction of a cheetah dummy made of a carpeted foam with sturdy, short metal-pipe legs and equipped with an artificial vagina (AV). This was a most impressive model to our eyes, but did nothing to elicit sexual behavior from Pesach. He simply enjoyed chewing on it.

PROCEDURE

In February 1985, we achieved success with Pesach by manual manipulation using the AV. The AV device is constructed of a short length of rigid hose, lined with surgical tubing folded back over each end of the hose. A second length of tubing lines the first, with one end folded over the hose (serving as a vagina) and the other end connected to a collection bottle. This method works best when two of Pesach's handlers perform the procedure. One handler enters his cage with a food reward, positioning the AV in such a way that the second handler is able to position the AV and stimulate him to achieve ejaculation.

Once collected, the sample is turned over to Dr. Durrant for analysis and freezing. Analysis includes recording the volume and pH of the sample and extraction of a small amount to later determine the sperm concentration. In addition, preparation and examination of a slide of the semen sample is performed to determine both motility and the speed of progression (SOP) of the sperm. The sample is then divided into vials in preparation for freezing. The diluent, which acts to protect each sperm while it is frozen, is added to the vials, which are then frozen in liquid nitrogen at -196°C. When freezing is complete, the sample is added to the "frozen zoo" in the Research Department at the San Diego Zoo.

RESULTS

The accompanying chart illustrates the results of the individual semen collections, showing the data for many parameters important when considering the semen sample as possible artificial insemination material.

Comparison of these semen collections (Durrant, 1985) with a limited number of cheetah semen collections accomplished with electro-ejaculation (Wildt *et al.*, 1983) shows that Pesach's average sample volume is less, average concentration of sperm per ml is higher, and average motility and SOP are similar.

CHEETAH SEMEN COLLECTION RECORD: PESACH

Date	(ml) Volume	(x 10 ⁶) Conc.	Motility	SOP	pH
1) 2-12-85	.54	30	3% (cooled)	2	-
2) 2-15-85	.20	10	10%	3	8.7
3) 2-19-85	.33	0	-	-	8.7
4) 2-27-85	.20	30	50%	2	8.7
5) 3-3-85	.20	15	15%	2	8.8
6) 3-25-85	.60	50	70%	3	8.6
7) 4-11-85	.60	35	70%	4	8.8
8) 5-9-85	.40	12.5	65%	5	8.8
"	.30	10	30%	3	8.8
9) 5-21-85	.60	25	70%	5	8.5
10) 6-13-85	.95	25	90%	5	8.5
11) 7-11-85	.50	2.5	-	-	8.5
"	.10	10	90%	5	8.9
12) 7-24-85	.60	22	65%	5	8.9
13) 8-1-85	.20	10	75%	4	-
14) 8-22-85	.70	25	0%	0	8.7
"	.80	2.5	0%	0	7.7
15) 9-5-85	.70	57.5	70%	4	8.4
"	.60	37.5	50%	3	8.4
16) 9-24-85	.10	20	0%	-	8.6
"	.35	20	0%	-	8.6
"	.35	2.5	0%	-	8.7
17) 10-17-85	.85	-	50%	3	8.5



SUCCESSFUL SEMEN COLLECTION FROM A HAND-REARED CHEETAH, Continued

Pesach's value as a sperm donor is increased many times because we are able to collect on demand, two to three times a month with little or no stress to the cat. Because the procedure is done the same way each time, Pesach quickly learned to associate the collections with the presence of Dr. Durrant and/or Susan Millard, even though they have never made any physical contact with him. His association manifests itself in normal male cheetah breeding behavior directed toward them.

Electro-ejaculation is never used and therefore no means of restraint or sedation are needed -- in fact, the cat is not even leashed, and the collections are carried out in his own cage.

Although we do not really consider Pesach's performance to be a trained behavior, the food reward has been an excellent means of control in positioning the cat properly for the easiest and best collection, and it adds to the routine nature of the procedure.

SUMMARY

Artificial insemination may become a realistic process benefitting the captive cheetah population, but only after many factors are examined and techniques perfected. By using the behavioral and physical data obtained from the collections, our researchers hope to:

- 1) Determine the normal parameters of cheetah sperm.
- 2) Accomplish the successful freezing of semen samples to facilitate their storage and transport.
- 3) Duplicate the process with other hand-reared male cheetahs (this has been accomplished twice to date).
- 4) Accomplish successful artificial insemination.

On submitting this paper, it is hoped that our success will inspire keepers who may see the potential that exists within their own animal collections.

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UTILIZING THE HANDICAPPED IN THE ZOO

By
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Washington Park Zoo's Education Division has an extensive adult volunteer program that runs year-round. There is a small percentage of the volunteers who are handicapped in some way, but wish to volunteer in some capacity and have their work considered useful and helpful to the community. Most are not capable of going out to schools, nursing homes or shopping centers with the various zoomobiles. The Education Division uses their abilities in various ways: stuffing envelopes and placing address labels on the many mailings that the department sends out each quarter are non-stressful tasks that stroke victims and the mentally retarded are capable of doing. Other activities include making footprint rubbings, cutting out items for classes, and making buttons that the volunteers sell. We used a few mentally handicapped persons in the Dove Walk-through Aviary to watch that birds did not get out, and to tally the number of visitors that entered the exhibit. This does not sound very exciting, but the mentally retarded couple who worked the dove exhibit enjoyed their time there; not losing any birds during the 'spring rush' was a plus for the zoo.

Since the Children's Zoo is under the Education Division, I have made use of an epileptic, an amputee, stroke and cerebral palsy victims, mentally retarded, emotionally handicapped, and the deaf. I must admit that teaching school for ten years has helped in working with the disadvantaged. Patience is essential!

The Children's Zoo with its domestic animals is a place where the handicapped can help with basic animal care without it being extremely physically demanding. In the beginning, I place all animals in holding cages and give step-by-step cleaning instructions. All are capable of doing dishes sweeping up straw, scrubbing and hosing - it just take some longer than others. When assigning cleaning chores, you must allow plenty of time for them to finish the job. For example, a cerebral palsy volunteer took three times as long to complete a cage as I did. You should also be careful where hoses and tools are kept in case any have difficulty walking. You need to check their work every so often to make certain that things are proceeding smoothly. I have found that some will clean an area for several months with no problems, and then leave a grate off a drain, or add twice as much straw as needed because it is cold outside.

Eventually, I give each person an animal handling session. Due to nerve problems, several have been unable to hold anything but a small animal, such as a guinea pig, for any length of time. I have them move the guinea pigs and dwarf rabbits into holding cages. I move the larger animals such as the French lop-eared rabbits, whose females average 12 pounds. Several of the stroke victims have been a help in the Children's Zoo during spring rush by holding animals for kids to pet, and making certain that the goats don't eat nametags.

I know of one instance where a handicap was not a hinderance but an asset in dealing with our "attack parrot", who had been abused. I had an amputee who had lost his forearm and had acquired a mechanical hook. This particular parrot liked to attack anyone, other than the bird keeper, who ventured to change her food, water, or cage papers. The amputee simply held the metal forearm above his good hand. The parrot, of course

TILIZING THE HANDICAPPED IN THE ZOO, Continued

Immediately tried to bite the metal hook. After several weeks of no response from the amputee, she gave up biting his "arm" and let him clean her cage. During this time period, I was feeding the bird her treats through the cage screening. I was not a threat to her, and the amputee or bird keeper cleaned her cage. By the time the amputee left in three months, the bird was accustomed to my feeding her and never tried to attack me if I cleaned her cage. This year the parrot is being used in the educational programs and allows several people to handle her.

It is not necessary to know sign language to work with the deaf. The two deaf boys were high school students. I had their counselors come the first day so that clear instructions could be given. Basic signs are easy to learn and the deaf are most helpful in showing them to you. One gets their attention by touching their arm, or hitting the countertop if their hand is resting on it. There are illustrated sign language books that can be of use to you. I found one with animal signs that was a help. I also have a chart showing how to sign the alphabet. Since Children's Zoo volunteers must be at least fourteen years old, the deaf students can read your instructions or write questions. To avoid problems, I have them work in the same area as me.

The Children's Zoo has also served as a half-way work situation for the Janis program drug-abuse kids. These are teenagers who are "clean" and need a chance to prove to themselves that they can handle a job situation. If you decide to assist with a program such as this, you must set up rules and expectations beforehand with the counselor. Even though they volunteer, treat their work as if it were a paid position and have them clock in and out. After the second week, together we select a specific chore that they will do each time they come in to work. Eventually, they have three specific chores to accomplish along with a variety of others that need to be done on that day. Of the four Janis program teenagers, only one did not work out. In this instance, we dismissed the person because we were never certain when he would show up.

The volunteer coordinator has pointed out the fact that many adult handicapped have been dealt with too tenderly or have been yelled at in a demeaning manner. Those who are emotionally or mentally handicapped usually have not been in a routine where if they do something wrong they must suffer the consequences. Many in the Janis program have not had a healthy relationship with adults where they laugh, argue and follow through with commitments in a constructive manner. There will be times when one must speak sharply to them, not to demean them personally, but to make them realize they do have responsibilities and must follow through with them. For example, it's best not to say, "You dumb kid, can't you tell time?". Instead say, "I expected you here at 11:00 a.m. and the goats were waiting for their feed. Since you were not here, I had to find someone to fill in for you. Lois, (our volunteer coordinator), really had some reshuffling to do. In the future, please make certain you call and let us know you'll be late or can't come in." Smile as you add, "We do really depend on you! Your substitute will be glad you're here so he can do his own job." It is not necessary to show malice, but the sharpness of one's tone will gain their attention and show them your concern about their error. Luckily, it takes a lot of agitation to raise my temper, but once I raised my voice and speak my mind, it is all over. Therefore, I can provide an environment where if an error is made and I do speak sharply, the error is corrected and the volunteer can continue to do a good job with appropriate "good strokes" the rest of the day. I enlist the aid of the volunteer coordinator to help reinforce their importance in our program.

UTILIZING THE HANDICAPPED IN THE ZOO, *Continued*

I would like to give you a case history of a 17-year-old boy in the Janis program. I'll call him J.P. (for the Janis program). J.P.'s counselor and I agreed that he would come one-half day, three times a week. The first two times, he did not show up using the bus schedules as an excuse. The counselor felt he would be productive if he could get him to the zoo, so he brought J.P. the next week with the understanding that he would lose house privileges if he didn't show up on his own accord after that. J.P. was extremely withdrawn and would barely acknowledge anything said to him. The first week, I worked along with him. The second week I worked in the same general area and gave cleaning tips as he went along. An important part of his rehabilitation was to tell him when he did a good job and how it helped me in my work. At coffee breaks, where he drank 24 packets of sugar in each cup of coffee, our volunteer coordinator would mention how glad we were to have his help, or ask him what he was doing that day. The first three months he invariably answered, "Really, I do help?". Over time, other educational staff members would reinforce his importance in the program or just stop to chat with him. The third week we agreed that he would be responsible for cleaning the ducks everytime he came in. Although still withdrawn, he requested that he come in every day. I agreed

About the third month, J.P. was carrying on conversations and tentatively telling jokes. I laughed at them, weird or funny, or said some were "gross". He asked the relief keeper, who he thought a "fox", why we kept our purses in a locker where he could steal from them. She replied that we trusted him and besides he was the only other person there. I was surprised and pleasantly pleased when he informed me of this conversation with her and that he felt amazed that we trusted him. I confirmed the fact that we were treating this as a job situation, and yes, he could be tempted, but we also trusted him to respect our property as we respected his. When he left us several months later, he very proudly announced that this was the first place he ever worked and never stole from anyone.

At this time, the bird keeper, Ralph, whose area is next to mine agreed to show J.P. how to clean the bird cages. As Ralph so aptly put it, J.P.'s testosterone was beginning to poison his system. While cleaning cages or doing dishes, Ralph would listen to his jokes and discuss girls with him. These added duties in the bird area, and a positive contact with a male adult in Ralph, really helped J.P.'s progress. Because of his progress, his counselor arranged for J.P. to work at the zoo through the CETA program so he could receive pay for his work. He did have occasional lapses where he wouldn't clock in and received the appropriate "chewing out". A preset consequence was that his pay was docked for not clocking in every day he was present. He also knew if I was not pleased with his work and would tell Ralph that "He was in trouble today".

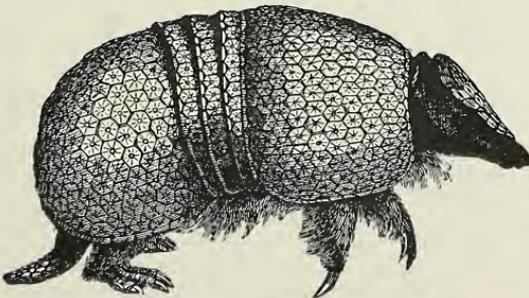
When he was here four months, I acquired another handicapped student whose mind was sharp as a tack when it came to facts and figures, yet he had great difficulty coordinating movements. I taught him to wind up a hose by "drawing" the hose around its hooks. Sweeping took a great deal of time because he would lose straw from the dustpan to the garbage can. By this time, J.P. was feeling secure in his duties and took it upon himself to teach the new boy how to clean the barns. I was surprised at J.P.'s patience, because it took about a month to teach the other boy how to tie a knot in a garbage bag. J.P. would say, "Now watch me", and show him repeatedly how to tie the knot and then come into the kitchen and vent his frustration to me. This provided the opportunity to discuss another's shortcomings and how he really was helping the other boy. By now, J.P. knew I kept his confidences, so he told me about movies he'd seen, records he wanted, girls he'd talked to or dated, and asked about clothes he wanted

UTILIZING THE HANDICAPPED IN THE ZOO, Continued

o buy. We also had long discussions on his going back to school to obtain his GED. We also worked on slowly getting him to decrease his sugar intake from 24 packets to four per cup of coffee. I took him out to lunch on his eighteenth birthday. J.P. stayed with us until our high school summer Children's Zoo program began. By then, he still had a few minor lapses in responsibility, but was outgoing and could relate to adults in a positive way.

The test of the program is when you are trained, yelled at if necessary, go on working but feel good about yourself, come back the next day, smile and say you like to be here. Many of our volunteers express those feelings. It is worth the effort when the Janis boy comes back a year later just to help for the day and because he wants to tell you he is studying to take his GED and was still down to four packets of sugar in his coffee. The latest mentally retarded boy got a job this summer after working in the Children's Zoo this past winter.

Each zoo is different, but if there is a way to use any of the disabled or help with a half-way house, I suggest you give it a try. One morning a week can give someone a sense of well being that he or she helped you in some way. One just has to plan one's schedule to allow time for them because in the beginning they need more supervision than regular volunteers. Tell them what to wear, what time to meet you and what is expected of them. They should have a current T.B. test and a tetanus shot within the last ten years. It is best to schedule one person per day. I have had three handicapped persons at a time, but again, I've worked with them for several years. The younger generation of handicapped are being expected to do more with their lives and are not treated with tender gloves as were any of the older generation of handicapped. At break time, we have coffee or tea for our volunteers in the volunteer office. This is a place where they can discuss upcoming events or news with other volunteers or staff. At our annual volunteer banquet, they are given a calendar and a Peacock Award thanking them for their help during the past year. I feel, in turn, help give them an added dimension to their lives that they could not normally have by providing a service to their community. The catchword is patience!



BREEDING THE TAWNY FROGMOUTH
(*Podargus strigoides*)
AT THE METRO TORONTO ZOO

By
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Oliver Claffey, Senior Keeper
George Rason, Curator of Birds
Metro Toronto Zoo, Ontario, Canada

Tawny frogmouths are members of the nocturnal family Podargidae of which there are twelve species. They are widely distributed throughout forested regions of South East Asia and Australia, with two species occurring in New Guinea. They have soft, cryptically-colored plumage resembling bark or deadwood and are about 47mm in length.

In June 1983, the Metro Toronto Zoo received 2.2 captive-bred tawny frogmouths (*Podargus strigoides*) from Adelaide Zoo. Initially, they were housed in a diurnal exhibit (approx. 4m x 2.6m x 2.4m) and settled in well. Their diet consisted of three dead mice each daily offered by hand. The mice were supplemented with vitamin E and Rogar SA-37 capsules inserted via a small incision in each animal.

It took only a short time for the birds to display individual personalities. One appeared unfriendly and gaped aggressively whenever a keeper approached - he was named "Oscar the Grouch". The second male was more placid and a good feeder and was called "Tony" frogmouth. The females were named after female keepers in the area: Beverley and Rebecca. Bev was flighty and often refused her mice while Rebecca ate well and was a quiet bird. Both of our males are larger and grayer in color while the smaller females are much browner in their feathering especially head, nape of neck and wings.

On 12 December 1983, after six months in their temporary exhibit, the frogmouths were moved to a newly completed display in the nocturnal wing of the Australian Pavilion - "The Edge of Night". The light cycle was set to simulate the Australian summertime - 14 light/10 dark. On 30 December and again on 1 January, Oscar was observed copulating with Rebecca. He was then observed on 4 January 1984, gathering twigs and attempting to build a nest on top of a large root system in the aviary. More nesting material was added to the exhibit but the birds were very poor at nest building. So a nest was constructed around a metal food bowl holder by the keepers and on 6 January this was placed in the exhibit approximately 1.5 meters above the ground. The area in which the nest was situated was bounded by two walls and the solid door into the display - the effect of being enclosed on three sides appeared to give the birds a sense of security.

Tony was observed sitting on the nest on 7 and 9 January while Oscar was busy gathering twigs. On 10 January, Oscar was observed sitting on his twigs piled on the stump so a second prepared nest was installed on the opposite side of the exhibit. Some thirty minutes later, Rebecca was on the new nest, rearranging twigs. However, the second nest was never fully accepted by the birds due, in part we feel, to the fact that it was enclosed on only two sides and, possibly, too open. Tony remained on the original nest but flew to Rebecca's nest occasionally.

Copulation between Oscar and an undetermined female was reported by a volunteer on 21 January. On the next day, Tony was copulating with Rebecca.

FEEDING THE TAWNY FROGMOUTH AT THE METRO TORONTO ZOO, Continued

id was observed rearranging the original nest. However, 23 January found scar on the nest. Two days later, one broken egg was found in the pool during the morning servicing and on 26 January, Oscar was sitting tight.

On the 27th, there were two eggs in the original nest and all birds were either sitting or trying to sit on the nest throughout the day. From 27 January to 29 January the incubating duties were shared by all birds but on 30 January just the males were observed on the nest. All four were again involved in sitting on 31 January and 1 February.

