



Animal Keepers' Forum

Continuation Institution Libraries



Dedicated to Professional Animal Care

JANUARY 1984



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

This month's artwork is by Donna Mason Smith, a former zookeeper at the Birmingham Zoo. Her sketch features a Hooded Merganser (Mergus cucullatus). Thanks, Donna!

Scoops and Scuttlebutt

Call For Papers for 1984 Southern Regional

Plans are being made for the 1984 AAZPA Southern Regional Conference hosted by the Little Rock Zoo April 1-3, 1984. Papers addressing animal husbandry, practical veterinary care, animal conservation programs, and ethics, education, and support organization activities are welcome. Additional sessions for special interest will be scheduled as necessary. Send abstract to Anna Patterson, Conference Coordinator, Little Rock Zoo, #1 Jonesboro Drive, Little Rock, AR 72205. A copy of all papers must be turned in prior to presentation.

ZOO AND AQUARIUM LIBRARY NEWS

Mary Rabb, the librarian at the Brookfield Zoo, is willing to send copies of articles to other zoo or aquarium libraries. If you have a problem finding a copy of an article you want, have your librarian contact Mary at the Brookfield Zoo, Brookfield, IL 60513.

There is now a newsletter for zoo and aquarium librarians. For copies, your librarian may contact Kay A. Kenyon, National Zoological Park Library, Smithsonian Institution Libraries, Washington, D.C. 20008 (202) 673-4771.

Mike Dee of the L.A. Zoo has volunteered to help identify rare books. If your librarian is contemplating getting rid of some old books or suspects that he/she may have some valuable holdings, have him/her contact Mike for a list of titles. He may be reached c/o 524 Irving Ave., Glendale, CA 91201.

ZOOKEEPERS IN PUBLIC EDUCATION COMMITTEE FORMING

Does your zoo use Keepers in its public education efforts? Is your chapter involved in public education?

We hope to begin a Zookeeper-Public Education Committee. This would be a separate committee from the already formed Continuing Keeper Education Committee, and would be directed more toward Zookeepers educating the public.

Please send a response if you would like to participate in this committee and a description of your role in public education at your zoo. We would appreciate any literature you could send us on this subject and we will contact you depending on the responses received and the Board's approval. We hope to initiate this committee after the first of the new year.

Please direct responses to: Eileen P. Gerity, Education Coordinator, Van Saun Park Zoo, Forest Avenue, Paramus, NJ 07652.



Births & Hatchings

BRONX ZOO.....Margaret Price

B&H for October 1983 include: Mammals - 0.1 Guanaco, 6.0 Brow-antlered deer, 1.0 Fruit bat, 1.0 Douroucouli, 1.0 Maxwell duiker, 2.0 Bushy-tailed jird, 2.0 Minnie Down's mouse, 2.0 Black-backed duiker, 2.0 Acouchi, 1.0 Hammer-headed bat, 1.0 Sambar, 0.1 Axis deer, 1.0 Yak, 1.0 Slender-horn gazelle; Birds - 1 Golden-breasted bunting, 2 Silver gull, 1 Green wood hoopoe, 1 Superb glossy starling, 1 Red-breasted touraco, 1 Edward lorikeet, 1 Mauritius pink pigeon; Reptiles - 10 Kenyan sand boa, 7 Mojave sidewinder, 7 California kingsnake, 1 Common snapping turtle, 1 Bog turtle and 8 Sinaban milksnake.

ASSINIBOINE PARK ZOO.....Barb Hafßner

October 1983 B&H include 1 Common marmoset, 1 Triangular-spotted pigeon and 1 Crested bronze-wing pigeon.

TAMPA--BUSCH GARDENS.....Sandy Moher

B&H for November 1983 include: Mammals - 0.0.1 White-handed gibbon, 1.0 Hunter's hartebeest, 1.0 Sitatunga, 1.1 Dorcas gazelle, 1.0 Kafue (red) lechwe, 0.0.1 Black spider monkey, 1.1 Thomson's gazelle, 0.1 Sable antelope, 1.0 Addax, 0.0.1 Guinea (Western) baboon; Birds - 0.0.1 Black-necked swan, 0.0.7 Cockatiel, 0.0.3 Fischer's lovebird, 0.0.3 Black-masked love bird, 0.0.5 Sun conure, 0.0.1 Crested tinamou; Reptiles - 0.0.8 American alligator and 0.0.10 Spectacled caiman.

JACKSONVILLE ZOO.....Anne E. Wiggins

The following are the B&H for September, October and November 1983: Mammals - 0.0.1 Brindled gnu, 0.1 Celebes crested macaque, 0.1 Sitatunga (DNS), 0.0.5 Capybara; Birds - 0.0.1 Peached-faced lovebird, 0.0.4 Vulturine guineafowl; Reptiles - 0.0.7 West African dwarf crocodile and 0.0.32 Bahama boa.

MIAMI METROZOO.....Lori Bruckheim

November 1983 B&H include: 0.1 Thomson's gazelle (died - age 19 days), 0.2 Grant's zebra, 0.1 Forest buffalo, 0.1 Sable antelope, 0.0.2 Grosbeak starlings (0.0.2 DNS), and 0.0.2 Emerald tree boa (0.0.2 DNS).

TOPEKA ZOOLOGICAL PARK.....Alice Miser

Recent B&H at Topeka include: 1.1 Common eland, 1.0 Siberian tiger (DNS) and 0.0.1 Blue-crowned pigeon (DNS).



Coming Events

1984 NATIONAL WILDLIFE REHABILITATORS ASSOCIATION SYMPOSIUM

February 22-26, 1984

Kalamazoo, MI

For information contact: Kalamazoo Nature Center, c/o Pat Adams, 7000 N. Westnedge Avenue, Kalamazoo, MI 49007. (616) 381-1574.

AAZPA GREAT LAKES REGIONAL CONFERENCE

March 4-6, 1984

Grand Rapids, MI

AAZPA WESTERN REGIONAL CONFERENCE

March 18-20, 1984

Sacramento, CA

AAZPA SOUTHERN REGIONAL CONFERENCE

April 1-3, 1984

Little Rock, AR

AAZPA CENTRAL REGIONAL CONFERENCE

April 15-17, 1984

Omaha, NE

AAZK SOUTHEASTERN REGIONAL CONFERENCE

April 19-21, 1984

Columbia, SC

Hosted by the Riverbanks Zoo AAZK Chapter. Registration fee is \$25.00. for members and \$30.00 for nonmembers. Contact person at Riverbanks Zoo is Stephen J. Danko. Watch AKF for registration forms and information.

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 21-May 1, 1984

Philadelphia, PA

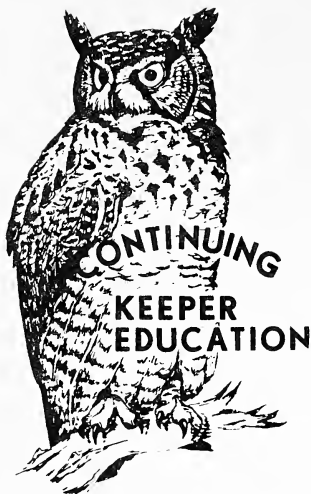
1984 AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at Woodland Park Zoological Gardens, 5500 Phinney Avenue North, Seattle, WA 98103. Watch upcoming issues of AKF for conference hotel site, registration forms and additional information. "Finders Keepers, No-Shows Weepers"!





VANCOUVER--SPECIAL SESSION ON STAFF TRAINING, PART II

By
*Judie Steenberg, Coordinator
AAZK Education Committee*

This article will cover the second part of the presentation on Staff Training given at the AAZPA Conference in Vancouver, B.C., condensed for publication.

There will always be a need for Staff training within an institution:

- for the orientation of new employees.
- for the new Keeper coming into the profession, with or without education, and no practical experience.
- for experienced Keepers to review and expand their knowledge and skills.

During the past eighteen months, the AAZK Education Committee, comprised of 26 members, has been working on finding out what is currently available regarding Keeper training. To do this the Committee worked on three projects:

Manual Review: this entailed locating and reviewing training manuals and programs being used in Zoos.