It was decided to separate the birds into pairs to try to avoid eggs being broken as birds jostled for a position on the nest and to give us an idea of which birds were the parents of future clutches. As Oscar had been observed treading Rebecca more frequently, they were left in the display. Tony and Bev were removed to a holding area of much the same dimensions. See Chart I)

The pair in the display continued to share nesting duties but on 10 February both eggs were found broken below the nest. One had a developing embryo, the other appeared to be infertile. It was suggested that the nest was too high (1.5m) and it was lowered to .8m (approximately knee level when the keepers were working in the display). Oscar and Rebecca started to construct a new nest on a stump, abandoning the lowered nest immediately.

On 20 February both females were sitting on nests - Rebecca on the stump. On 7 March one egg was found in the nest in the holding and Tony was sitting tight. A second egg was observed on 18 March - the birds had been disturbed as little as possible so a laying date is unknown.

Two dummy eggs were placed in the display to attempt to induce egg laying - one in the lowered nest and one in the stump nest - but were removed three days later as the birds showed no interest in the nests.

On 31 March, 0.0.1 chick hatched to Tony and Bev in the holding, 24 days after discovery of the egg. The second egg was candled on 2 April and found to be infertile. A bed of camel hair was spread under the nest to cushion the fall in case the chick fell out.

CHART I

	<u>Original Exhibit</u>	<u>New Exhibit</u>	<u>Holding</u>
Length	4 m	3.7 m	3.8 m
Width	2.6 m	1.8 m	1 m
Height	2.4 m	2.4 m	2.5 m
Day/Night Hours	10/14	10/14	14/10
Nest Height	-	1.5 m	1.8 m

On 1 April, the chick had a good gape reflex and was offered two small pieces of mouse flesh via tweezers. Pieces of mouse were left on the nest to allow the parents the opportunity of feeding the chick. The next day, the chick appeared less active with no gaping action but did eat several pieces of skinned and dismembered mouse from tweezers. Again,

food was left on the nest but it appeared the parents were not inclined to offer food to the chick. Actually, the male was the only bird observed sitting on the eggs or chick.

Day 3 found "Tiny" weaker and it took some effort to get his mouth open. Once stimulated, however, he ate 1/3 of a pinky while held in the keeper's hand. (Prior to feeding he weighed in at 30.6gm). The chick's eyes were still closed but he was using his claws to grip. The down on the back was a very light brown, the rest white. Slight vocalizations were heard while handling "Tiny". After receiving five drops of water from the fingers, he sat up and flapped his wings in an uncoordinated fashion. For the first time "Tiny" was offered, and took, more food in the afternoon - not trusting the parents to feed him. On the 4th, "Tiny" was much stronger - gaping as soon as Tony was moved off the nest. He ate 1/2 minced mouse trunk (skinned and dismembered) in the morning, refused food mid-afternoon, but ate again in the evening two pinky trunks, gaping for both. Slight weight loss was evident when he was weighed, 28gm.

Day 5 and "Tiny" was stronger. Both eyes were beginning to open and a fecal sac was found under the nest. Food was offered and accepted three times during the day. Weight up to 32.4gm.

On the 6th, "Tiny" was fed in the nest after moving Tony off and he ate whole pinkies for the first time. There was a noticeable improvement in strength (good gripping action of feet) and activity and weight 38.7gm. Feather cones were evident on the wings and starting to develop along the spine.

On 8 April "Tiny" weighed 50.35gm. Tony was observed holding half a mouse in his beak while "Tiny" gulped and tore at it. When the chick gave up, Tony swallowed the rest. A second fecal sac was found under the nest.

Until the 10th day, the female appeared indifferent but on this day she became aggressive toward the keeper, vocalizing and snapping her beak while the chick was being fed. A VCR and camera were set up outside the cage with a monitor being installed in the pavilion kitchen. With the help of the VCR we were able to observe the interaction of the chick and his parents, saw him develop preening techniques, saw the parents feeding the chick and vocalizing.

On 13 April, "Tiny" weighed 114.15gm. He was now eating six pinkies a day at 3-4 feedings (half-mice were also accepted) from the keepers and food was also being left on the nest - some of which disappeared. He spent some time preening his new grey feathers along the back and wings. The white down on his head was being replaced with grey as well.

A week later, 20 April, "Tiny" was eating whole mice (with vitamin supplements added) and his weight was up to 180.9gm.

By the 28th day, "Tiny's" weight was 243.5gm and he was now observed "posing" as frogmouths do and displaying threats with wings spread and a fierce look in his eyes. Via the monitor, it was noted that "Tiny" spent more time daily exercising his wings, stretching and flapping. As the nest became too small to accommodate an exercising juvenile and an adult, both parents spent more time on the wooden railing approximately 1m down from the nest, calling softly to "Tiny". On the morning of 3 May when the keepers did their morning rounds, "Tiny" was found sitting on the rail with his parents. When returned to the nest, he promptly flew down to the rail again. He continued to fly back and forth over the next

REEDING THE TAWNY FROGMOUTH AT THE METRO TORONTO ZOO, *Continued*

ew days gaining strength. Food was now being offered twice a day, vitaminized in the morning and hand-fed, while the afternoon/evening meal was just left for the birds to eat if they were so inclined.

ot to be outdone, Oscar and Rebecca had not been idle once the nest was raised to the original height. On 12 May, one egg was laid and a second found on the nest on 16 May. Interestingly, the pair on display shared incubation duties and on 8 June one egg hatched an apparently strong and healthy chick. Although he ate mouse parts and pinky pieces on 9 June, he was found dead on the camel hair below the nest on the morning of the 10th. The remaining egg was pipping and hatched overnight. Two days later the chick weighed 17.95gm.

his chick "Big Bird" was raised in much the same way as "Tiny" was; the fact that the public had access to view the aviary had no apparent effect on the birds. Nor did the fact that the light cycles were reversed i.e. the birds on display were subjected to 14 dark/10 light while in the holding it was more like 14 light/10 dark.

On 1 July, Rebecca held a mouse in her beak and offered it to "Big Bird" - to our surprise he ate the whole thing. This happened again on 6 July. On 9 July, "Big Bird" left the nest.

Since then we have bred five more tawny frogmouths: Oscar and Rebecca produced "Woodstock" on 11 October 1984; Tony and Bev hatched "Gibson" on 7 February 1985; Oscar and Rebecca hatched a pair of chicks "Ewok" and "Mopoke" on 19 May and 23 May 1985; and Tony and Bev again produced a single chick "Anzac" on 23 May 1985.

We have found that the parent birds are becoming more adept at "parenting", and more aggressive towards the keepers with each rearing. The pair of chicks raised by Oscar and Rebecca are especially "wild". It is quite conceivable if we can offer a supplement to the initial diet by way of soft bodied insects (as would be the case in the wild), the parents would take over total rearing. It is not known whether the color variation is a dimorphic characteristic, but we are finding that the chicks are showing color and size variations similar to their parents.

Our goal is the rearing of a second generation from these Canadian born frogmouths.

Thanks to all staff at Metro Toronto Zoo who helped out, one way or another, in the Tawny Frogmouth project.



HUSBANDRY AND BREEDING OF THE
TWO-COLORED GIANT SQUIRREL
AT THE WASSENAAR ZOO, HOLLAND

By
Frits Hoeksma, Zookeeper
Wassenaar Zoo, Holland

Since 1975 the Wassenaar Zoo has exhibited the Malay or Two-colored Giant Squirrel (*Ratufa bicolor phaeopela*). In 1980 we made changes in the husbandry techniques for this species and from that time on young squirrels were born one after another. To date, seven squirrels have been born and reared at Wassenaar, probably more than in any other zoo.

Besides the Malay Giant Squirrel the genus *Ratufa* has another three subspecies which are all approximately the same size (340-350 mm. including tail); only the color of the pelt is different. All species live in Asia in India, Nepal, North Vietnam, High Burma, South China, Thailand, Malaysia, Laos, Sumatra, Java and Bali.

The squirrels at the Wassenaar Zoo have a shiny black-colored back and a gold-colored belly. The long black tail is longer than the body at about 30 cm while the body measures about 25 cm in length. Each subspecies can also be very different in color. The number of subspecies is not certain yet.

Hardly any research has been done concerning the life and behavior of these animals in the wild. This is not so strange since the squirrels live in tropical and sub-tropical forests, high in the trees and they seldom come down to the ground.

The first Giant Squirrels arrived at the Wassenaar Zoo in 1975 and in the first years two of three specimens were kept in mixed-species exhibits with Phillipine Slender-tailed Cloud Rats and other small tropical squirrels. Their small cage was kept very tidy and cleaned every day. Furthermore, small wooden nestboxes were hung in the cage and some branches were provided as additional furniture. At first everything seemed to go well, but at times the animals became very aggressive towards one another and had to be separated. There were also no breeding results and this was what we hoped to achieve with this species which rarely breed in captivity.

In 1980, Paul Wisse, one of our zookeepers at that time, suggested a totally different approach to the husbandry of the Giant Squirrels and the directors of the Wassenaar Zoo agreed. The cage was enlarged to twice its former size and leaves were thrown all over the "sterile" floor. Several branches and tree trunks were placed here and there in the cage. Various kinds of trees were used including birch, maple, oak, willow, poplar and beech. The squirrels were excited and remained constantly busy building nests. The male as well as the female marked the large trunks with urine.

Because of all this vegetable material the diet of the squirrels changed radically. Seeds and leaves were especially welcome additions to the normal diet which consists of rodent mixture, parrot mixture, mixture for soft-billed birds, sanovite and some monkey pellets together with vegetables, fruits and eggs supplemented with vitamins and minerals. Peanuts and bananas are favorites. The food is given once a day.

Because the squirrels kept busy building nests and also ate a part of the branches and leaves, fresh branches and leaves were brought into the cage regularly. The large trunks were not removed so as not to disturb the animals.

HUSBANDRY & BREEDING OF THE MALAY GIANT TWO-COLORED SQUIRREL, Cont'd

This and feeding the animals was the only direct contact between the zookeepers and the animals. The squirrels were now less aggressive towards each other until one of the females built a large nest on the floor (1m diameter). This female behaved aggressively towards the other two squirrels (1.1) as soon as they approached her nest.

THE FIRST YOUNG: Although none dared to believe, it seemed as if a squirrel had been born. Checking the nest was difficult as it was very large and there was the risk that it would collapse and that the mother would be disturbed. It was decided to leave the mother alone.

After several weeks of waiting a rather large young was seen near the nest on 4 May 1981. The back of the animal was brown-colored and later the age was determined to be six weeks. Three weeks later the little squirrel was less shy and stayed out of the nest nearly the whole day. During this time the second female had to be removed from the cage because she was under continual attack by the male.

Until this birth the only other successful breeding results had occurred at the Nandankanan Biological Park in Orissa (India) and in the London Zoo. But also in these zoos the breeding results were not satisfactory. In the N.B.P. of Orissa only three of the six young lived longer than two days (in the period 1972-75) and in the London Zoo only two of the - probably - four young grew up (in the period 1976-78). According to the International Zoo Yearbook of 1978, Giant Squirrels were born in the Bristol, Saarbrücken and Rotterdam Zoos. All these squirrels died at a very young age.

Hoping for more success, the zookeepers at the Wassenaar Zoo began to reorganize the enclosure by bringing in fresh material and placing bamboo baskets hanging from the walls and ceiling. The animals, at this time two adults and one young, were now able to make nests in the trees. In December 1981, a four-week-old young was discovered near one of the nests.

At that time a large outdoor exhibit was created measuring 6 x 7.50m which the squirrels enjoyed very much. They also built nests there. In April 1982 a third young was born - a female of about four-weeks of age at the time of discovery. To make more room for the animals it was decided to send the two eldest offspring (1.1) to the Copenhagen Zoo in Denmark on breeding loan.

Until that first birth no mating of Giant Squirrels was ever recorded at the Wassenaar Zoo and the only sexual activity the animals exhibited was chasing each other. There are no details about the length of pregnancy, but in the N.B.P. of Orissa there were only 94 days between the two births in 1974. In the Wassenaar Zoo the period between the two births in 1982 was a few months longer. In October 1982 another four-week-old female was discovered. It was also discovered that when the young becomes more independent, it breaks down the birth-nest together with its mother and builds a new nest elsewhere. The mother does not use this nest but builds another one for herself (and the next young).

At this time it was decided to check all the nests daily during feeding times. A lamp was used for the nests were very dark inside. The animals were not disturbed and each received a tidbit to make them less shy.

The fifth young was discovered on 2 March 1983 near the nest of the mother. It was very small, only two or three days old, and it had little hair. However it was already two-colored: dark-blue on top and beige underneath.

The length of the body was about 10cm and the length of the tail 5cm. When approached the squirrel appeared very frightened so it was decided not to weigh or measure the animal. In the N.B.P. of Orissa the average weight and length of the squirrels right after birth was respectively 75.5 grams and 27.3cm (including a tail of 12.1cm). The first young there opened its eyes after 22 days and the second young after 27 days. At the Wassenaar Zoo the squirrel opened its eyes after 15 days but they were still covered with a blue mist. As the mother got very nervous and started to drag the young from one nest to another, it was decided not to disturb the animals anymore but the young was still seen in the rather open nest.

Because the birthdate of the last-born squirrel (a male) was now known, the ages of the other four young could be determined. Two other squirrels were born in August 1983 and May 1984. The reason for the long period between the two births is not clear. Surplus population could possibly be a cause. In the period before the last birth, two males and four females lived together in one cage and they sometimes fought each other.

In the summer of 1984 the indoor and outdoor cages were enlarged. The indoor cage measures 100 cubic meters and the outdoor cage 180 cubic meters. In spite of the large cage the squirrels were fighting a lot. The breeding male especially fought regularly with his eldest daughter. On 19 December 1984, the breeding pair was separated from the young ones and everything was quiet again. Matings were observed sporadically, but unfortunately no young have since been born.

On 15 March 1985, a pair of Giant Squirrels arrived from the Saarbrücken Zoo in West Germany. These squirrels have never bred successfully although the female has had several miscarriages. As the condition of this female is not very good, we are considering placing the male together with one of the eldest daughters of our breeding pair.

CONCLUSION:

Giant Squirrels are kept only rarely in zoos. The ISIS computer system, in which mainly American Zoos are being listed, shows that only five zoos in America house this species. Although not considered an endangered species, the Two-colored Giant Squirrel is listed on Appendix II of CITES.

It is of great importance that zoos which possess this species cooperate together, as explained in this lecture. Breeding the Giant Squirrels is certainly not impossible provided the necessary precautions for the right accommodations for them are taken.

I hope that this lecture has contributed to enlarge the preservation of Giant Squirrels in zoos.

With thanks to:

My colleagues Ria Bakker, Leo Hulsker, Ellen van Kerpel and Paul Wisse. Our Assistant Director John Rens

Our secretary Bertie Hatef, who took care of the translation.

My joint-editor of the HARPIJ, Koen Brouwer. The HARPIJ is the Dutch professional journal for zookeepers, in which a summary of this lecture was published.

Our photographer, Oscar den Bogert, who took the slides for this lecture.



PRACTICAL ASPECTS OF THE HUSBANDRY AND MAINTENANCE
OF MAGELLANIC PENGUINS (*Spheniscus magellanicus*)
AT THE SAN FRANCISCO ZOO

By
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Magellanic penguins (*Spheniscus magellanicus*) are found along the coasts of Chile and Argentina, throughout the islands of the Cape Horn region, and in the Falkland Islands off the Patagonian coast (Boswall and MacIver 1975). Although numerous in the wild, there have been few colonies exhibited in zoos and, therefore, little information has been available on their basic care.

This paper details the husbandry and maintenance of a colony of wild-caught Magellanic penguins. In Section I we describe the exhibit, the arrival of the penguins, and their subsequent adjustment to our facility. In Section II we cover the routine procedures of caring for the penguins (i.e., food preparation and feeding, exhibit maintenance, environment, handling techniques, diseases and mortalities). Section III describes the chronology of the first breeding season in captivity. The Appendix suggests a hand-rearing protocol.

SECTION I: ARRIVAL AND ADJUSTMENT

The Exhibit. A remodeled outdoor reflecting pool was an ideal habitat for maintaining and breeding a colony of penguins. The exhibit consisted of a rectangular pool 57m x 11.4m x 0.8m (188 ft x 37.5 ft x 2.5 ft) and a central island 29m (95 ft) long and 5.8m (19 ft) at its widest point (Fig. 1). This configuration allowed the penguins to swim at top speed and perform other aquatic behaviors (porpoising, bathing, etc.) without encountering obstacles (Gailey-Phipps 1978; Todd 1978).

Our raised hills of earth (average height 0.5m or 20 in) were formed on the island. Thirty-six fiberglass half-cylinders were embedded in the hills to start and support the burrows that the penguins would dig and use as nesting sites (Fig. 2 and 3). In the wild, Magellanics (as well as other *Spheniscids*) dig burrows which provide shelter from the sun and protection from predators. Magellanics excavate burrows in flat ground but prefer tunneling into the banks of hills (Boswall and MacIver 1975).

Initially, the earth hills were covered with sod, but this coating deteriorated rapidly and was replaced with cement. Large carpets of artificial turf were placed over the cement and provided a dry, non-abrasive surface which reduced foot problems. Two thick plantings of pampas grass (*Carlina selbana*) at either end of the island provided windbreaks and nesting materials. The other predominant plant on the island was cordyline palm (*Cordyline australis*).

A high-pressure jet supplied the pool with fresh, non-chlorinated water from an underground well which was occasionally treated with small amounts of copper sulfate to retard algae growth. We drained and cleaned the pool three times weekly and, although the water was not filtered, quality tests determined that it was pure (coliform count of less than 2.2 ppm).

Originally, decorative volcanic rock functioned as haulouts for the birds.

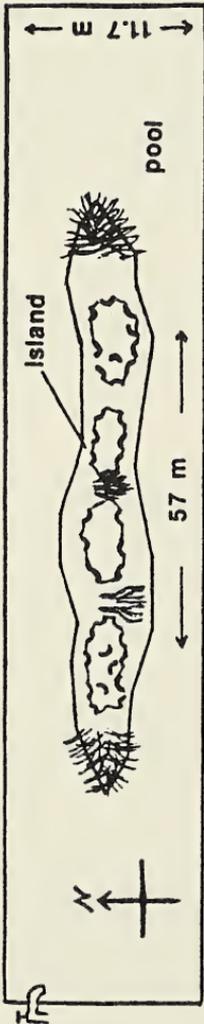


Fig. 1 Overhead view of exhibit.