Reference Search: collecting data for the development of a bibliography on captive animal management.

Training Videotapes: a pilot tape on the subject of Safety; a supplement to the AAZPA Animal Husbandry Training Manual.

The objectives of the manual review were first to determine what was available and second, to help determine supplements that AAZK could provide to the AAZPA Manual. (Copies of several manuals were available for hands-on review in Vancouver). The AAZPA Animal Husbandry Training Manual was reviewed by nine AAZK Committee members. In general, it was felt that the manual provided a good basis for any Zoo to develop their own program from, geared to their own needs. Author Jim Ellis had mailed out a follow-up questionnaire on the manual which resulted in some interesting information.

- time was mentioned as a primary factor for not having a training program.
- several zoos mentioned that they were "trying" to start a program.
- 24 of the 50 respondents had not developed any in-house training materials.
- one Zoo had used the ZPA manual to write their own manual.

(Copies of the AAZK Committee's evaluation and the survey results were distributed.)

The one manual that was written using the AAZPA Manual as a guide was the Metro Toronto, Manual of Zookeeping, by Chris Parker. It is an excellent example of how the ZPA manual outlines can be used. AAZK Committee mem-

bers who reviewed the Toronto manual found it to be quite comprehensive. With some rewriting of items that pertain specifically to the Toronto Zoo, the manual would be very useful to the individual as well as to another Zoo. However, their manual is NOT YET AVAILABLE outside of the Toronto Zoo. The possibility of it becoming available for purchase at a future date is being worked on.

A total of 12 manuals, notebooks or guidebooks were reviewed. A chart indicating the major topics covered by each will be published in a future issue of AKF, pending approval of the various Zoos involved.

During the manual review several Keeper training programs were identified: The Santa Fe Community College Biological Parks program (see AKF, September 1983 issue, p. 272); the Moorpark College "Exotic Animal Training and Management Program"; and the Jersey Wildlife Preservation Trust six-week internship. Animal Management, a British correspondence course offered by the National Extension College, Cambridge, is a self-directed study course. The course was developed at the request of British and Scottish Zookeepers and is reported to be quite comprehensive. Just recently it was learned that overseas students can test on the course and receive certification. Committee member Douglas Richardson, Howletts Zoo Park, has made arrangements with the National Extension College for U.S. students to test at local universities. (See details under "Highlights of Philadelphia Conference" later in this column.)

One especially interesting program was the Calgary Zoo's four-year apprenticeship program. A list of test assignments is posted to give the apprentice a guide to acquiring the skills and job knowledge (s)he is expected to have. Before moving from one area to another, the apprentice is tested by an evaluation team. (A sample of Calgary's Job Method Training was available for review.)

Also available was a brief description and a copy of the Woodland Park Zoological Garden's 1983 Staff Training program and schedule. References used in the WPZG program are: WPZG Employees Notebook which is issued to each new full-time employee and covers personnel information and Zoo procedures on safety and animal health; copies of Murray Fowler's Restraint and Handling of Wild & Domestic Animals; the WPZG Plant Care Manual; and The Keeper's Role in Zoo Animal Health are all available through each of the Senior Keepers as well as the Zoo Library. Plans are underway to develop a structured basic Keeper training program for the Assistant Keepers and Keeper Aides.

The AAZK Staff Exchange Program was discussed as another approach to Staff training. Information was mailed to all AAZPA member zoos in August as well as to several other zoos; copies of the mailing were available. The preliminary list of 21 zoos that had registered to date was also displayed.

At this point in the special session, Mr. Simon Hicks, from the Jersey Wildlife Preservation Trust spoke about their program and answered questions from the delegates regarding the program and funding.

Closing comments were directed toward the realization that Staff training is not an easy task. The key to success is having a commitment and working cooperatively. Delegates were asked to give consideration to how larger Zoos with more resources can help smaller Zoos. It was hoped that everyone would leave the special session both acknowledging and supporting the need for continuing Keeper education and the development of training materials in their institutions. The last fifteen minutes was spent by most of the attendees taking advantage of the opportunity to look at the

suitcase full of materials we had brought along for display. Comments were very supportive and appreciative of the opportunity to attend the session.

The information in this two-part series was also presented at the AAZK Conference in Philadelphia during the paper sessions. AAZK delegates had the opportunity to review all the materials mentioned, plus more.

During the past month there have been four requests from Zoos wanting to know about the information presented at the special session; they had not been able to attend. Overall the response to the special session and the subject of Staff training has been very good. It confirms the need to identify and share programs, and materials for the training of Keepers.

HIGHLIGHTS FROM THE PHILADELPHIA CONFERENCE

Over 50% of the Education Committee members attended the Philadelphia Conference allowing for several decisions to be made, with Board approval.

- AAZK Keeper Training Videotape on Safety was viewed and approved by the Board and members present. This is the first of a series of training tapes AAZK will be producing. Guidelines for the production and distribution of future tapes was submitted, discussed and approved with some changes.
- Reference Search Project status report was presented. An IBM personal computer was used to compile existing bibliographical information on over 300 references. Goals for the coming year are to enter index data from International Zoo Yearbooks, Animal Keepers' Forum, Zoo Biology, and the AAZPA Newsletter.
- Exhibit Design Form prototype copies were distributed. This project will require additional development, but promises to be a valuable source of information.
- Animal Management Correspondence Course (see the Sept. 1983 issue of AKF p. 206). We have finally managed to enable those people taking the British Keepers Course to gain certification. It is up to the zoo or the individual to find an establishment like a high school or college that will oversee the final exam. According to Douglas M. Richardson, Howletts Park Zoo, Bekesbourne near Canterbury, Kent, England--once an individual has located such a proctoring agency, they should write to him at the above address and he will verify the information with the City and Guilds of London Institute. This is the organization from which an individual will receive certification. He notes that it is probably not necessary to find a test site until one is working on Volume III of the Course.
- Zoonoses, A Keeper's Guide received approval as an Education Committee project. Although there is considerable work to be done, the end result will be a valuable reference.
- Manual Review is taking on a new direction. The Committee is still interested in receiving copies of training materials currently being used in zoos. Ideas and information from this project will be incorporated into other projects. Permission will be sought prior to using any information.

--Feed Bag is in need of your questions: mail them to the Metro Toronto Zoo AAZK Chapter. Delegates at the Conference provided 10 questions to be answered in future AKF's.

--Zookeeper Husbandry Fundamentals: An outline for this project was presented to the Committee by Jim Ellis. ZHF would be a book that would incorporate much of what has been worked on to date. The Board and Committee unanimously approved the project. Pat Sammarco has agreed to co-author the book with Jim. This will be an opportunity to collect and publish the experiences of many Keepers and Zoos regarding animal husbandry in a practical sense. ZHF is expected to take at least two years to complete. You will hear more about this in the near future.

The Education Committee's first year was very productive. All members are to be commended on their hard work. A complete list of Committee members and the projects in which they are involved will appear in the next issue of Animal Keepers' Forum.



AAZK STAFF EXCHANGE PROGRAM----Help Wanted

The Puget Sound Chapter is in the process of compiling the master list of institutions interested in participating in the Staff Exchange. December 1st was the cut-off date and the list will be available after January 1, 1984.

All participating institutions will receive a detailed copy of the master list and a copy will be on file at AAZK National Headquarters. The list will also be published in Animal Keepers' Forum.

We would like to hear from you if you have:

- already participated in an exchange (problems, highlights, name of participating institutions, duration of exchange).
- have encountered problems in trying to arrange an exchange.
- have questions about conducting an exchange (see Vol. X, Issue No. 10, pages 303-304 in AKF) that have not been covered.
- are anticipating an exchange in 1984 (names of institutions, duration of exchange).

Contact: Elandra Aum, Coordinator Staff Exchange
Puget Sound Chapter
Woodland Park Zoological Gardens
5500 Phinney Avenue N.
Seattle, WA 98103



USE OF NATURAL TOYS BY SMALL FELIDS
AT THE MILWAUKEE COUNTY ZOO

By
Valerie Werner, Zookeeper
Milwaukee County Zoo, Milwaukee, WI

In an attempt to provide "amusement" and to stimulate activity for viewing by zoo visitors, the keepers at the Milwaukee County Zoo's Feline Building have experimented with various natural toys for use by the two species of small felids exhibited here: servals (Felis serval) and caracals (Felis caracal).