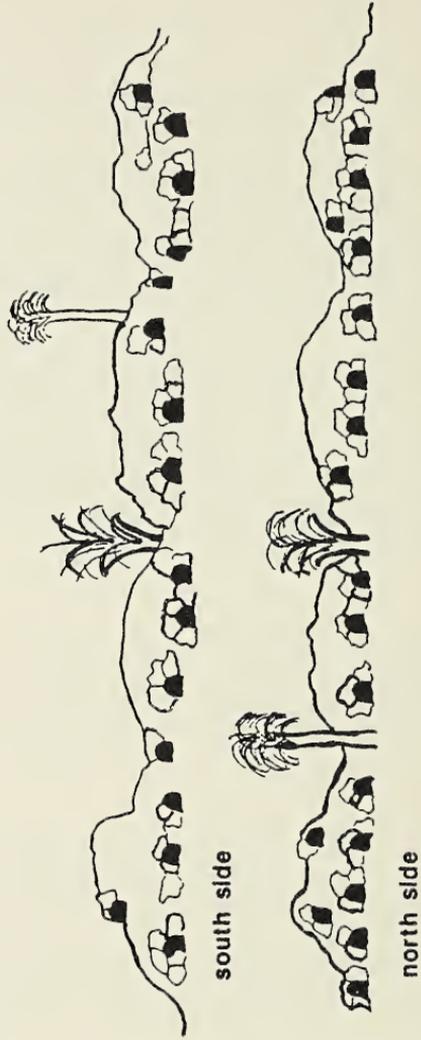


Fig. 2 Map of Island showing burrow locations.

...e found, however, that the porous rocks harbored debris and algae, and we
...ave temporarily replaced them with stacks of cinder blocks.

...enguins' Arrival. On 11 May 1984, 67 adult Magellanic penguins of unknown
...ender arrived at the zoo. They had been wild-caught off the coast of Chile,
...nd had been quarantined in New York for approximately one month. Upon their
...rrival, we weighed the birds, took random blood samples, and noted any un-
...sual conditions. Weights ranged from 3.4kg - 5.2kg (7.5lb - 11.5lb). We
...ssigned each bird a number and banded it with a hospital-type plastic
...dent-A-Band[®] fastened around the base of the flipper. We then released
...he penguins into the exhibit and closely monitored them for several weeks.
...leven birds were surplused in June 1984.

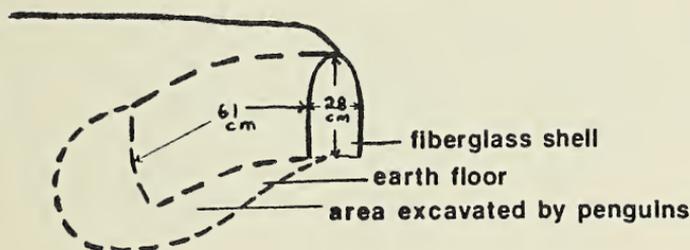


Fig. 3 Cutaway of burrow (side view).

...adjustment. At first, the penguins were shy and fled from the keepers.
...ne regular keepers spent a great deal of time with the birds to accustom
...them to people. After a few days they became more relaxed and allowed close
...approach.

...is essential to hand-fed penguins and to maintain individual consumption
...records (Fig. 4). While there are two normal periods of fasting (molt and
...pre-breeding season), prolonged loss of appetite is generally indicative of
...illness. Birds should be fed by their regular keepers to insure that each
...receives sufficient food and the prescribed nutritional supplements (Fowler
...1978; Lensink 1978). Penguins learn to recognize people and are more like-
...ly to eat if consistently fed by the same keepers. Daily hand-feeding pro-
...vides an excellent opportunity to monitor each bird's overall condition,
...and it also encourages positive interaction between penguin and keeper.
...After much trial and error, we developed a successful hand-feeding technique.
...First, it was helpful to get a bird's attention by waving a fish up and down.
...When the fish was tossed to the penguin or placed headfirst in the bird's
...mouth. The penguins were encouraged to approach the keepers as closely as
...possible. Birds that did not eat within a few days were isolated away
...from the exhibit until they took fish from the keepers.

...An important part of the adjustment process was the birds' adaptation to
...the six-month difference in seasons between the southern and northern hemis-
...pheres. This shift was most obvious in its effects on the penguins' breed-
...ing and molting cycles. Before their capture, the birds presumably molted
...in March 1984, and they were in good feather when we received them in May.
...As we anticipated, most did not molt again in the fall of 1984, although
...six birds did complete a second molt and 15 molted partially. By August
...1985, those penguins that did not molt twice in 1984 had brittle, faded
...plumage, and a few suffered severe feather loss. All of our original birds
...molted completely during September 1985.

PRACTICAL ASPECTS OF THE HUSBANDRY & MAINTENANCE OF MAGELLANIC PENGUINS
 AT THE SAN FRANCISCO ZOO, *Continued*

Prior to the molt, which followed the breeding season, appetites increased dramatically and some birds doubled their weight. This additional weight is necessary to sustain them during the molt fast. Bare facial skin around the eyes and beak yellowed, and began to slough. Following the period of gorging, the subcutaneous mass of new feathers and increased vascularization caused the body to swell and the flippers to double or triple in width (Gailey-Phipps 1978). At this time, we checked their flipper Identification-Bands® frequently for signs of constriction, and bands that were too tight were removed and replaced. The new feathers supplanted the old within 7 to 10 days. During this period the birds were aloof and lost interest in food; however, we attempted to feed them to maintain their good health (Todd 1978).

	A.M.			P.M.			ID	A.M.			P.M.		
	R _K	Plain		R _K	Plain			R _K	Plain		R _K	Plain	
1.							43						
2.							44						
3.							45						
6.							46						
8.							49						
9.							50						
10.							51						
11.							52						
14.							53						
15.							55						
16.							56						
17.							57						
18.							59						
19.							61						
20.							63						
24.							64						
25.							65						
26.							67						
27.							70						
29.							71						
31.							72						
32.							73						
35.							74						
36.							75						
37.							76						
39.							77					 	
40.							78						
41.							79						
42.							80						
Date: 15 October, 1985							81						

Fig. 4 Sample daily feed chart. (15 fish per kg)

SECTION II: HUSBANDRY

Food Preparation and Feeding. Initially the penguins were fed both Pacific herring (*Culpea harengus pallasii*) and whitebait smelt (*Allosmerus elongatus*) to provide them with a variety of fish sizes. [According to Boswall and McIlver (1975), wild Magellanic eat small fish and squid.] Once the penguins were taking food out of hand they could eat fish up to 22cm (8.5 inches) in length. Herring was chosen as the primary diet because of its superior nutritional value, containing more protein, fat, vitamin A and calories per pound than other commonly fed species (Fowler 1978; Todd 1978). Smelt, however, is lacking in two essential fatty acids and was phased out (Penney 1978).

We prepared the fish immediately prior to feeding, since thawed fish degenerates rapidly and the buildup of thiaminase can cause serious vitamin deficiencies (Fowler 1978). Frozen blocks of fish were immersed in cool running water, and as individual fish were thawed they were separated and refrigerated. Any fish not used within three hours was discarded. We closely monitored the quality of the fish and any that were mushy or broken were not fed out (Todd 1978). Food containers were cleaned daily with Roccal[®] and then thoroughly rinsed.

Although herring is very nutritious it is still necessary to supplement the diet with vitamins and minerals. Prior to each feeding, pills or capsules were inserted into the fish through the gills (see Table 1 for supplement regimen). These "medicated" fish were given to the penguins before they were fed plain fish. We fed the birds twice daily, but we tried not to overfeed in the morning so that they would be more likely to take their afternoon supplements. After the birds had received both morning and afternoon supplements, they were fed as much fish as they wanted.

Once a week each penguin was given 10mg of ketoconazole as a preventative and control for aspergillosis. This was administered as a liquid suspension made by dissolving tablets of Nizoral[®] in sterile water, with two drops per tablet of 0.2% hydrochloric acid to maintain an even dilution. For each 20 doses, one 200mg Nizoral[®] tablet was dissolved in 10ml water. A #0 gelatin capsule (0.5ml) was filled with the liquid suspension using a eyedropper, and inserted into the fish. This procedure worked well with two people: one to make the capsules and the other to quickly insert them into the fish before the capsules became soft. Our penguins do not appear to have suffered any toxic effects from this dosage of ketoconazole.

During the first year, one-fourth (3.5mg) of a Primaquin[®] tablet was added daily to the supplements as a prophylaxis for avian malaria. In addition, ferrous gluconate was added twice weekly to minimize anemia. To date, malaria has not been a significant problem, and on 1 August 1985 we removed Primaquin and iron from the regimen to avoid hemosiderosis.

Gulls (*Larus occidentalis*, *L. argentatus* and *L. californicus*) caused problems at the exhibit by stealing fish and harrassing the penguins. We strung wires over the exhibit to discourage them, and we added more lines during the breeding season to protect eggs and chicks. No eggs or chicks were lost to gulls.

Exhibit Maintenance. The penguin island was hosed and scrubbed daily. Once a week we removed the artificial turf carpets from the exhibit and thoroughly cleaned them with a disinfecting agent such as Roccal[®] or Polvasan[®]. We drained and cleaned the pool three times a week, using chlorine bleach or Bactichlor as needed. The birds usually remained on

PRACTICAL ASPECTS OF THE HUSBANDRY AND MAINTENANCE OF MAGELLANIC PENGUINS AT THE SAN FRANCISCO ZOO, Continued

the island during cleaning, and we were careful not to use any chemicals near them.

Environment. The marine climate of the San Francisco Bay Area (average maximum and minimum temperatures of 66°F (19°C) and 50°F (10°C) is similar to that of northern Chile where Magellanics reside year round (Boswall and MacIver 1975). When the weather was warmer, the birds were inactive, spent relatively little time in the water, and showed signs of thermal stress. Overheated penguins panted, extended their wings from their bodies, and exposed the soles of their feet to radiate excess heat. When we observed these behaviors, we cooled the penguins with a sprinkler, or herded them into the pool and turned on the high pressure jet to stir and cool the water. These "rapids" also stimulated natural aquatic behaviors. Feed totals generally decreased during hot weather.

Handling Techniques. Magellanic penguins are deceptively strong and powerful, and caution must be used when handling them. Penguin bites and blows from the flippers can cause serious injury, so we usually wore heavy leather gloves and protective eyewear. A bird was caught by approaching it from behind and either grabbing the head or holding the beak closed. Then the bird was picked up and held against the keeper's body; the free arm secured the flippers. We always used caution regardless of how calm a bird seemed, as even ill birds can be extremely agile and strike without warning.

Table 1 Adult supplement regimen.

MORNING FEEDING

Daily:	1	Sea Tab [®]
	1	DiCal Cap [®] (dicalcium phosphate)
	250 mg	vitamin B ₁
Twice weekly add:	5 gr	ferrous gluconate ^a
	10 mg	ketoconazole

AFTERNOON FEEDING

Daily:	7.5 gr	brewer's yeast
	1	capsule cod liver oil
		(1250 IU vitamin A, 135 IU vitamin E)
	7 gr	salt tablet ^b
	$\frac{1}{4}$	tablet Primaquin ^a
Once weekly add:	600 IU	vitamin E
	500 mg	vitamin C

^a omitted as of 1 August 1985.

^b since the birds were kept in fresh water; they may excrete excess salt by sneezing.

ACTUAL ASPECTS OF THE HUSBANDRY & MAINTENANCE OF MAGELLANIC PENGUINS
THE SAN FRANCISCO ZOO, *Continued*

seases. Some of our birds contracted aspergillosis, a common penguin disease. We observed a variety of unusual behaviors in these birds, including anorexia unrelated to molt or breeding cycles; isolation from the group; inactivity; apparent difficulty swallowing; increased thirst; and labored breathing. We also noted a pale or bluish tinge to the skin around the eyes. Penguins exhibiting these symptoms did not recover. To reduce the incidence of the disease, we cleaned the island daily (as described previously), regularly removed fallen vegetation and debris which would harbor *Aspergillus* spores, and we administered ketoconazole twice weekly. We were successful, perhaps in part, because our penguins congregated on the island hilltops and were not confined to low areas where spores can accumulate (Smith 1985 pers. comm.).

Other penguin ailments include avian malaria, bumblefoot and internal parasites. To date, avian malaria has not been a significant problem in our colony. A few of the birds were afflicted with mild cases of bumblefoot, but the installation of artificial turf has ameliorated this problem. We have not seen cases of internal parasites since the birds were treated for avian tapeworm with ivermectin shortly after their arrival.

Mortality. Nine adult penguins died during the first 17 months. Aspergillosis was present in seven of these birds. A pathology report on another bird that died showed evidence of malaria. The necropsy of the fourth bird revealed a large uric acid stone (urolith) in the cloaca.

SECTION III: 1985 BREEDING SEASON

Behavior. Breeding activity occurred during the fall of 1984, but the first true breeding cycle in captivity began six months later, after the penguins adjusted to the northern hemisphere photoperiod. Magellanics in the wild come ashore to breed in September (Boswall and MacIver 1975); consequently, our penguins began to nest in the spring of 1985. Courtship behavior was contagious and the actions of the early pairs seemed to stimulate the others (Todd 1978). By the end of March, 42 birds were paired and nesting.

Breeding activity began with courtship and nest-building throughout February and March. Appetites declined sharply during the period, and lengthy fasts of up to 25 days were not uncommon. As the days grew longer, courtship behavior intensified. The males gathered in groups on the hilltops, gave their ecstatic displays, and competed for prime nest sites. Bill clacking (parrying), threat displays, and chasing characterized this ritualized fighting. After the birds paired, mates defended their territories, sang duets, mutually preened, and spent a great deal of time excavating their burrows. The exhibit design, which allowed for natural construction of burrows, may have strengthened pair bonding, resulting in greater breeding success (Todd 1978). (However, as the parents could dig without limitations, some burrows became too deep to allow easy access to the chicks.) Primarily the males provided the nesting material, carrying leaves and other vegetation to their burrows. Nest building continued throughout the breeding season.

After we observed copulation, we checked the nests daily, and found the first egg on 3 April. By the beginning of May, the 21 pairs produced 41 chicks: all but one nest contained the typical two-egg clutch. In most cases, the second egg was found two to three days after the first. Eggs were parent-incubated except for one found cold and outside the nest. This egg was artificially incubated but proved infertile.

We observed males piling additional nesting material at the burrow entrances for the few days preceding hatching. After a 39-day incubation - typical in the wild (Boswall and Prytherch 1972) - the first chick hatched on 15 May, and by 11 June, 27 of the 41 eggs had hatched. Both eggs hatched in 11 of the nests. Incubation periods varied from 35 to 45 days, with 39 days as the mode (Venizelos et.al. 1985). Eggs that did not hatch after 60 days of incubation were removed from the island.

Chick Rearing. Males and females shared the brooding and feeding of their young. Generally one parent remained in the nest while the other stood guard at the burrow entrance, and parents exchanged places at least once every two days. Either parent fed the young. Chicks solicited for food by cheeping incessantly and tapping the parents' bills, and the adults responded by regurgitating fish. The parents increased their own food intake to accommodate the needs of the chicks. Consequently, we provided additional feedings throughout the day, and fed adults on the nest whenever possible. However, there was not a significant rise in feed totals until the chicks were approximately one week old.

In the wild, Magellanic penguins are rarely able to raise both chicks (Croxall 1985). Some of our second chicks began to decline as their parents ceased to respond to them. Chicks were monitored daily, and those with signs of dehydration, obvious weakness, medical problems or insufficient weight gain were pulled for hand-rearing (Appendix). We continued to weigh the chicks and measure specific morphological features on a weekly basis. We compared the development of the 12 hand-reared chicks with the 12 parent-reared chicks (Fig. 5). Two chicks were found dead in their nests at ages 1 and 4 days, and a hand-reared chick died of unknown causes at 42 days.

Some birds allowed us to handle their young without protest, while others attacked when we walked near their burrow entrances. Before examining a chick, we waited for the more gentle adult to take its turn brooding. If a parent was particularly high-strung, we watched from a distance until we could determine that the chick was strong and healthy.

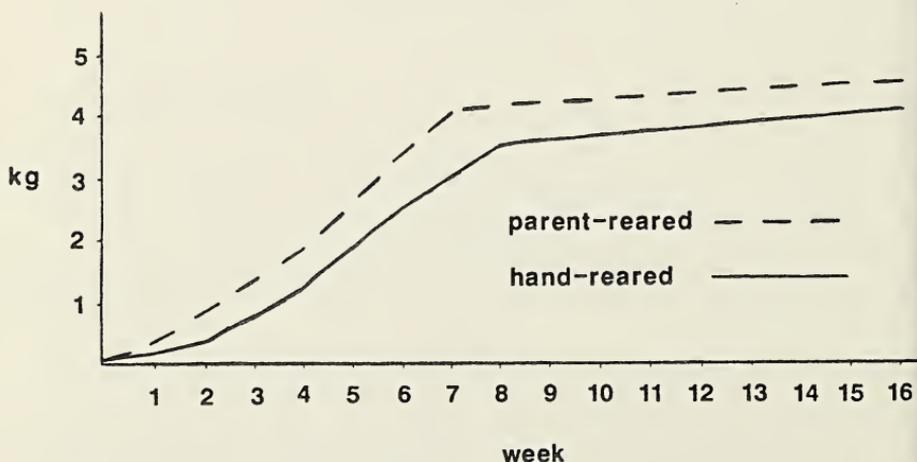


Fig. 5 Average weight gain comparison.

RACTICAL ASPECTS OF THE HUSBANDRY AND MAINTENANCE OF MAGELLANIC PENGUINS
AT THE SAN FRANCISCO ZOO, *Continued*

When we removed an adult from its nest to check the young, we grasped the parent's beak with a gloved hand and pulled the bird out by the head. The neck muscles are very strong and this does not injure the adult.) We avoided causing parents to make sudden, violent movements which might harm the delicate chicks. If the chick was so young (i.e. under four weeks) that its parents were not yet leaving it unattended, we held the adult and returned it to the burrow after we replaced the chick.

The enormous food requirements of growing penguin chicks (up to 2 lbs of fish per day at five weeks of age) can undermine the parents' health. We adults from different nests became debilitated and succumbed to aspergillosis while rearing young. When the chicks were five weeks old, we began feeding them an amount of small whole fish equal to 10% of their body weight, twice a day, to reduce strain on their parents. We included the adult supplements in these fish, except that chicks received only a half-dose of ketoconazole until they reached adult weight (4kg or 9lb). While under their parents' care the chicks ignored our hand-feeding attempts and had to be force-fed. We continued to force-feed the chicks until they fledged. We then removed them from the exhibit to teach them to take food willingly from the keepers (Gailey-Phipps 1978; Healy 1978; Pensink 1978; Penney 1978). If the parent-chick bond is not broken, parents, unable to refuse the solicitations of their young, can become under-eat and will not be able to withstand the stress of molt (Penney 1978). The chicks were healthy and had fat keels when we pulled them from the exhibit, and they were able to tolerate several days without food while learning to take fish from us. We offered them food twice a day but we did not force-feed them except to administer their biweekly dose of ketoconazole. Within three weeks, all parent-reared chicks were eating out of hand. The presence of a younger, hand-reared chick intensely soliciting the keepers for food seemed to stimulate the other chicks to follow suit and expedite the process. We returned them to the exhibit after all the chicks had been hand-feeding for at least one week. The juveniles spent several days at the exhibit before they resumed taking fish from their keepers, but they no longer solicited their parents.

Husbandry. We ceased hosing the island to avoid disturbing the birds and to prevent flooding of the burrow, but we continued to clean the pool as before. We went onto the island only to feed, check nests and replenish nesting material. Anticipating that the chicks might wander out of their burrows, we placed a cinder block barrier six inches in height around the island perimeter to prevent them from falling into the pool (Healy 1978). This may not have been necessary, as we found only one chick away from its nest before it was old enough to swim. After the chicks had fledged, we cleaned the burrows, removed accumulated debris from the island, and steam-cleaned the entire exhibit.

SUMMARY

The husbandry and maintenance program that we developed for our Magellanic penguin colony incorporates several features which may have led to our breeding success in 1985. The key factors included:

- 1) the exhibit design, especially the large pool which allowed natural aquatic behaviors, and the central island with naturalistic nest sites which encouraged reproductive behavior;
- 2) a critical mass of birds and a fortuitous ratio of males to females, which stimulated reproductive behavior;
- 3) a labor-intensive husbandry program requiring two full-time regular keepers, careful fish preparation and quality control, daily nutritional

PRACTICAL ASPECTS OF THE HUSBANDRY AND MAINTENANCE OF MAGELLANIC PENGUINS
AT THE SAN FRANCISCO ZOO, *Continued*

supplements, preventative medication, hand-feeding, maintenance of individual consumption records and daily monitoring;

4) and a propagation management program founded on both parent-rearing and hand-rearing to minimize losses.

In the future, we plan to improve the exhibit to avoid the possibility of burrows flooding, to prohibit excessive digging by the nesting pairs, and to create a more aesthetical environment.

ACKNOWLEDGEMENTS

We are grateful to Gail Hedberg, A.H.T., for her continued support and guidance. We also thank Craig Machado, D.V.M., his staff, and Nancy Venizelos for developing the husbandry and breeding programs, and for the excellent care the penguins received. Special thanks go to zoologist Mike Sulak for the burrow design; keeper staff Tony Colonnese, Robin Taha and Scott Bental; raptor program staff members Lesley Salmans, Ann Sheldon and Steve Marks; and the zoo volunteers whose dedicated service helped make this project so successful. We also express our sincere appreciation to the staffs of Sea World, the Baltimore Zoo, the Detroit Zoo, and Steinhart Aquarium at the California Academy of Sciences for their technical assistance.

APPENDIX: HAND-REARING PROTOCOL

This appendix describes a general protocol for raising Magellanic penguins including feeding, basic husbandry, and crisis intervention. For more detailed information see Todd (1980) or Venizelos et. al. (1985), or call the San Francisco Zoo veterinary hospital.

Birds under one week of age were brooded in isolettes with an ambient temperature of 35°C (95°F). We placed a heating pad under one half of the isolette to provide a temperature gradient so that the chick could seek the more comfortable zone. When the birds began to thermoregulate, we decreased the temperature a few degrees per day until the ambient temperature in the isolette equaled room temperature. The heating pad was still offered as an option. Extreme caution should be used when monitoring temperature and humidity: signs of overheating included panting, drooping wings, and lethargy, while shivering was a signal of chill. (Panting and lethargy were also signs of over-feeding.)

We fed the chicks formula (herring, krill and nutritional supplements), filleted or whole herring, and Pedialyte[®], in varied amounts based on body weight (Tables 2 and 3). The amount of food given at each feeding approximately equaled 10% of the chick's weight. The formula was kept refrigerated and not warmed prior to feeding to prohibit bacterial growth. Both the formula and the Pedialyte[®] were delivered into the stomach by a rubber feeding tube, lubricated with surgical jelly. (Penguins do not have crops.) Catheter-tip syringes, sizes 35cc and 60cc, contained the formula. The largest tube appropriate was used, ranging from 5 fr. for very young chicks to 18 fr. for chicks 1000g or larger. A separate tube was used for each bird and feeding equipment was meticulously cleaned.

Chicks removed from the exhibit in a state of crisis (underweight, dehydrated, listless and without feeding response) were given a rehydrating solution of Pedialyte[®] and aminoplex. This was administered in small amounts (up to 10% of body weight per tubing) as necessary. Chicks that were especially distressed, showed signs of vomiting, or had "sour mouth",

responded quickly to antibiotic therapy. Improvement was obvious after only one treatment of fluid replacement with Pedialyte, tetracycline syrup, aminoplex and Lactobacillus. All the birds responded extremely well to the first aid and were usually entered into the hand-rearing routine the next day.

Vitamin B-avitaminosis was present in some parent-reared and hand-reared chicks. The symptoms included loss of motor control, head-shaking, and incoordination. The therapy was 1/4cc corticosteroid and 1/2cc B-complex administered IM for three consecutive days, and then the above was given with the formula, once per day, until remission of symptoms occurred. The parent-reared chicks were successfully treated at the exhibit and remained in their nests.

Table 2 Penguin chick formula.

Ingredients for one batch (approximately 600 cc):

330 g krill (frozen, cut into chunks)
330 g herring (frozen, cut into chunks)
8 oz Pedialyte®
8 oz half and half dairy cream
vitamin supplements (below)

Directions: Blend thoroughly; keep chilled; use within 24 hours.

Vitamin Supplements for each batch:

1 1/2 Sea Tabs®
3/8 tsp predigested protein powder
375 mg vitamin B₁
9 DiCal Caps® (dicalcium phosphate)
45 gr brewer's yeast
1500 IU vitamin E

Suggestion: Pulverize tablets with mortar and pestle before adding to blender; break vitamin E into blender and discard capsules.

**Table 3. Suggested feeding regimen
 for hand-reared penguins.**

WEIGHT OF CHICK	FISH ^a	FORMULA ^a	PEDIALYTE R	FEEDINGS PER DAY	SUPPLEMENTS
under 100 g (first day)	---	---	1-2 cc	8 (q3h)	---
under 100 g ^b	---	3-6 cc ^c	1-2 cc	8	---
100 g	---	5-10 cc	---	8	---
200 g	3-5 g fillet (twice per day)	20 cc (alone) (15 cc w/fish)	1-2 cc (w/fish)	8	---
250 g	3-5 g fillet (every other feeding)	20 cc (alone) (20 cc w/fish)	3 cc (w/fish)	8	---
300 g	10 g fillet (per feeding)	20 cc	5 cc	5-6	---
400 g	15 g fillet	25 cc	5 cc	5-6	---
500 g	25 g (whole)	25 cc	5 cc	4	50 mg B ₁ BID
700 g	ad libitum (approx. 35 g)	35 cc	10-15 cc	3	50 mg B ₁ BID
1000 g	ad libitum (approx. 40-50 g)	45 cc	10-15 cc	3	100 mg B ₁ , ½ Sea Tab, 100 IU vitamin E BID
2500 g	ad libitum	45 cc ^d	10-15 cc ^d	3	same as above
3000 g	ad libitum	---	---	3	same as above
Fledge (60 days)	ad libitum	---	---	2	adult supplements

^a When both fish and formula are fed, formula plus fish equals approximately 10% body weight per feeding.

^b Formula and Pedialyte[®] are blended in a 3:1 ratio.

^c For convenience of using a syringe to measure formula: 1 g (formula or Pedialyte[®]) = 1 cc.

^d Formula and Pedialyte[®] fed 1-2 times per day.

PRODUCTS MENTIONED IN THE TEXT

- Hexachlor (a chlorine-bearing disinfectant): distributed by Industrial Sanitation Consultant Products, POB 1037, Danville, CA 94526.
- Cal Caps (dicalcium phosphate with calcium gluconate and vitamin D): manufactured by Rugby Laboratories, Inc., Rockville Centre, NY 11570.
- Went-A-Band (Animal Care): manufactured by Hollister Inc., 833 New Orleans St., Chicago, IL.
- Polvasan (chlorhexidine diacetate disinfectant): manufactured by Aveco Co., Inc., 800 Fifth Street, N.W., Fort Dodge, IA 50501.
- Izoral 200mg (brand of ketoconazole): manufactured by Janssen Pharmaceutica, NJ 08854.
- Oralyte (brand of oral electrolyte maintenance solution): manufactured by Ross Co., Columbus, OH 43215.
- Trimethoprim phosphate 14mg: manufactured by Winthrop-Breon Laboratories, New York, NY 10016.
- Disinfectant-D (disinfectant): manufactured by Winthrop Veterinary: a division of Sterling Drug, Inc., New York, NY 10016.
- Vitamin Tabs (vitamin mineral supplement formulated for marine mammals): manufactured by Pacific Research Laboratories Inc., POB 1877, El Cajon, CA 92022.

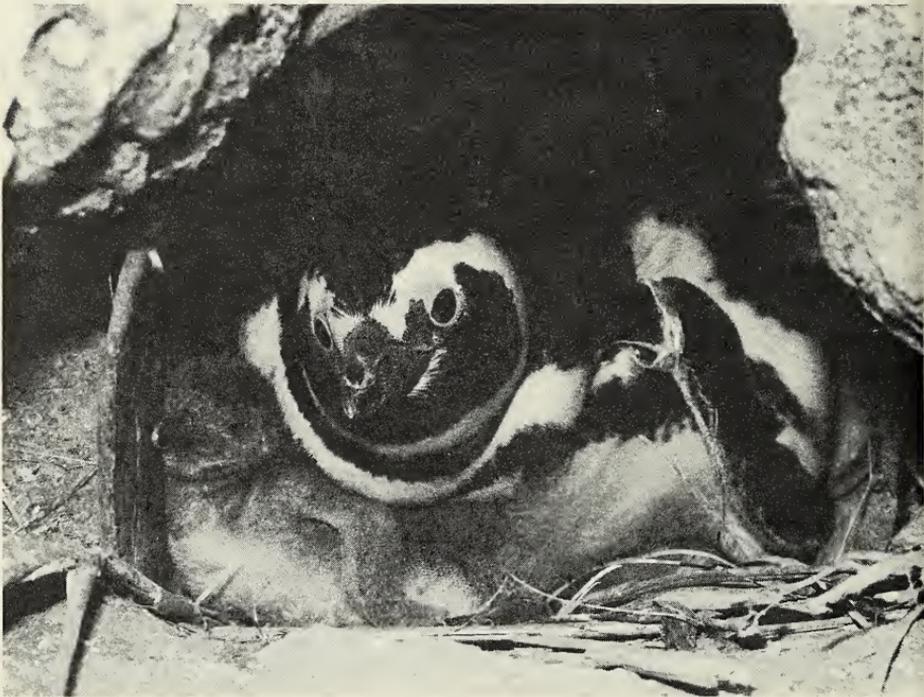
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A Magellanic penguin parent raises its chick in the safety of one of the numerous burrows of the penguin exhibit at the San Francisco Zoo. These naturalistic nest sites have encouraged successful reproductive behavior. (Photo credit: Brian Klacher)



METHOD OF ANALYSIS OF THE ACTIVITY PATTERNS OF
OF LOWLAND GORILLAS (*Gorilla gorilla gorilla*)
AT THE MIAMI METRO ZOO

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ABSTRACT

Five gorillas were observed at the Metro Zoo over a period of one year. Each gorilla was observed one hundred times for a period of fifteen minutes each time. A Hansen's one-zero checklist was used to record behaviors in an ethogram that consisted of 60 different behavior patterns. A distribution was arrived at from the data collected in the ethogram. Analysis of variance was then used to prove that there were significant differences at the 0.01 level between the activity patterns of the five gorillas. A Fisher's Least Significant Difference test was used to demonstrate activity differences at the 0.01 level within the group of gorillas at the Metro Zoo. The results indicated that the juvenile male was the most active and the adult female gorilla was the least active. The other three gorillas, two adult males and a young adult female, were grouped together as having similar activity patterns.

INTRODUCTION

The Metro Zoo in Miami acquired its first gorilla, named Ramar, in November of 1981 from the North Carolina Zoo in Ashboro by way of the Philadelphia Zoo on a breeding loan. The Metro Zoo was interested in how this adult male gorilla's behavior might change through time with acclimation to his new environment. The zoo brought Dr. Terry Maple, a primate behaviorist, in to discuss the observation of the new male gorilla. Dr. Maple gave the zoo an ethogram on behaviors to observe that might be the most meaningful in showing a changing pattern of behavior over time. The gorilla was observed using a diary format (Bramblett, 1976) from November, 1981 through September, 1982. In March of 1983 the zoo received four gorillas from NIH in New Iberia, LA. This group of gorillas included an adult male, Jimmy; an adult female, Josephine; a young adult female, Hope; and a juvenile male, Jimmy Junior. I decided to observe all of the gorillas to see if there would be any differences in their behavior. During the study period a successful introduction of the young female Hope with the male Ramar occurred, and Josephine gave birth to a male infant on 10 March 1984 who was named Moja. This paper examines the overall activity patterns of the gorillas.

MATERIALS AND METHODS

There were five gorillas used for collecting data for this study (Table 1). The ethogram, Figure 1, contains five broad areas of behavior patterns: normal day-to-day activities, social interactions, sexual responses, occasionally aggressive and submissive behaviors, and abnormal behaviors. In addition, there was a common section where behavior patterns could be more thoroughly discussed. The ethogram was constructed from four sources: (1) Dr. Maple's original adjustment ethogram, (2) diary format records on the first male gorilla at Metro Zoo, (3) The Mountain Gorilla (Chandler, 1963), and (4) continued expansion of the ethogram due to new behaviors being observed during the study period. This ethogram contains a total of 60 different behavior patterns. The ethogram also includes

A METHOD OF ANALYSIS OF THE ACTIVITY PATTERNS OF LOWLAND GORILLAS,

FIGURE 1

APRIL, 1983 - MARCH, 1984

Date _____ Time of Day _____

Weather _____

ACTIVITY	(100)	(100)	(100)	(100)	(100)
	J1	JJ	JO	HO	RA
On ground-OG	99	100	94	99	100
climbing-CL	5	30	20	22	15
elevated-E	5	30	24	23	11
walking-W	93	91	46	90	92
running-R	40	42	5	25	43
sitting-SI	99	94	95	98	98
standing on all fours-ST	84	81	26	56	85
kneeling on elbows-K	3	3	-	-	20
stands bipedally-SB	37	54	11	47	30
lying down-LA	42	73	45	42	36
yawning-Y	3	6	6	11	10
sleeping-SL	3	13	7	9	6
manipulating with hands-MPH	89	93	59	92	77
manipulating with mouth-MPM	13	32	17	23	20
wearing something on head-HA	-	5	21	7	3
drinking-D	7	17	2	13	21
urinating-U	2	3	4	4	9
eating-EA	78	80	30	80	41
bowel movement-BM	2	-	2	2	9
nesting-N	-	-	4	1	-
grooming self-GRS	48	60	79	80	66
SOCIAL					
grooming another-GRA	-	-	5	-	-
contact passive-CP	31	13	18	16	7
contact active-CA	8	50	6	16	12
playing-PL	23	36	1	10	7
transport-TR	-	2	2	2	-
nursing-NU	-	-	1	-	-
SEXUAL					
masturbation-M				-	3
presenting-PR				2	-
copulation-C				-	-
ejaculation-EJ				-	1
initiating sexual encounter-ISE				1	2

FIGURE 1, CONTINUED

APRIL, 1983 - MARCH, 1984

FUNCTIONAL	J1	JJ	JO	RG	RA
thigh beating-TB	1	7	3	20	1
chest beating-CB	29	56	1	18	27
charging display-CD	13	-	-	-	15
tight lips-TL	37	5	1	4	48
strutting walk-SW	31	8	2	4	29
beating on objects-B	13	28	11	14	15
throwing objects-T	11				1
grinding teeth-GT	-				4
smashes object-SO	1				2
pucker hooting-PH	-				6
grumble-G	5			4	22
staring-STA				3	3
chasing-CH					6
hitting-HI		1	1		1
grappling-GA					-
mock biting-MB					1
biting-BI					
screaming-SC					
coalitions-CS			1		
turning of head-TH				1	1
head shaking-HS				1	
cowering-CW				6	
dominant supplanting-DS	22			-	31
subordinate supplanted-SS		2	7	29	

ABNORMAL					
stereotyped rocking-SR					
coprophagy-CO					
regurgitation reingestion-R					
pacing-PA					1

COMMENTS.					

all behaviors in a one to three-letter code from which I was taking data in the diary method, which allows for quick recording of behaviors. The ethogram sheets have a place at the top for the date, time, and weather conditions. A Hansen's checklist (Altman, 1974) was employed for the gathering of the data on the ethogram. I was more interested in quality than quantity and the Hansen's checklist requires one to only check a behavior off once if it has occurred or to leave a blank if a particular behavior is not observed during a time sequence. The gorillas were observed one at a time for fifteen minutes each. This type of observing is called focal animal observation (Bramblett, 1976) and allows one to concentrate on one individual at a time. Each individual gorilla was observed 100 times from April 1983 through March 1984.