Included among the more successful toys are rounded pieces of wood, pine cones, and the knotted ends of rawhide bones. These all provide a rolling, ball-like motion when struck, inviting the animal to chase it. Care must be taken to ensure that these toys are large enough to prevent accidental swallowing by the animal, and the pine cones should have scales with smooth edges, not sharp bracts or thorns. At our zoo, we have installed drain covers to prevent clogging should the toy roll near or into the drain opening.

Balls made of tanned sheepskin, with the fleece intact, were also successful toys. Not only could they be rolled about, but because of their light weight and fibrous make-up, these toys could be tossed and caught by even the smallest kitten. Unfortunately for us, the animals enjoyed playing with the sheepskin toys too much; they were reduced to practically nothing in a few hours. Replacing these toys regularly became quite an expense.

Our alternative to the sheepskin toys is rabbit fur. Since we feed rabbits to both the servals and caracals on a weekly basis, the fur is readily available. A small portion of the rabbit is skinned; the fur is rolled into a ball-like shape and placed in our refrigerator's freezer section to harden before being presented to an animal. The freezing allows the "ball" to retain its shape for a longer period of time and also prolongs the life of the skin with regard to decomposition.

Rabbit fur toys have proven just as successful as sheepskin without the expense. When our cats tire of playing with the fur, it is often ingested. If not, care is taken to remove the skin from the cage before it begins to decompose.

All of the toys discussed have been used to alleviate boredom in solitary animals, both adults and kittens. Where two or more animals are housed in the same enclosure, a toy is provided for each animal to prevent any fighting that might occur over possession of a single toy.

We have also used these toys as a means of enticing an animal out of a shift area into a display cage, or into an unfamiliar area such as a squeeze cage or shipping crate. In the latter case, we usually attach a cord to the toy so that it can be quickly retrieved before the animal catches hold of it.

In conclusion, these various natural toys have not only provided our animals with a safe source of mental and physical stimulation, but have also helped present a more active display for our zoo's visitors.

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KEEPER TRAINING VIDEO TAPE PROJECT
SEEKS PARTICIPANTS

By
B. Wayne Buchanan
Woodland Park Zoological Gardens
Seattle, WA

One of the projects of the Education Committee this past year was the initiation of the keeper training video tape project. The aim of the project was to produce video tapes for beginning keepers that will complement the AAZPA Keeper Training Manual.

It is hoped the varied expertise of AAZK members will be used to produce these tapes. That means we need volunteers! I urge everyone to read the project guidelines below and give serious consideration to participating by producing a training tape:

- 1) The tapes will be sold to any interested party with the following agreed to in the purchase agreement:
 - a) the price of each tape will include the cost of the cassette, insured postage, and a small "contribution" of \$15-\$30. This contribution will vary with the program length.
 - b) the purchaser agrees not to copy the tape or make the tape available to any person or institution for the purpose of duplication.
 - c) the purchaser agrees not to use the tape for any commercial purpose.
 - d) should the purchaser decide the program will not be useful to their training system, the undamaged tape may be returned within fifteen days of receipt and the cost of the cassette will be refunded. The "contribution" will be retained by AAZK as a rental fee. (See page 12 of this issue for Purchase Agreement Form.)
- 2) All collected "contributions" will be placed in a special account and made available and used specifically for payment of future AAZK keeper training tape production.
- 3) Funding for future video tapes will be restricted to:
 - a) cost of video tape
 - b) the cost of renting video hardware.NO money will be provided for the purchase of video hardware or payment of person(s) or institution(s) for services or time rendered in conjunction with the video tape production.
- 4) Because the intent is to complement the AAZPA Keeper Training Manual, funding priority will be given the following topics:
 - a) Sanitation and Pest Control
 - b) Feeds and Feeding
 - c) Animal Restraint and Handling
 - d) Safety--note that though the pilot project is a program on safety, it deals with a systematic safety approach to zoo keeping and development of the proper attitude. It does not address specifics.

Again, other topics will be considered, but the above will have funding priority.

The AAZPA Keeper Training Manual should provide a very good source around which to build a program, but do not feel obligated to follow its form exactly. It is intended only to provide guidelines.

KEEPER TRAINING VIDEO TAPE PROJECT SEEKS PARTICIPANTS,

Application for funding support can be made in the following manner:

- 1) Write a detailed script. Include comments on what type of shots you plan on using for each scene. This will insure that there is enough information to fairly evaluate the application.
- 2) Include an expected budget and clearly state the exact amount you wish granted.
- 3) Make three (3) copies of the script and budget information. Mail two (2) copies to:

B. Wayne Buchanan
Woodland Park Zoological Gardens
5500 Phinney Avenue N.
Seattle, WA 98103

Mail the third copy to:

Jim Ellis
General Curator/Professional Specialist
Santa Fe Community College Teaching Zoo
3000 N.W. 83rd
Gainesville, FL 32602

Applications will be reviewed by myself, Judie Steenberg, and Jim Ellis. We will make every effort to do this as quickly as possible.

I'd also like to refer you to the article "So You Want To Be A Star" in the December 1983 issue of AKF. It has some helpful hints on making such a training tape.

Additionally, Jim Ellis has a full studio available and may be able to assist in editing, credits, and voice over work. Contact Jim or me if you desire more information.



BROOKGREEN GARDENS GOOD CHOICE FOR POST-REGIONAL TRIP

*Submitted by Connie Cloak
Cheekwood Botanical Gardens
Nashville, TN*

I recently attended a conference at Brookgreen Gardens just south of Myrtle Beach, SC. It's a beautiful place, and one I think keepers would be interested in knowing about. It's unique in being a sculpture garden, with over 400 pieces ranging from small bronzes to huge marble statues, the great majority being of animals. The gardens are beautiful with hundreds of huge live-oaks. Part of the Garden's property is a wildlife sanctuary and there is a small collection of captive native animals, including a one-half acre area of cypress swamp enclosed under a 70-foot mesh tent and containing several species of heron, ibis, and small ducks. Adjoining the gardens is Huntington Beach State Park, with camping facilities and magnificent bird-watching habitat in a salt marsh. The whole area is an oasis of wild land in an area rapidly being overrun by luxury hotels and condos. Keepers going to the AAZK regional in Columbia this spring, or to the 1985 national in Miami, might want to put Brookgreen Gardens on their itinerary.



AAZK KEEPER TRAINING VIDEO TAPE NOW AVAILABLE

Entitled Zoo Keeper Safety, An Attitude Adjustment, this first tape attempts to create a safety attitude and presents a systematic safety approach to the job of zoo keeping. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes.

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 responsibility for the restrictions listed above.

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Make checks payable to: "AAZK KEEPER TRAINING VIDEO TAPE PROJECT".

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 Woodland Park Zoological Gardens
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 Seattle, WA 98103





. . . Feed Bag

By
Sergio Oyarzon, P. Agr., M. Sc.
Animal Nutritionist
Metro Toronto Zoo, Toronto, Ontario, Canada

Q. . . .my question concerns our cuban anoles and a giant toad. They are both fed a diet of crickets only. The anoles are not putting on weight and the toad's skin darkens and flakes off quite often. How often and how many crickets should these animals get, and should their diets be supplemented with something else?

Submitted by Beth Poff, Mill Mountain Zoo, Inc., Roanoke, VA.

A. 1) The problems you describe can indeed be caused by dietary deficiencies, but there are some basic husbandry requirements that should be checked. Both species are tropical and require a warm, humid environment. Both species also require a day temperature of about 80-85°F for proper digestion and assimilation of food. Amphibians must have access to water at all times. The skin condition you describe, assuming it is not a fungal problem, might be a shedding problem resulting from a dry atmosphere or the inability to burrow in the substrate. Most amphibians shed weekly so that a build-up of skin is not normal. The skin is important in oxygen exchange and water uptake so you must ensure that it is in good condition.