Table 1 Metro Gorillas

<u>Name</u>	<u>Code Name</u>	<u>Sex</u>	<u>Birth Date</u>
Jimmy	JI	male	1966
Jimmy Junior	JJ	male	7/1979
Josephine	JO	female	1967
Hope	HO	female	10/1974
Ramar	RA	male	1968

RESULTS

A distribution calling for a series of measurements to be made (Scheffler, 1969) is performed (Table 2). From the measurements taken in the above distribution an analysis of variance can be accomplished. The analysis of variance allows one to observe the differences between groups. In this case the groups refer to the total number of behaviors that each individual gorilla was observed exhibiting during the course of the study. Table 3 gives the summary for the analysis of variance. From this summary table a comparison of the between-group variance with the within-group variance could be determined to find if the between-group variance is significant or not. An F-distribution test is then performed that allows one to find whether or not there is significance from the above measurements. The F-test value is also given in Table 3 and is calculated by dividing the mean squares within by the mean squares between. Examining the F values in a statistical book table with 499 degrees of freedom at the 0.01 significant level, it is found that there is significant difference between the groups because the F-value is greater than 3.36. A Fisher's Least Significant Difference (Roscoe, 1975) is now used to find if there is significant difference within the groups of gorillas. T-tests are performed on all combinations of gorilla pairs. Table 4 gives the results of all the different T-tests. Checking a statistical book table of T-values with 499 degrees of freedom at the 0.01 significant level for a two-tailed test, it is observed that there is significant difference if a T-value of 2.62 or greater is obtained.

JJ shows a significant difference in activity pattern from all the other gorillas except for RA when checking the results of the T-tests from Table 4. JI shows significant differences in behavior from JJ and JO with JJ being more active and JO being less active than JI. JO, when

METHOD OF ANALYSIS OF THE ACTIVITY PATTERNS OF LOWLAND GORILLAS, *Cont'd*

ompared to all of the other gorillas, is significantly different in ctivity with a low activity pattern. Ho, as with JI, is also significant- y different in behavior activity when compared to JJ and JO. RA's activ- y pattern is only significantly different from JO.

DISCUSSION

t was predicted from my hypothesis that the different gorillas in the tudy would show a different pattern of activity. The hypothesis was roven correct in 12 out of 20 cases when the gorillas were paired in 11 possible combinations (Table 4). Using the ethogram checklist (Fig- re 1) one can observe how the gorillas differed in their behavior pat- erns from one another.

Table 2 Distribution

	JI	JJ	JO	HO	RA
N	100	100	100	100	100
ΣX	958	1122	657	982	1040
\bar{X}	9.58	11.22	6.57	9.82	10.40
Σx	20	0	0	0	0
Σx^2	859.52	1083.32	686.02	836.52	1021.68
S^2	8.60	10.83	6.86	8.37	10.22
S	2.93	3.29	2.62	2.89	3.20
C	.31	.29	.40	.29	.31
Me	9	11	6	10	11
Mo	6	11,14	5	8	11

- N number of the distribution
- ΣX sum of members of the distribution
- \bar{X} mean
- Σx sum of signed deviations from the mean
- Σx^2 sum of squared deviations from the mean
- S^2 variance
- S standard deviation
- C coefficient of variation
- Me median
- Mo mode

he juvenile male gorilla, JJ, was observed to be the most active of all he gorillas at Metro Zoo. JJ was the most inquisitive of all the gorillas nd showed the highest score for manipulating objects with his hands and outh. JJ could go from being the most active gorilla with the highest cores for climbing and being elevated above the ground to being the least ctive with the highest scores for lying down and sleeping. These extremes f behavior often occurred within the same 15-minute time span in which bservational data was collected. This pattern of activity allowed more ifferent behaviors to be recorded during the observational period. JJ

would most often actively seek contact with other gorillas and was observed playing with others and by himself the most often. JJ beat his chest the most, because it was part of his play routine and he would imitate the other gorillas.

Table 3 Summary of Analysis of Variance

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F-Test</u>
between groups	4	1246.05	311.51	
within groups	495	4487.06	9.06	
total	499	5733.11		34.3

Table 4 Summary of T-Tests

	JJ	JI	JO	HO	RA
JJ		3.81*	10.81*	3.26*	1.91
JI	3.81*		7.00*	0.56	1.91
JO	10.81*	7.00*		7.56*	8.91*
HO	3.26*	0.56	7.56*		1.35
RA	1.91	1.91	8.91*	1.35	

*significant ≥ 2.62

The adult female gorilla, JO, was the least active of all the gorillas. Her low activity pattern can be seen by her showing the lowest scores for walking, running, and standing bipedally. JO even scored the lowest when it came to eating. Her social behavior showed an inactive role by her high score of passive contact. JO was the calmest when it came to emotional bursts of activity.

The other three gorillas, the two adult males JI and RA and the young adult female HO, showed similar overall activity patterns, but different behaviors were incorporated in their overall activity patterns. The two adult male gorillas beat their chests more often than HO did, but HO beat her thighs much more than did the adult males. JI and RA showed more aggressive behavior while HO was more submissive in her behavior. HO climbed more than the two adult males. JI and RA were seen running more often than HO.

Some behaviors seemed to be sex-linked in their pattern of observation. Female gorillas were seen 3.5 times more often wearing something on their heads than were males. Nesting behavior was only observed in female gorillas. Females would groom themselves more often than would males. Male gorillas would most often beat their chests, while females would beat their thighs. Only males would throw objects around and do other overtly aggressive behaviors. Males would stand motionless on all fours much more than females would. Also, only males were observed kneeling on elbows.

METHOD OF ANALYSIS OF THE ACTIVITY PATTERNS OF LOWLAND GORILLAS, Cont'd

JO was the most active of all the gorillas because he was still in a stage of growth and learning and was seen playing and being more inquisitive than the other gorillas. JO was possibly the least active of the gorillas because she was pregnant for most of the period that the observational study was being conducted. Also, JO showed the most composure when it came to emotional outbursts of behavior. The two adult males, JI and RA, were similar in their activity patterns, especially when it came to their emotionally aggressive behaviors. HO, the young adult female, was just as active as the two adult males were, but differed in showing more emotionally submissive behaviors than aggressive behaviors.

ACKNOWLEDGEMENTS

I wish to thank Dean Crouch, who also takes care of the African Ape section, for volunteering to observe the gorillas. Without Dean's help it could have taken me a lot longer to collect the 500 observations on the five gorillas. I also wish to thank Dr. Catherine Morris and Dr. Marcia Belcher of the Institutional Research Office at the Miami-Dade Community College for help with the statistical methods used in this study. Drs. Morris and Belcher gave me invaluable assistance in choosing what statistical methods would be the most useful in proving whether there is a significant difference in activity between and within the group of gorillas in this study.

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METHODS OF DETERMINING ESTRUS
IN A WHITE RHINOCEROS
(*Ceratotherium simum*)

By
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In 1977, the Pittsburgh Zoo received a pair of 2½-year-old white rhinos. They were housed together in our old zoo building for six years. Upon the opening of our new African Savannah Exhibit in October of 1983, the two rhinos, named Deano and Kid, were moved to a more modern and more natural habitat. It was at this time that I became their keeper and considered some far-ranging plans for the pair. Deano and Kid have adapted well to their new surroundings. They are both well-behaved when being routinely handled by myself or the veterinary staff. Neither animal has had any serious illness or parasite problem. I had hoped to see signs of mating activity now that they were both eight years old. However, the male never showed any interest in the female or made any attempts at mounting her. During the summer of 1984, Dr. Wagner, our staff veterinarian, and I discussed the problem of our non-breeding rhinos and in the fall we decided to begin a lengthy work-up on her estrus cycle.

The reason behind studying and charting her cycle was because, like us, many zoos only have one pair of white rhinos. We know this is not likely to produce offspring. If we could find an alternative to housing a large number of animals in order to produce young, we could possibly have offspring in zoos like ours where only a pair is kept. After our study is more complete, we will try artificial insemination. Since there is not a great deal published about white rhino's estrus we feel our study will be useful in that respect alone.

Our zoo currently has a holding facility for two adults and possibly one immature or compatible animal. The two adults are kept separated at night to give each more room and to regulate food intake. There is a central area between the two cages that serves both as a transfer cage and an access to the outdoor exhibit. It is in this transfer cage that I could see housing for a possible third animal. In the future we may be able to expand our holding area but what we need now is a solution of sorts toward which to work. What our plan consists of is careful monitoring of the female's estrus cycle and eventually an attempt at artificial insemination during peak receptivity.

We have four methods of determining what stage of estrus our female is in. They are behavior, vaginal smears, rectal palpation, and urinalysis. The first we will discuss is behavior. This is quite dependent upon keeper observation. As a heat approaches (proestrus), the female become aggressive with the male. She initiates minor battles. These fights are more intense while the animals are indoors in close quarters. The fights occur as soon as the animals are put together in the morning. After being put outside in the exhibit the battles are less frequent. The fights consist mainly of jousting and slashing with the horns and a few head-down charge. If this behavior occurs in my absence, I have only to look at Deano's face and sides to see the superficial wounds she's dealt him. This behavior starts about 5-7 days before what we call "Full Heat".

The second method of determining estrus is by vaginal smears. These are done nearly every day to keep tabs on their accuracy in relation to the other methods. In doing a vaginal smear we first steady the animal and

roke her sides and rear legs until her tail curls up and out of the way. Sometimes this is very difficult. If she is uncooperative we may try again later or attempt to hold her tail out of the way. After the tail is up, we wipe the vulva with a disinfecting solution called Virosan®. Next, a cotton swab is inserted three inches into the vagina, removed and rolled gently onto a clean slide to be stained after it is dry.¹ We do two separate slides. What we examine on the slides are epithelial cells. They will either be cornified or noncornified. We count 100 cells to get a ratio of how many cornified cells there are in relation to noncornified cells. The higher the number of cornified cells, the closer the animal is being in heat. We also note white cells and debris. In some animals (dogs) this also is indicative of heat. We really do nothing more than note the presence and number of white cells. We haven't tried to correlate this into the rest of our data yet. When we count the number of cells on the two slides and the ratios are nearly the same, we take the average. If the two slides are greatly different from each other, we must redo them because one may have been improperly done and this could cause the results to be off. If the female is showing behavioral signs of heat and the epithelial cell slides don't agree with this, it may be because as the estrus cycle develops all physiological changes don't occur simultaneously. As hormone levels increase, changes happen one by one. Therefore, an animal behaving as if in heat may have a cell ratio that is nonsupportive. If it is rechecked in 2 or 3 days the cell ratio may have changed quite a bit. There can, however, be results that aren't correct due to contamination as I mentioned before or from improper technique (i.e. not getting the swab in far enough). That is why we use a three-inch insertion as our standard. When someone other than the veterinarian takes a swab we sometimes get confusing data.

These vaginal swab epithelial cells are taken from a dog, but will show the differences between a cornified cell and a noncornified cell.

6. Dog; Vaginal Smear; Early Estrus; Wright's Stain
The epithelial cells are cornified. Nuclear detail is apparent.
Leukocytes are absent.



Figure 6

Dog; Vaginal Smear; NMB Stain
The large cells are noncornified epithelial cells. Numerous neutrophils are present.

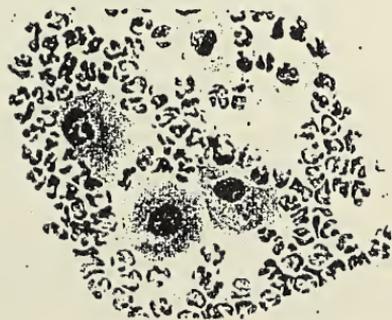


Figure 2

The third method is rectal palpation. This is done at least weekly and more often when we expect heat is nearing. Again, we get Kid to raise her tail and to steady. The veterinarian inserts his arm, covered with a glove, Virosan[®], and lubricant into the rhino's rectum and feels the shape of the uterus and fallopian tubes through the rectal walls. He then rates them by tone, length, and diameter. A tone of #1 indicates that the animal is not in heat (diestrus). A #2 could be approaching or diminishing heat (proestrus or metestrus). A #3 is full heat. During the most receptive periods the animal has a shortened and enlarged uterus, enlarged fallopian tubes, and a good tone. She will stand patiently for the exam and will slightly spread her rear legs and brace herself. We have found the rectal exam to be the most conclusive way of determining which part of the estrus cycle the animal is in.

Our final method is urinalysis. This is a very unreliable test for us at this point for two reasons. First, there are not standard hormone levels for white rhino urine established. This is currently being worked on. Second, sample collection is often infrequent. Our female tends to urinate at night, into her food, or the minute I leave the building. Urine taken from the floor is probably contaminated. We have taken steps to get a more frequent, free-catch sample by having one of our docents simply stand by all morning, cup in hand, waiting for urine. This has helped us to obtain one or two samples a week which is better than we had been doing. The samples are then frozen and when we get an adequate number they are sent to a laboratory² for hormone analysis. Once we get the results we can see how and if they agree with the other data we have collected.

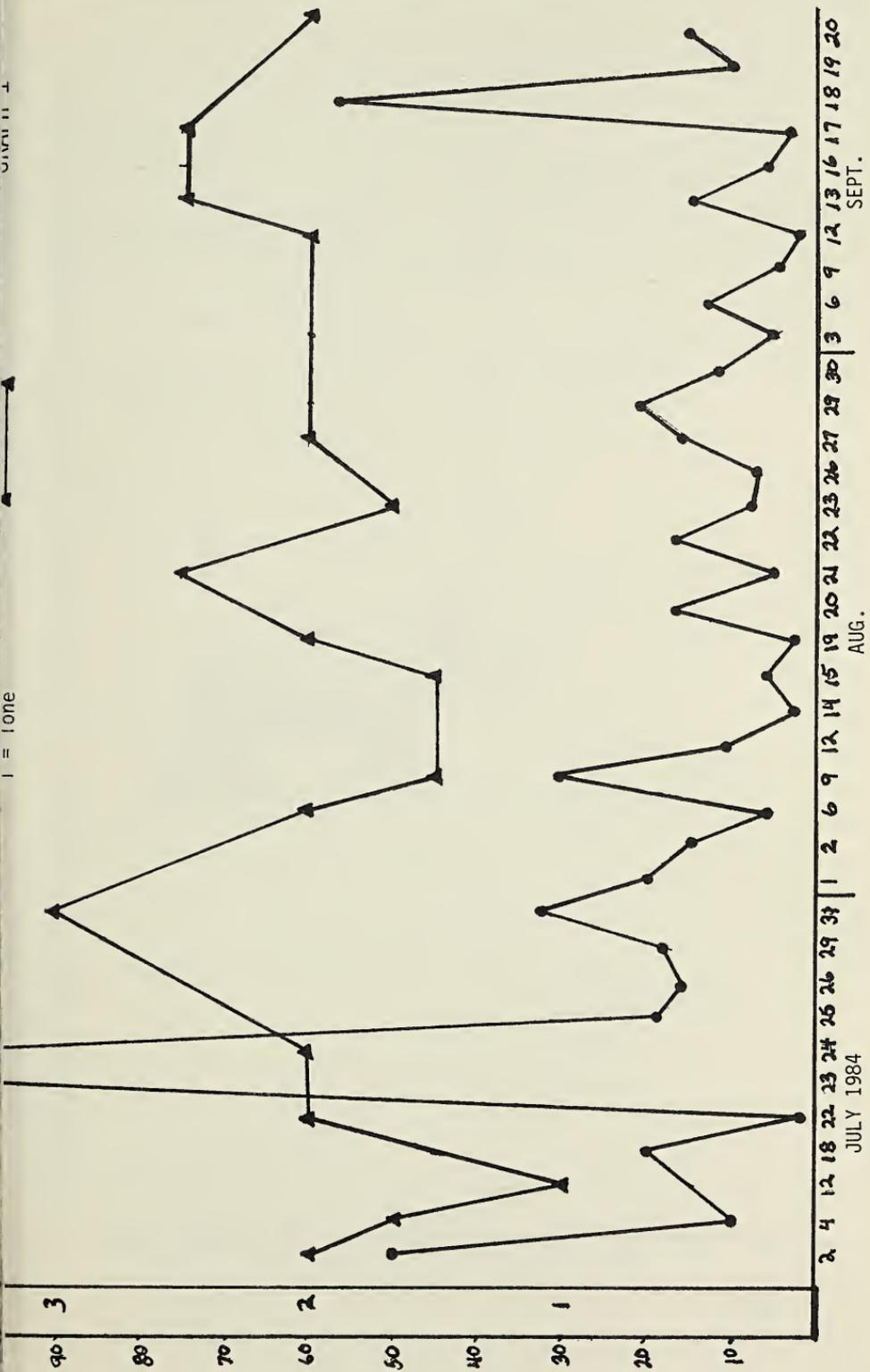
None of the four methods I've mentioned can be used exclusively to determine estrus yet. There are too many variables. However, used together we can get a much better idea of what is going on in our rhino's estrus cycle.