Your Anolis lizard, being aboreal, prefers to lap water from leaves so it should be misted daily, preferably in early morning so that it can dry out before lights off in the evening. Dehydration is a common problem with arboreal lizards and it usually results in poor appetite. Most amphibians and reptiles eat a large variety of foodstuffs in the wild. It would be advisable to provide some variety in their diets. Try your toad on earthworms, pinkies, mice, crickets, mealworms, and flies. Your lizards will eat mealworms, crickets, flies, moths, and pinkies.

B. Johnson

2) As already mentioned and also well stated by Frye (2), there is no single course of action to be taken when one is faced with a captive reptile that refuses to eat or presents the problems you describe. The entire captive environment, husbandry practices, and feeding program should be considered as a whole and must be carefully assessed.

Unfortunately it is very difficult for anyone to set up or to recommend a balanced diet for a reptile or amphibian, particularly for species that will only accept live prey food. First, because neither their quantitative nor their qualitative nutrient requirements have been established, our knowledge of their natural feeding habits is incomplete. Under captive conditions we are limited to only a few prey food items (mealworms, crickets, earthworms, etc.), and the published data regarding the chemical (or nutrient) composition of these foodstuffs is incomplete and sometimes even controversial.

FEED BAG, *Continued*

At this point the best I can do is to try to provide you with an "educated guess." From a qualitative standpoint, we will assume your Anolis and toads have the same basic nutrient requirements as birds and mammals. In other words, they do require a dietary source of amino acids (protein), energy (fat and/or carbohydrates), vitamins, and minerals. With this in mind I have no doubts that your diet of crickets only is extremely deficient and consequently inadequate. For example, from the data presented in the table below you can see that crickets have very low calcium levels in addition to an imbalance in the calcium:phosphorus ratio (0.1 : 1.0). Continual use of such a diet will produce a Secondary (nutritional) Hyperparathyroidism Syndrome.

	MEALWORMS (3)		CRICKETS	MICE	EARTHWORMS	WAX MOTH
	BRAN ONLY	BRAN+ SUPPL.	ADULTS (3)	1-DAY OLD (1)	(1)	LARVA (1)
Dry matter %	40.41	35.77	29.63	18.81	-	-
Protein %	55.90	55.50	73.45	63.47	-	-
Fat %	27.16	26.25	12.96	19.62	-	-
Fiber %	5.96	5.98	8.32	-	-	-
Ash %	4.94	4.65	5.27	10.00	-	-
G.energy Kcal/g	6.23	6.11	5.62	-	-	-
Calcium %	0.07	0.39	0.09	1.72	0.95	0.03
Phosphorus %	0.86	0.95	0.90	1.66	0.95	0.39
Magnesium %	0.23	0.27	0.11	-	-	-
Potassium %	0.92	0.95	1.16	-	-	-
Manganese ppm	14.	-	31.	-	-	-
Copper ppm	16.	-	22.	-	-	-
Zinc ppm	152.	-	244.	-	-	-
Ca:P	0.08:1	0.41:1	0.1:1	1.03:1	1:1	0.08:1

(1) : Allen, M.E., and O.T. Oftedal.(1982). Calcium and Phosphorus levels in live prey. AAZPA Regional Proceedings.

(3) : Metro Toronto Zoo data.

Again, looking at the data presented in the table, Bob's recommendation to provide variety in the diet is a logical and practical approach. By offering a variety of prey-food items there will be a better chance of providing a more balanced diet, i.e. the calcium deficiency in crickets will be compensated by the calcium level in mice and earthworms, and the same may be applicable for other nutrients as well. Also, I think that it would be advisable to supplement each of the food items before offering them to your animals. This can be accomplished by "dusting" them with a vitamin-mineral powder and a source of calcium (calcium carbonate, calcium gluconate, limestone etc.) Even though this approach is not perfect, still it will provide an additional source of nutrients to your animals.

It would also be advisable to keep your mealworms on a supplemented food substrate (i.e. wheat bran + vitamin-mineral powder + source of calcium). With this method calcium content can be increased (see table), and presumably the vitamins and minerals ingested by the worms will be retained in their digestive tracts, increasing their overall nutritional value. A similar approach can be used to increase the nutritional value of crickets and earthworms.