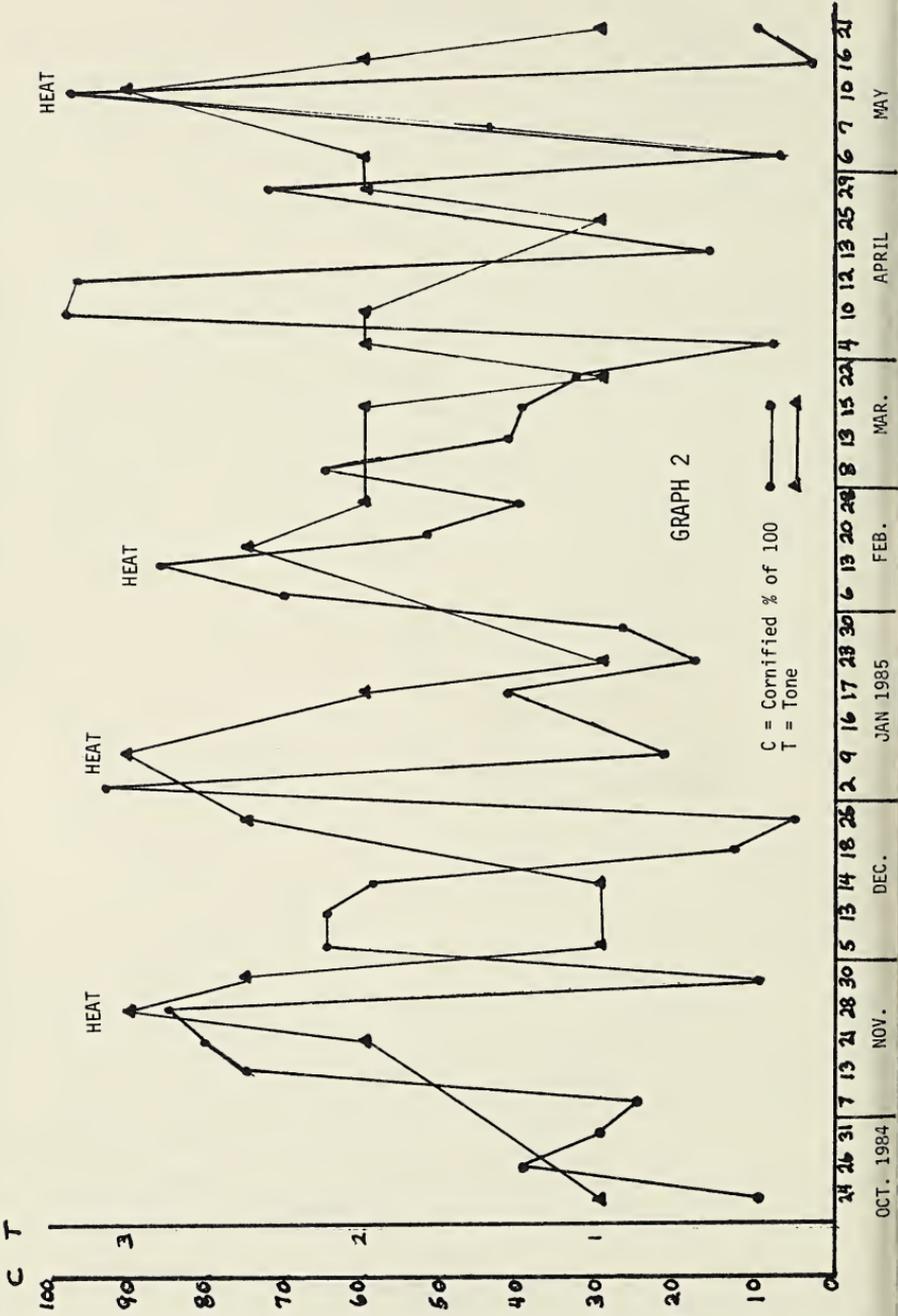
Our findings over the past year have been interesting. I have drawn graphs comparing cell ratio with tone. It shows that the summer months produce some very confusing data. It seems that the female doesn't have a true cycle. Dr. Wagner thinks that an egg begins to form in the ovaries and instead of developing and traveling through the fallopian tubes, it is instead reabsorbed and the symptoms of approaching heat disappear (See Graph 1). The reason behind this is as yet unknown, but I understand the same thing can occur in horses during the summer in the Northern Hemisphere. From the graph you can see the slightly elevated cornified cell count and tone measurement, but the numbers never reach a sufficient level to indicate a receptive period. We call these slight increases "mini heat". The winter graph shows just the opposite (See Graph 2). There are very obvious peaks and valleys that show a cycle pattern of estrus. We want to plot out another year of cycles so we can validate what we have found so far. We also would like to collaborate with other zoos that have a similar light and dark cycle and similar temperatures to see if our findings are due in any part to geographical location.

We keep a running log book and in it is recorded the daily cell ratios, other cellular findings, behavior, urine collection, tone rating, and anything else of note.

One important thing to keep in mind when acquiring this data is that this has been obtained from a single animal and should not be anything more than a guideline to go by, not a definite rule to be found with every other female rhino.

METHODS OF DETERMINING ESTRUS IN A WHITE RHINOCEROS, *Continued*



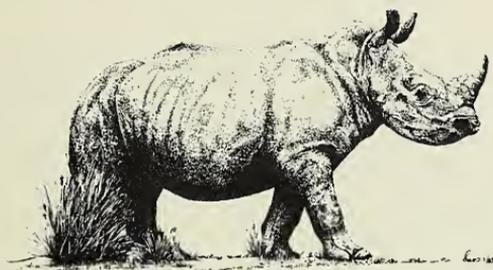


For us this is just the start. When we are confident that we know the approximate date of a heat and seasonally which heats are the strongest, we would like to try artificial insemination. We are going to try to insert an equine catheter into our female routinely to get her used to the sensation. After that, the next step will be to acquire rhino semen. We are trying to get a sample from our male. We have managed to get two small samples that did indeed contain sperm and we are encouraged by this. Although we are trying to produce rhinos the hard way, it is the only way open to us at this time. Hopefully our efforts will be successful and we will have opened new doors into rhino research and reproduction for ourselves and for other zoos.

NOTES

Slides are stained with DIFF-QUIK. Given five 1 second dips in Fixative Solution, Solution 1 and Solution 2.

Urine is being sent to Dr. Clint Lothrop, University of Tennessee.



ANIMAL CARE AT THE SAN DIEGO ZOO HOSPITAL
(A Generalist's Approach To Specialized Animal Care)

By
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INTRODUCTION

The animal collections of the San Diego Zoo and Wild Animal Park contain approximately 7,000 specimens of over 800 species or subspecies representing some 120 families of vertebrates. An integral part of the care of this large and diverse collection are the Veterinary Services Department of the facility. They manage the primary health care, preventative medicine, nutritional and quarantine requirements of the collections. As part of the Veterinary Services Department, the role of the San Diego Zoo hospital keepers is unique in that they must be able to provide highly specialized care not only appropriate to each species within the collections of the Zoo and Wild Animal Park, but any new species that may be acquired as well. They must also be able to provide care appropriate to the medical, physical and psychological needs of any individual animal in their care. Clearly no group of four keepers anywhere could duplicate the specialized, and sometimes idiosyncratic care provided by the 150-plus animal care personnel in the San Diego work force, let alone know the "personalities" of every animal in the collections. However, they have worked out a few techniques which help them approximate the specialized care many individuals require.

This paper will deal primarily with problems of housing a wide variety of animals, each with individual requirements, and fine tuning the daily activities of many animal care personnel in response to an animal's reaction in hospital design or operations. This is not intended to be a lesson in hospital design or operations. For discussions of those topics, with examples drawn from the San Diego Zoo hospital, see Robinson 1982a and 1982b. The cage types discussed are fairly generalized, and the exact dimensions or layouts are not important. Anyone can come up with a better cage design for a specific purpose, given enough time and money. To one degree or another, a keeper is always in a position of having to use what is at hand to provide immediate care for the animals someone else has selected. The ability to identify important differences between cages for animals, and take advantage of those differences is what is important. The discussion will concern specific problems or capabilities of the operation of the San Diego Zoo hospital, but it is hoped that many of the general concepts can be of use at other facilities.

THE HOSPITAL FACILITY

The Jennings Center for Zoological Medicine, the hospital complex for the San Diego Zoo, includes 2704 m² (29,084 ft²) of floor space, over one-third of which, 988 m² (10641 ft²) is devoted to animal holding areas. The animal holding areas are divided into bird wards, raptor pens, pheasant pens, mammal wards, quarantine wards, hoofed stock pens, barns, isolation rooms, recovery and intensive care rooms. Some of the major cage types used are: glass and fiberglass terraria; wire bird cages which can be hung from wall brackets; indoor and outdoor concrete and wire (or steel bar) cages, some of which include deep or shallow pools; "squeeze cages" which can mechanically restrain or move animals, larger ones are permanently built into cage systems, while smaller ones are portable; pens surrounded and covered with wire or chain-link with a decomposed granite substrate; barns and cages equipped with a permanent rubber floor, some with

ANIMAL CARE AT THE SAN DIEGO ZOO HOSPITAL, Continued

rubber-padded walls as well; and incubators equipped for the regulation of temperature, humidity, and oxygen therapy. Obviously on the basis of cage designs alone, the hospital keepers have a great deal to work with in selecting animal housing. The hospital keepers also have access to all foreign items used in the zoo, most foods served in the zoo restaurants, and many other foods available on the open market on a "special order" basis. Nonetheless, the hospital cannot provide elaborately planted enclosures specific to certain species, complex social groupings or even the space each animal enjoys on exhibit. Although each animal holding area and each cage type at the hospital has a basic function, such as housing hoofstock or quarantining primates, from a pragmatic standpoint, there is a great deal of overlap between the different areas. The housing requirements for a marmoset are essentially more like those of birds than they are those of baboons. Consequently marmosets are generally housed in the "bird cages" in the bird wards. Also, crowding in one area of the hospital to mean a raptor cage has to be modified in order to accommodate a flock of lesser flamingos. Thus, the requirements of sanitation for a relatively dense animal population and versatility in caging means having to modify other stark cages to suit the most critical needs of each animal.

THE HOSPITAL POPULATION

The numbers of animals and the types of animals housed at the hospital can vary drastically from day to day, month to month. This would include all animals housed for routine examinations or to treat medical problems, incoming animals held in quarantine prior to their introduction to the general zoo population, and animals being held prior to shipment to the Wild Animal Park or another facility. A single incoming shipment can send the hospital bird population from five to fifty. Figure 1 depicts graphically the changing size and character of the hospital population during a six-month period in 1983. The number of animals housed each day was averaged for each week from 4 February to 4 August 1983. Separate counts were maintained for birds, primates, ungulates, other mammals, and amphibians and reptiles. The different shaded areas of the graph represent the portion of the total population made up of the five groups of animals. From the graph you can see that from 25 February to 3 March, the average daily population was 56 individuals, made up mostly of birds and "other mammals". During the week of 15-21 April, the average daily population had almost doubled to 91, this time made up mostly of birds and primates. The hospital populations of ungulates and amphibians and reptiles dwindled to zero for several weeks during the six-month period. Weekly averages were used to calculate the data points in Figure 1 because the daily fluctuations in the numbers of animals at the hospital were so drastic that a graph showing each day's changes would be impractical to fit into this journal.

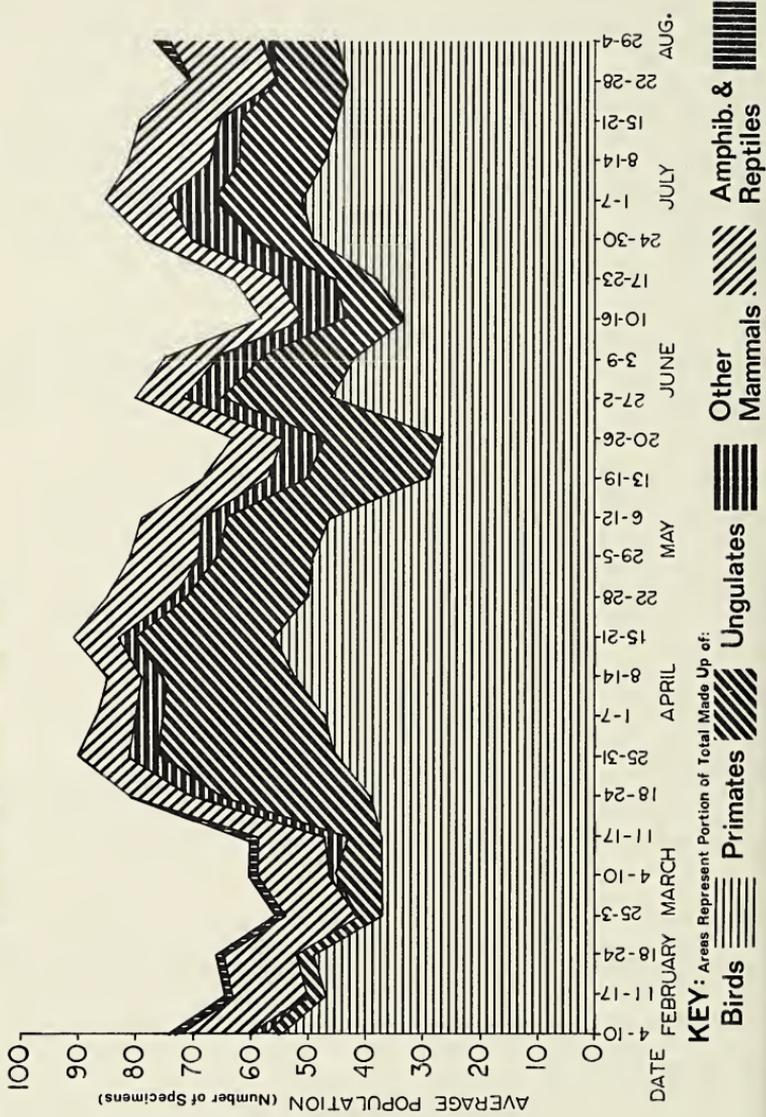
In estimating a long-term average, the animal holding areas of the hospital ran from half to three-quarters full during the period represented by Figure 1. Through not occurring during the period represented by Figure 1, the total number of animals housed at the hospital at any one time has been known to approach 200.

THE SELECTION PROTOCOL

The data showing the dynamic nature of the hospital population underscores the fact that the varied and constantly changing clientele at the hospital make it impossible to reserve a particular area or a particular cage to a single use, or for housing a single group of animals. To deal with this fact of life, while still maintaining certain standards of

FIGURE 1: Area Graph of Average Hospital Population

For the weeks from 4 February - 4 August 1983



quarantine, isolation of infectious animals and providing caging appropriate to each individual, the hospital keepers have developed a list of priorities in cage selection for a new animal. When presented with an animal to be housed at the hospital, or group of animals that may be housed together, a number of factors are considered.

1. Does the animal show signs of an infectious disease? Does the animal have a history of chronic infectious disease, such as tuberculosis or Salmonella? If so, the animal and its wastes should be isolated as much as possible in an easily disinfected environment. This includes temporary disinfectant footbaths, gowns and possibly masks for personnel entering their enclosures.
2. What are the physical capabilities or limitations of the particular individual(s) involved? The cage must not only prevent escape and minimize potential injury to animal and keepers, but should also provide for any special locomotory patterns/problems; the need for supplementary heating, cooling or humidity; any substrate, bedding or hiding requirements; pools for feeding or exercise; and reverse light cycles for those animals coming from or going to a reverse lightcycle housing on the zoo grounds.
3. Is the animal going to require special attention or enforced peace and quiet? Special attention includes medical problems requiring frequent monitoring or acute care as well as species whose normal husbandry requires a great deal of keeper time and attention. The need for close observation may be met simply by housing the animal where it will be seen frequently throughout the day during routine activities. Situations requiring a great deal of keeper or clinician activity may necessitate a cage big enough to accommodate the animal and one or more people.

For some animals the best therapy is simply to be left alone. If an animal is extremely flighty, it is often best to house the animal away from high traffic areas, strictly limit human access to the area, and satisfy any need for observation by the use of sight barriers with peepholes. A mirror may be set up beforehand to look into a nest box from a remote location. Individuals recovering from broken limbs usually require enforced peace and quiet.

4. Is the animal going into routine incoming quarantine? The hospital facility only has a few areas that meet California Department of Public Health standards for the quarantine of primates. If a room already contains a quarantined primate, the introduction of another primate for quarantine will set back the release date of all primates in the room until the last primate has been quarantined for the minimum period, usually thirty days between administration of two TB tests. Consequently it is preferable to schedule several incoming primates to arrive within a few days of each other, or arrange housing for them in different rooms. For other species attempts are made to at least keep quarantine animals separated from similar species as much as possible.

During quarantine, an attempt is also made to limit human access to the animal and enclosure. Personnel likely to contact the general zoo animal population are encouraged not to contact animals in quarantine.

5. What is the likely length of stay at the hospital? If the animal is only going to be in the hospital for a few days, we may be more inclined to use a cage which only allows marginal daily cleaning,

but is better suited in other respects. Animals only staying the night, especially smaller species, may be left in their transfer crates as long as provision is made for security, food, water, drainage, warmth, and ventilation. As a general rule, if the length of stay at the hospital is unknown, it is assumed to potentially involve the length of time required to fund and construct a new exhibit on the zoo grounds.

6. What are the medical limitations on housing? Such considerations not already discussed above include substrates or cage materials that prevent the animal from abrading or contaminating sutures, dressings or foot/hand lesions. Animals with dressings or casts must be housed indoors at least when rain threatens. Water may need to be provided in a way that is not likely to soil the dressing, such as by a ball point tube drinker or by an unspillable container too small to stand on, located above floor level.

Animals suffering from intestinal pathogens need housing that minimizes their ability to defecate on their food and water. For most large animals, feeders which keep the food above ground level generally work well. Sometimes the choice of food may be dictated by what will stay off the ground. Smaller animals, unless they naturally keep their stool and food separate, may be difficult to prevent from soiling their food, as anything big enough to hold food and still be accessible to the animal can also be used as a perch. Sometimes feeders suspended outside the cage can be used for primates, as long as they leave the food in the feeder until they decide to eat it. For some animals the only solution is to use a cage with a wire or barred floor which at least allows the stool to fall through, if not food as well.

The problem of providing water to animals with intestinal pathogens is even harder than for animals with dressings or casts. If the animal cannot or will not use a tube-type drinker and insists on spoiling an elevated container, a constant trickle of water near the cage drain or through the wire cage bottom can generally solve the problem. This method has been successfully used to water capybara who would practically stand on their front legs alone in order to put their hind legs into a tall bucket and defecate. A hose carefully arranged out of reach, and a metal nozzle firmly anchored to protrude just inside the cage can generally increase the popularity of this technique.

7. What are the considerations for minimizing stress to the animal and keepers during uncrating, routine cleaning and feeding, medicating or handling, and eventual crating upon discharge from the hospital? Up until now, most of the considerations have been for the animals' needs. As a matter of practicality, the animal must also be housed to suit the keepers' needs as much as possible. On one extreme, the animal is so fractious as to fling itself headlong against cage sides or ceilings at the slightest disturbance, setting the animal up in a cage away from the hubbub of daily activity with plenty of water and enough food to last for several days without spoiling may be the only way to go. Cages with enough length or height to allow the animal to get comfortably away from people can go a long way toward minimizing stress for all concerned during routine cleaning and feeding activities. In any event, even "calm" animals can get in trouble if their cage does not allow for the animal's typical flight reaction, whether it be actual flight, hiding, running or jumping. The cage must allow for cleaning without the keeper having to enter

the cage with the fractious animal. This can most easily be accomplished if the cage can be divided into two separate cages, such as closing a remotely operated guillotine door between indoor and outdoor areas of the same cage, or by allowing the animal to run into an adjacent cage with an intervening remotely operated door. Cages that can be hosed clean from the outside can be used so long as the animal can and will avoid the spray, and satisfactorily tolerates the intrusion.

Uncrating procedures can be handled most safely for the dangerous or unruly individual if the crate is equipped with a sliding or guillotine door that can be securely opposed to a similar door on the cage. The same doors can make future crating procedures safer.

If one wall of the cage can be mechanically moved to "squeeze" the animal between two surfaces through which an injection can be given, the animal can be safely restrained for sedation or medication, if necessary. If properly designed, the squeeze mechanism can also be used to force an animal into a crate. One of the hazards of squeezing large carnivores is the potential for dental fractures resulting from cage biting.

Nest boxes equipped with sliding doors can sometimes be used to capture and even transport animals at a later date.

8. In what kind of cage and location in the hospital is the animal likely to be the most comfortable? What cage is the most easily modified to suit the animal's needs? This item is the "comfort" counterpart of the "necessity" considerations described in item 7. Perching birds and arboreal mammals generally seem to be more at ease if they can spend most of their time above the ground, preferably in a position higher than people. Therefore tall cages which can be fitted with perches or elevated platforms are well suited, even if they are in relatively busy areas. At the hospital there are several cages overlooking a wooded canyon where the animal may actually enjoy the illusion of being higher than it really is. Strictly terrestrial species (keepers included) will frequently find perches to be a useless hazard if they are inclined to jump or run in response to a perceived threat. Thus perches left from a previous tenant should also be easy to remove when not needed. Again, even if the animal is not likely to injure itself in a flight response, certain accommodations should be made in the form of sight barriers or nest boxes where the animal is likely to use them. Nest boxes equipped with ventilation holes will frequently provide privacy while also giving the animal and keeper peepholes to keep tabs on each other. Burrowing animals will frequently adopt appropriately sized PVC pipes, drain tiles, bath towels or even rolled newspaper as their hiding place.

Whenever possible, animals such as waterfowl, penguins, flamingos and otters should be provided with some sort of pool, if only for the feeling of security they seem to provide. Hopefully item 2 will already have provided pools for marine mammals and aquatic reptiles and amphibians.

Many primates and hand-raised individuals will frequently benefit if they are housed, not necessarily amongst it all, but at least where they can watch the routine hospital comings and goings, if they desire such entertainment.

Generally, if the animal is a runner or a large bird, the larger the cage and the quieter the location the better. Otherwise, as long as the particular need for that species to feel safe is met, whether it's a nest box, pipe, pool, high perch, or simply a towel to crawl under, the furnishings of the cage can to a great extent make up for a small cage or a busy location.

9. Are there special state or federal limitations on the type of housing this animal may be kept in? Certain species in our collection are considered by the United States Fish and Wildlife Service to have a high potential for becoming pests if they were to escape into verdant, warm Southern California. Meerkats, a relative of mongoose and flying foxes, a form of fruit bat, are two examples. For these animals special provision for housing them in cages with cages and/or with safety cages are made. Safety cages are utilized as much as possible for other animals, but particularly so for restricted species.
10. Should the animal be housed where it can see a comforting companion? Should the animal not be housed near certain other hospital residents? This is as simple as housing social animals where they can at least see conspecifics, keeping solitary or competitive animals away from similar species, and avoiding housing predator and prey species near to, or even within earshot of each other.
11. Is the animal a "star"? Though last of the considerations for housing from the standpoint of the well being of the animal and the integrity of hospital care, one must admit the requirements of "star" animals can easily transcend all other considerations. The rare species a curator has spent three years trying to acquire will certainly be visited during "quarantine" by curators, managers and keepers. If the director has expended a great deal of effort or money in acquiring the animals, the visitor list will probably also include administrators, donors and members of the media. Therefore the animal will have to be housed in a highly accessible location, an attractive cage. When this can be done without compromising other animal care requirements, the extra attention is simply a time consuming annoyance.

Sometimes "star" animals come complete with dictates from above as to where and how the animals will be housed and managed in the hospital. Sometimes these dictates are based on sound husbandry. Sometimes these dictates are based simply on the cost of the animal and must be followed, even if they conflict with infectious isolation or quarantine practices, or force more "needy" animals into less appropriate cages. This causes the hospital to cease functioning like a hospital. Sometimes, if the star quality of the animal is low enough and the interested staff member is unlikely to make a return visit, the dictates can be satisfied with, "We'll do our best." Of course, the hospital keepers will do their best to equally meet the needs of all the animals under their care, regardless of the animals' cost or public relations value.

12. What if the "right" cage for the new animal is already occupied? Many times the present occupant does not really need to be in the hospital, but was acquired for the collection without a definite place to go following quarantine, or just needs a quiet place to recuperate off-exhibit. An excellent time to pressure a department to pick up their animal(s) simply being held at the hospital is when that department wants to bring in something else. This

is where the problems of inadequate off-exhibit holding facilities on the zoo grounds can force the hospital to compromise their quality of care.

If the present occupant cannot be moved out of the hospital, repeat the preceding considerations for the present occupant. Weigh the housing pros and cons for the two animals to see if it is worth the stress of shifting the present resident to another, perhaps less appropriate cage. Sometimes due to chance vacancies, an animal may be housed in a cage more "luxurious" than its real needs require. If the process of moving an animal to another cage is not too stressful, a certain amount of shifting may occur to make room for someone new.

The twelve steps in selecting appropriate housing from a variety of options are arranged more-or-less in the order of their importance. Obviously, satisfying one priority is bound to conflict with one or more of the other priorities, and trade-offs will have to be made. Generally higher ranking priorities will take precedence over lower ranking ones, but often compromises can be reached. Housing may not be perfect in any one respect, but provide the best possible blend of all the important factors.

CAGE MODIFICATIONS

As previously suggested, the cage with the best shape, design and location may not be properly furnished for the animal to be put there. The permanent features of a cage can either help or hinder certain types of modifications. Wire or chain-link sided cages make the installation of wooden perches fairly easy. Poles can be nailed to the wire or pushed through chain-link and held in place with bailing wire. A more modular variation of this theme can be used in cages with a strong wire or bar ceiling and at least one wire side. Poles or planks are permanently fitted with a 0.9 - 1.2m (3-4 ft) length of chain at one end and two strong screw-eyes at the other. The screw-eyes are poked through the cage wire side from the inside and secured to the wire with snap fasteners or locks. The free end of the chain is then secured to the ceiling of the cage with a snap fastener or lock. By varying the length of the chain and the attachment point to the wire side, the height and slope of the perch can be adjusted to suit, and the same perch is reusable in different cages. This also saves poles from wear and tear of nailing. Cages with concrete walls can make the placement of perches difficult. Many of the concrete-sided cages at the hospital have been fitted with notched, horizontal two-by-fours bolted to the walls to allow for the attachment of perches to the otherwise smooth surface.

Perches need not always be horizontal poles extending from one side of the cage to the other. By scouting tree-trimming operations, sections of forked trunks and bent branches can be selected which will act something like a freestanding tripod. These can be used as freestanding low perches for cormorants or scratching posts for small cats. Freestanding perches with sloped elements can be incorporated into more elaborate arrangements where animals must climb from the floor to higher perches. Sections of thick tree trunks can be stood on end to provide pelican perches or feeding platforms for raptors.

Along the lines of perches for terrestrial primates or medium sized cats, benches come in handy. The hospital keepers utilize wooden benches with metal pipe legs ranging from stool, to picnic bench, up to heavy 1.5 x .6m (5 x 2 ft) size, each standing about 30cm (1 ft) off the ground. Of course, the bench should not only be big enough to hold the animal, but

ANIMAL CARE AT THE SAN DIEGO ZOO HOSPITAL, Continued

at least make it difficult for the animal to topple or throw it as well. Sometimes a bench can be wired to a cage side for stability, but some animals will thwart this measure as well. Unless the cage is large enough to incorporate a permanently placed bench or shelf, some animals may simply have to do without.

Sight barriers can be constructed by attaching a piece of plywood to the cage wall or hanging a piece of burlap from the ceiling. Care must be taken with the use of burlap and other loose-weave fabrics. Trailing threads from unhemmed edges can entangle a bird or cause intestinal impaction if swallowed. Ground dwelling birds such as quail will generally hide under a leafy branch propped upside-down in a corner of the cage. If available, palm fronds are good cage furnishings as they don't drop their leaves when they dry out.

One step beyond a sight barrier is the nest box. Wooden crates in which animals are shipped sometimes make good nest boxes if the materials and workmanship are sturdy enough. (Some shipping containers were surely intended to spontaneously collapse at the final destination.) Some of the features that make a good versatile nest box are: removable sliding doors, adequate ventilation when the doors are closed, feet of some kind which keeps the bottom off the ground, drainage for urine, a lip at the door opening to help retain bedding, materials and construction which allow for cleaning between occupants, and for larger boxes carrying handles. The size of the nest box should be adequate to allow the animal to stand, turn around and lie down in a variety of natural positions. Nest boxes with doors can make capture and transport of certain animals easy. They also give the keeper a place to temporarily hold an animal while he gives the cage a thorough scrubbing.

The hospital keepers maintain a wide assortment of nest boxes. Bird nesting boxes with hinged lids make great nest boxes for small marmosets, lorises and small rodents. Bushel boxes or plastic airline animal crates make good hiding places for partridge or small pheasants. For canids or medium-sized cats, square, short boxes about 1.2 x 1.2 x 0.25m (48 x 48 x 10 inches) with no top can be used. To slow down chewing, the top edges of the boxes should be covered with galvanized sheet metal. Those same boxes, with the addition of corn cob bedding or towels, can house hedgehogs or echidnas.

Apart from nest boxes and perches, other portable cage furnishings can be used. Housing terrestrial or water birds on concrete floors can lead to major problems with their feet. Whenever possible, pheasants are housed in pens with a dirt substrate, but in concrete pens, the addition of dirt becomes a time-consuming sanitation problem. Covering the floor with a piece of outdoor carpeting has some benefits, but the best product so far discovered is a rubber carpeting made by 3M called Nomad[®]. This material is about 1cm thick, is easily washable with sodium hypochlorite solutions (bleach) and drains rapidly. Nomad[®] remains reasonably soft and pliable unless repeatedly exposed to the phenylphenol disinfectant One Stroke Environ[®], which causes it to become hard and somewhat brittle.

The use of artificial turf carpets can be used to soften concrete floors as they too drain and wash well. Care must be taken to watch for trailing threads from the backing. Ratites will frequently eat anything that they can swallow, and have been known to suffer intestinal impactions from consuming the fibers of artificial turf carpeting or particles of other deteriorating floor coverings.

Also of concern for waterfowl is their access to a pool. Four hospital cages have built-in pools, two about 20cm (8 in.) deep and two about

NIMAL CARE AT THE SAN DIEGO ZOO HOSPITAL, Continued

1.5m (5 ft) deep. If these cages are occupied, plastic children's wading pools have been added to raptor cages to accommodate pelicans and flamingos. Rubber hoofed stock food tubs and shallow metal pans, about 76 x 76 x 10cm (30 x 30 x 4 in) at least provide a place to bathe and a psychological "safe area" for waterfowl housed on concrete.

Supplemental heating can be accomplished by the cautious use of portable radiant heat lamps or forced air heating units. Extreme care must be taken to insure a safe distance between the heating unit and any combustible material, including the animal. If the unit is attached to a wall bracket or other elevated site, a secondary attachment should be provided to prevent the unit from falling into the animal's reach or into bedding should the first attachment fail. Often this can be accomplished in a way such that the unit will have to pull free of the electrical plug before it can fall. Of course, extreme care must also be taken to prevent exposing appliances or plugs to water or urine, and to prevent the animal from contacting an electrical cord.

Careful monitoring is critical if the animal is unable to move away from supplemental heat. Otherwise healthy amphibians and reptiles should never be housed where they cannot get away from supplemental heat. These animals regulate their body temperatures by moving in and out of warm areas and require daily changes in their body temperature in order to express their normal behavior patterns.

Supplemental cooling can be provided by the use of shade cloth awnings, maximizing cross ventilation, or even housing the animal in an air conditioned building.

Humidity can be raised by sprinkling the ground as needed. Indoors, similar techniques can be used. There are also a variety of inexpensive mechanical and ultrasound humidifiers on the market that can be used indoors.

Reverse light cycle situations can be set up in any room that can be completely darkened and is equipped with electricity. The red or blue "night" light can be left on all the time. The white "day" light can be controlled by a simple plug timer of the type sold as home security devices. By shifting the night cycle to start an hour or two after the beginning of the work day allows for cleaning and feeding without disturbing the nocturnal animal.

The requirement of on-demand cage modifications makes it important for a facility like a zoo hospital not to put too many permanent specializations into cages which limit the kinds of animals that can be housed there. Being able to move a variety of nest boxes, benches or perches in and out of a cage as needed maximizes versatility. A moderately sized concrete pen with a heated floor may be perfect for canids or medium sized cats, but a waste of space or even a hazard to large bears. Retrofitting heating units into some of the hospital enclosures has been done in a manner that when not needed, the heating apparatus is not in the way or in danger of being ripped-out by destructive tenants. Permanent wooden shelves in larger cages must be constructed to withstand the attentions of the most destructive species likely to be housed there. The heavy planks forming a shelf in one large carnivore cage held up well until a large bear decided to chew them up, resulting in splinter abscesses. The new shelf is protected on all exposed edges with heavy angle iron bolted and welded in place.

COMMUNICATION

Just as the hospital keepers have a large selection of cages to work with, staff at the hospital complex is equally varied and numerous. From veterinarians, pathologists, researchers and their secretaries, on through laboratory technicians, animal health technicians, interns, externs, students, janitors and keepers, the hospital staff numbers in excess of 16 individuals. Moreover, hospital keepers find themselves in the position of caring for animals otherwise under the jurisdictions of the many different animal departments of the zoo and Wild Animal Park. They must also include among their duties the impossible task of simultaneously satisfying the personal requests of six animal care managers and their assistants, four curators and their assistants, plus animal trainers, researchers, members of the education and public relations departments as well as film crews, members of the media, the occasional tour group of potential donors, and keepers simply interested in their hospitalized friends. Each of those people has a particular job to do. Each has their own set of priorities and blind spots. This situation of no-win diplomacy has caused the hospital keepers to develop the ability to cut to the point and talk fast. The only thing that keeps the hospital from flying off in 20 different directions is communication in large doses.

From the view of the hospital keeper, communication revolves around keeping up with the day to day changes in care of each of the hospitalized animals. The first order of business each day is for the keepers to walk through the whole facility together to check on every animal. During "keepers' rounds" the keeper who worked a particular section of the hospital the previous day will evaluate each animal's food consumption, stool quality, and general vitality, and inform the other keepers of any new developments that have taken place in that section. Keepers who had worked the previous few days fill in a keeper just coming back from his days-off on recent changes in food preferences, diet changes, health trends, and any expected new arrivals. Keepers coming back from their days-off can frequently spot changes too gradual for the day-to-day eye to pick up, such as changes in weight. The results of experiments with new food items for reluctant eaters are frequently discussed during keepers' rounds. At this time the keepers also check every empty cage just in case a late night delivery or emergency has presented the hospital with a new occupant.

Following keepers' rounds, the keepers will pass through the hospital treatment room, the center of hospital activity, to check the vets' calendar for any exams or treatments scheduled for the day. The vets' calendar is an erasable acrylic board marked with boxes for the days of the week for the next four weeks. Here exams, surgeries and treatments are scheduled so that, supposedly, the elective work load doesn't inadvertently all end up on the same day. This scheduling calendar gives the keepers a source to double check verbal instructions about which animals are scheduled for work.

Now, anywhere from 30 to 45 minutes into the day, the keepers check their own board in the keepers' kitchen for the schedule of medications they are to give out. This erasable whiteboard has a list of every prescription to be administered to an animal by a hospital keeper. The animal's identification, medication, amount, frequency, dates to be given, and the prescribing doctor are written on this board for quick reference. This board also keeps track of grocery items that have been or need to be ordered from the forage warehouse, fecal samples that need to be collected, and animals to be held off food/water prior to scheduled sedation.

After the veterinarians and animal health technicians have arrived for work and gotten a chance to walk around the hospital on their own, another

NORMAL CARE AT THE SAN DIEGO ZOO HOSPITAL, Continued

ounds" takes place, this time with the vets, AHT's and keepers together. Every hospital case is discussed, with each person at the meeting having the opportunity to add their own observations in order to develop a clear picture of how each animal is doing. Problem cases are discussed so that the particular concerns of vets, AHT's and keepers can be taken into consideration in formulating any new plans of treatment. This is also where the vets discuss their plans for the day, and any animals expected to move in or out of the hospital are mentioned so that everyone will know what to expect.

For each animal in the hospital, a paper tag is attached to the outside of the cage which has blanks to fill in the species, individual identification, sex, weight, date of arrival and status (quarantine, patient, or normal) for the animal. This helps to prevent several individuals of the same species from being confused. The cage tag also has blanks to fill in the date fecal samples were collected. As part of routine quarantine procedures, at least two fecal samples are collected from all new animals to screen for enteric parasites. Of course, fecal analysis is also done for animals showing signs of enteric parasitism. The cage tag is a handy, on-site record of if and when fecal samples were collected, without having to refer to medical records. There is also a blank for the initials of the person collecting the fecal sample in case a question about the quality of the sample comes up later.

PETS

Perhaps the biggest problem with caring for so many different kinds of animals is keeping all their diets straight. Verbal communication between hospital keepers helps to make day to day changes known, but a file is also kept of diets for most of the species that have passed through the hospital. A record is not only kept of the latest diet for a species, but previous diets successfully fed are also retained. That way if an animal refuses the usual fare, there is a ready reference of alternate diets to fall back on.

Feeding a newly acquired animal is usually made easier when they are accompanied by an Animal Data Transfer Form, sometimes it isn't. Diets which call for a "scoop", a "slice", or provide enough food to feed 30 animals in a mixed-species exhibit are great sources of amusement. When it is known in advance that a new animal will be arriving, an attempt is made to get the curator concerned to fill out a Quarantine Arrival Form, which asks for the animal's diet, housing and health history. Quarantine Arrival Forms filled in with "standard diet" are also great sources of amusement, as the same species within the zoo's collection may be fed several different diets if cared for by different keepers in different exhibits. Often the blanks are filled in with "info to accompany shipment". Frequently the only thing that accompanies the shipment is a health certificate. So the hospital keepers are often left the task of trying to come up with a diet from scratch for a species they have never seen before, or for an animal that may have been fed entirely differently at its previous facility compared to our "standard diet".

The library is the obvious source for dietary information, except when searching a new species and only the common name is known. Many times an animal has refused to eat what the book says it should because the species was not properly identified in the beginning. Often the diet the animal would consume in the wild is impossible to provide in captivity, and its captive diet is currently out of season in this hemisphere. You can imagine how much it costs to buy New Zealand cantaloupe in our winter. Talking with other keepers who may have cared for that species in the past is also a possible source of diet information.

ANIMAL CARE AT THE SAN DIEGO ZOO HOSPITAL, Continued

The starting point for developing a diet from scratch is to try to generalize from the diets of related species or species which fill similar ecological niches. Sometimes the only choice comes down to offering a bit of everything to see what the animal selects. A great deal of caution has to be exercised in this approach. An animal should not be allowed to gorge itself, especially not on a single food item. In the short run this can lead to bloat in many species, and in the long run can spoil the animal for a single food and lead to malnutrition. There is a certain safety in providing small amounts of many foods so that if one or two of them cause indigestion, at least they will have been diluted by the other food items. A variety of different foods will also tend to balance the nutrient deficiencies in any one item. Also, attention has to be paid to basic nutrients in the diet. There must be adequate sources of protein and fiber in the diet and not too much carbohydrate. If the diet in the wild is all there is to go on, at least that should indicate what the sources of protein are (such as meat, seeds, insects, grasses, or leaves) and the relative level of fiber in the diet.

Over the course of several days, the animal's reactions to the foods presented should be carefully observed, if not recorded, so that adverse patterns can be identified. Remove a suspect food for a week, and then reintroduce it to see if it does in fact cause problems. A similar technique can be used if the animal refuses a food it "should" eat. Sometimes taking the food away for a while and then reintroducing it can spark new interest. At other times a food may have to be offered each day even if refused before the animal will get used to it and finally pick it up.

Of course sick animals will test the true culinary creativity of a keeper. Recalcitrant eaters at the hospital have necessitated the invention of such entrees as scrambled eggs flavored with cherry syrup, and seedless grapes stuffed with ratite pellets.

CONCLUSION

Basically the generalist's approach to specialized animal care is to look at an animal as a collection of many different characteristics. Some of the characteristics can be considered apart from the others in formulating some aspects of animal care, as long as the final evaluation takes the whole animal into consideration. For example, if the animal is arboreal it is likely to prefer perches above the ground and may not even go to the ground for food or water. If the animal relies on an innate reflex to rapidly run from perceived danger in the wild, it is not likely to do well in a small pen, nor would it be wise to try to manually capture such an animal if it may take more than one try. A Patagonian cavy is a large (8kg) grassland dwelling rodent with relatively long thin legs. From its habitat and general build its locomotory behavior is a lot like a small antelope, but being a rodent will take advantage of nest boxes to hide in more readily than hoofed stock, will handle a more varied herbivorous diet without upset, and are accomplished burrowers. Marmosets are small mammals (thus require nest boxes), are small primates (thus have some insects or small animals in their diet), are arboreal (thus require perches), and being primates, their quarantine quarters must conform to the same California Department of Public Health regulations that quarters for apes do.

It is hoped that by writing this type of article, not on a specific breeding success or new exhibit, but on everyday aspects of animal care, that keepers will be encouraged to share the experiences and decision-making processes which simply help to get the job done.

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MANAGEMENT PROBLEMS WITH MANED WOLVES
AT THE RIVERBANKS ZOO

By
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Chrysocyon brachyurus, the maned wolf, is a rare, interesting, and most unusual member of the canid family inhabiting the open pampas and swampy mangrove forests from north-eastern Brazil to northern Argentina. In the Sierra de Canastra National Park, Brazil, maned wolves mate monogamously, share a common home range throughout the year, but avoid contact except during breeding season.

Due to its shy nature, very little is known about the natural behavior of this species. Although classified as a wolf, in appearance it resembles a very large fox. Standing approximately .915m, most of it is long, slender legs, not adapted for swift running, but rather for efficient vision and travel in tall vegetation. Large, rounded ears help detect prey located in the grass where they usually stalk and pounce on their prey like a fox. Long, reddish-orange hair covers their lanky frame. Down the nape of the neck and across the back, a long black mane stands erect when excited. The extremely long legs, black in color from the middle down, cause the animal to move in a distinctive swaying walk or gait, an adaptation for moving through open, tall grasses.

Females are monestrous with births occurring in July and August in South America and in January and February in the Northern Hemisphere. Heat lasts approximately five days and the gestation period is sixty-two to sixty-six days. The litter size is usually two to five pups with each weighing approximately 350 grams at birth. The pups open their eyes after eight or nine days, consume regurgitated food at about four weeks of age, and are weaned by fifteen weeks of age.

Due to habitat destruction and concentrated hunting by local farmers, the maned wolf is an endangered species on the decline throughout its range. High-strung and shy, until the last two decades, there were no successful births in captivity and as such it has joined the list of difficult animals to manage in captivity.

On 24 October, 1984, Riverbanks Zoo received a pair of young maned wolves from the National Zoo's Conservation Research Center. The exhibit to be used as their enclosure had previously held 3.2 African cheetahs, *Acinonyx jubatus*. The exhibit, approximately 30.5m long and 9.1m wide, was enclosed from behind and on both sides with gunite structured walls. The substrate consisted of sand with some grass and a few shrubs for shade. The public was kept at a distance by a 4.575m wide and 6.1m deep moat. Two wooden pupping dens 1.2 x .915 x .915m high and spaced 1.5m away from each other were located towards the back of the exhibit for privacy.

After a quarantine period of approximately ten days, the wolves were crated, moved from the hospital, and introduced to the exhibit. Burlap skirting was placed around the top of the moat for a few days to prevent them from falling or jumping down into it. It did not take the animals long to discover that they could avoid visitors and staff by climbing down into the moat. The problem was that they could not climb back out. A wooden ramp was constructed and placed in a position to allow them access in and out.

MANAGEMENT PROBLEMS WITH MANED WOLVES AT THE RIVERBANKS ZOO, Cont'd

en not in the moat, they mainly confined themselves to the wooden boxes the rear of the exhibit. Visitors to the park rarely got a glimpse the "new arrivals".

order to make the animals more visible, morning and evening feedings re delayed to the times when visitors at the park were most numerous. e musk odor, which greeted people as they entered the park, created other problem. Even though signs explaining it as a territorial marking ent were placed in front of the exhibit, complaints became numerous. rly on it was apparent to the staff that these maned wolves may not be sirable exhibit animals.

2 March 1985, the female became quite aggressive and would not allow epers to enter the exhibit. She was observed spending most of her time one of the pupping boxes and chasing the male away when he came too ose to the den. Many facilities are now allowing the male to remain in e exhibit with the female and pups. It has been observed that the male ps rear the pups. Such was the case with the wolves at Riverbanks. x days after the pups were born, one of the adults was seen carrying a p around the exhibit. Wolf pups, at this stage, appear dark grey in lor with white-tipped tails. They resemble German sheperd pups with ort little snouts and legs.

ring the next few weeks the pups were transfered from one den to another. en the pups were three weeks of age, the female and young disappeared. ter a thorough search they were found within a gunite wall. The female d dug through the sand substrate and placed the pups in a opening in the nite structure. The mother and three pups were removed, unharmed, and turned to one of the dens.

the time the pups were four weeks of age, they had already begun ex-oring the exhibit with both parents always close by them. The young ps began eating Nebraska Canine Diet[®] at five weeks of age.

8 April 1985, after separating the parents, the pups received their rst physical exam. All three pups were sexed, weighed, and then in-culated. Weights at seven weeks were approximately 2.5kg and the sex tio was 3.0. A dosage of .5cc Pittman-Moore, Quantum 6,[®] modified-live, nine origin was administered. The adults, released back into the ex-bit, immediately picked up the pups and placed them back into one of e dens.

p activity continued to increase every day as they adjusted to keepers d visitors. However, on 2 May 1985, at 0900, two weeks after their ccinations, two pups were observed stumbling and biting at the air. l three were removed and taken to the hospital. Two pups showed clini-l signs of distemper. The third pup, through able to stand, appeared ak. Blood samples were taken from all three pups. The two pups became thargic and began to show stiffening of the legs. On 4 May 1985, one d the two pups showing clinical signs of distemper died. The second pup gan labored breathing and was placed in an oxygen therapy unit. Attempts re made to exercise the stiffening limbs, but no signs of improvement re seen. On 15 May 1985, the second pup was euthanized. Further blood rk was done on the dead pups and tissue samples were taken. Final diag-osis was clinical distemper.

the third pup developed a peculiar blue film over both eyes impairing his sion. Hepatitis was diagnosed and treatment was begun. Drops were ministered several times daily. Treatment involved several months.

MANAGEMENT PROBLEMS WITH MANED WOLVES AT THE RIVERBANKS ZOO, Cont'd

After a few months, the pup was returned to an area located behind the exhibit where the adults were housed. The pup was placed in a sky kenne and the adults were given access to the backup area, beginning a reintroduction process. Unfortunately, aggressive behavior developed in the male and it became obvious to the staff that the male would eventually kill the pup. After all the wolves were innoculated with another distemper vaccine, Fromm D[®], the pup was sent to the National Zoo for further observations.

Further investigation found that canine distemper vaccines causing clinical disease in exotic carnivores have usually been of canine origin such as Quantum 6.[®] Facilities such as the Conservation Research Center and Oklahoma City, which house maned wolves, use a modified-live, canine distemper vaccine of avian origin named Fromm D.[®]

Unfortunately, at Riverbanks Zoo, the maned wolf may not be accepted by the public as a successful exhibit animal. However propagation did occur. The dilemma arose as to which is more important--public entertainment or propagating an endangered species. Perhaps the propagation of this species should be carried out in off-exhibit facilities at a zoo or at a private breeding center with more emphasis on the acclimation and conditioning of young animals for exhibit purposes. These conditioned animals will then allow more institutions to exhibit and hopefully breed maned wolves increasing the captive carrying capacity for the species.

The American Association of Zoological Parks and Aquariums (AAZPA) has recently assigned the maned wolf to its Species Survival Plan (SSP) program. Currently the U.S. population is at 38.29 with 35 institutions worldwide holding a captive population of 201 animals. Since 1980 the U.S. maned wolf population has grown 20% each year. There are nineteen founder animals of which ten are the most represented.

Within the next year, husbandry techniques will be discussed with all institutions housing maned wolves. New guidelines will be developed concerning medical problems, housing requirements, and diets.

Due to its tenuous status in the wild, the need to propagate the maned wolf in captivity is great. If zoos are to continue in increasing the captive population, work must continue in the improvement of husbandry and exhibition techniques for this rare and unusually beautiful animal.

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- Walker, Ernest P. Mammals of the World. Baltimore: The Johns Hopkins University Press, 1983.

Products Mentioned

Fromm D	Nebraska Brand Canine Diet	Quantum 6
Fromm Laboratories, Inc.	Animal Spectrum Inc.	Pittman-Moore, Inc.
Grafton, WI	5801 Locust St.	P.O. Box 344
	Lincoln, NE 68516	Washington
		Crossing, NJ
		08560

AAZK Regional Coordinators

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ene Pfeffer, Philadelphia Zoo, PA (215) 243-1100 (w)
for the states of PA,NJ,MD,DE

vacancy - for the states of VA,W.VA,D.C.

ie Payne, Detroit Zoo, MI (313) 398-0903 (w)
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an Sharples, Zoo Atlanta, Atlanta, GA (404) 624-1235 (w)
for the states of FL,AL,GA,AR,MS,LA

vacancy - for the states of TX,NM,CO,KS,NE,SD,ND

urence Gledhill, Woodland Park Zoo, Seattle, WA (206) 625-5497 (w)
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vacancy - for the states of CA,NV,AZ,UT

onolulu AAZK Chapter (Dan Zitiello, Pres.) (808) 923-4772 (w)
for the Hawaiian Islands

vacancy - for Eastern Canada which includes the Provinces of
Ontario and Quebec

vacancy - for Western Canada which includes the Provinces of
Manitoba, Saskatchewan, Alberta and British Columbia

If you would be interested in participating in AAZK as a Regional Coordinator for one of the areas listing "Vacancy", please contact the RC Co-Coordinator in charge of that area. Either Diane or Debbera will be happy to explain the duties of an RC and discuss the position with you.

Institutions wishing to advertise employment opportunities are asked to send pertinent data by the 15th of each month to: Opportunity Knocks/AKF 635 Gage Blvd., Topeka, KS 66606. Please include closing dates for positions available. There is no charge for such listings and phone-in listings for positions which become available close to deadline are accepted

ZOOKEEPERS...requires one year of experience with exotic mammals and/or birds in a zoo or major animal collection. BSc preferred. Salary commensurate with experience. Send resume and letter of intent by 31 December to: C. Dietrich Schaal, General Curator, Zoo Atlanta, Inc., 800 Cherokee Avenue S.E., Atlanta, GA 30315.

ANIMAL HEALTH TECHNICIAN...position available at the new medical facility in the Baltimore Zoo. Applicant must have an A.H.T. certificate, or equivalent. Zoological park experience preferred. Responsible for complete inventory of hospital, aiding in anesthesia and medical procedures minor treatments under the direction of the veterinarian. Must be familiar and competent at all routine lab procedures. Salary - \$15,000 plus benefits. Send resume to: Dr. Michael Cranfield, Baltimore Zoo, Druid Hill Park, Baltimore, MD 21217.

FUTURE ANIMAL KEEPER POSITIONS...in the coming years, the New York Zoological Society is expected to expand its operation at a rapid rate. This expansion will create a need for qualified and experienced animal keepers. In order to meet this need, the NYZS is attempting to create an active file of resumes of experienced keepers who are interested in working for the Bronx Zoo, New York Aquarium or one of several proposed new facilities within New York City.

Job requirements include two or more years' paid experience, a college degree in an animal science related field, (Bachelor's preferred), ability to perform physical labor in all weather conditions, complete dedication to the concepts and ideals of conservation biology. The job would carry the title "menagerie keeper" and the starting salary at this time is \$18,656 per year with a projected 6% increase on 1 July 1986. Four weeks paid vacation, full employer-paid major medical and hospitalization, pension, life insurance, and a generous tuition assistance program. Successful applicants would receive partial relocation assistance.

Those keepers interested in being considered for future openings should submit their resume to: *The Personnel Office, New York Zoological Society Bronx Zoo, Bronx, NY 10460*. Resumes must be typed and limited to one page in length. No phone calls please. All resumes will be kept on file for three years. Applicants will only be contacted when a position requiring their skills is open.

MOVING????

To insure uninterrupted delivery of AKF please send address changes as soon as possible to:

Barbara Manspeaker, Administrative Secretary
AAZK National Headquarters
635 Gage Blvd.
Topeka, KS

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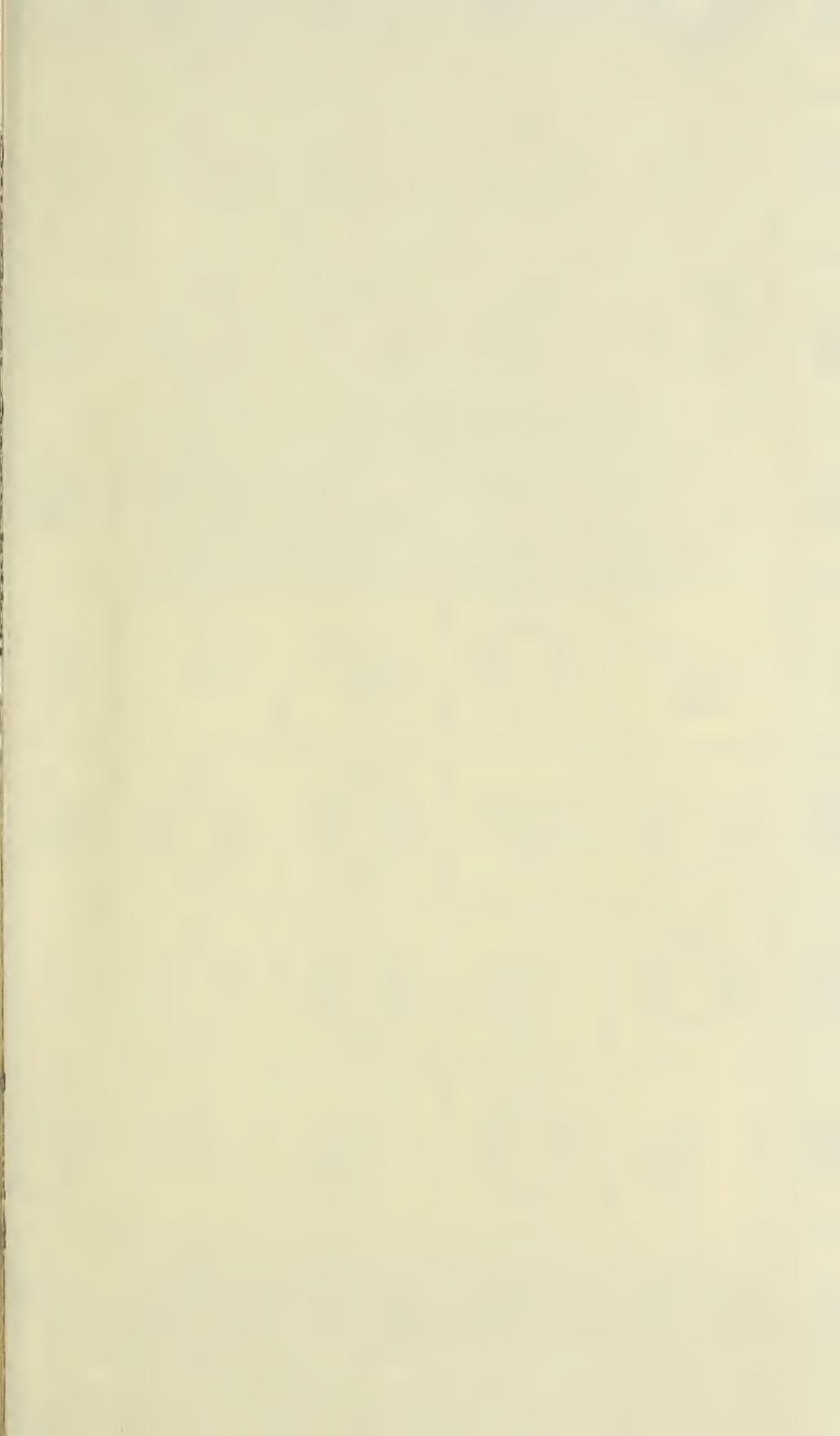
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