With respect to your question of how often and how much food should be offered to your animals, apparently there is a general consensus among zoo people that these types of animals need only to be fed two or three times per week. This recommendation makes sense if we consider their lower metabolic needs compared to birds and mammals who need food on a daily basis. Despite this fact, considering your present problems I would recommend you to start feeding your toads and Anolis daily and on a free-choice basis. Try offering alternate sources of food in order to stimulate their appetites. At the same time you should keep an accurate record of the amounts of food offered and consumed. Weigh your animals before you start the new feeding program and continue to weigh them on a weekly or bi-weekly basis, and at the same time record all possible observations regarding changes in activity, food preferences, physical condition, etc. This information will provide you with sufficient data to re-evaluate your feeding program and set up a more adequate one in the future, without the risk of ending up with obesity problems. Additional information will be sent to you by mail.

S. Oyarzun

Note: Bob Johnson is a curator-in-training at the Metro Toronto Zoo. His main area of interest is amphibians and reptiles.

- (2) Frye, F.L. 1981. Biomedical and Surgical Aspects of Captive Reptile Husbandry. Veterinary Medicine Publishing Co., Edwardsville, Kansas 66111.

There has been some concern and hesitation from zoo keepers about submitting their questions to this new column, which explains its interruption since it was initiated in August. Apparently this hesitation derives from the fact that many people, for obvious and understandable reasons, would like to remain anonymous. Because of space limitations sometimes it will not be possible to fully answer a particular question. In order that additional information can be forwarded to the relevant individual it is requested that the person's name and address or institution be included with the question. Those who wish to remain anonymous in Animal Keepers' Forum may do so by request. I hope that in future this column will be a regular feature in AKF. You may submit questions to: S. Oyarzun, c/o Metro Toronto Zoo, P.O. Box 280, West Hill, Ontario, Canada M1E 4R5.



Information Please

The elephant keepers at the Topeka Zoo are reviewing elephant commands from different zoos throughout the United States. Your input would be appreciated and will be put to substantial use. Please send your list of commands to: Kirk Craver, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

For an upcoming conference presentation on Timber Wolves I would appreciate any information in the following areas: Handraising Techniques, Reintroduction of handraised young to existing pack, and all available information on zoos that have received timber wolves as "orphan wildlife". Send information to Diane Weinhardt, Lincoln Park Zoo, 220C North Cannon Drive, Chicago, IL 60614.

LING-LING SHOWS POTENTIAL FOR RECOVERY

Worried panda watchers issued a collective sigh of relief when medical tests performed December 8 showed that Ling-Ling's serious kidney ailment can be attributed to a bacterial infection. Although the prognosis is still guarded, this type of condition is more amendable to treatment than the other kidney diseases which were being considered and it offers some hope that recovery is possible.

A medical team from Children's Hospital National Medical Center, consisting of nephrologists, radiologists, and an anesthesiologist joined the NZP veterinary staff in conducting a highly specialized examination on the anesthetized panda. A variety of blood tests were performed to pinpoint the cause of Ling-Ling's anemia, and the team used an ultrasound machine to get a picture of her kidneys. Then they used a laparoscope to visualize one kidney and to aid in getting a biopsy of kidney tissue. Each test contributed to the guardedly optimistic prognosis. Antibiotic therapy will now be intensified and Ling-Ling will be treated and carefully followed in an attempt to bring the kidney infection under control and to reverse the anemia.

LAB TESTS REVEAL HSING-HSING IS PANDA CUB'S FATHER

Laboratory tests conducted on giant panda tissue samples have revealed that the sire of the panda infant born at the National Zoological Park in July 1983 is Hsing-Hsing, the resident male.

The paternity of the baby panda, which lived only three hours before dying of a respiratory infection, had been in question. In March 1983 Ling-Ling, the National Zoo's female panda, mated once with Hsing-Hsing, but when no further breeding occurred Ling-Ling was artificially inseminated with semen from the London Zoo's male panda, Chia-Chia.

Blood and skin samples taken from the Washington pair, from the male in London, and from the deceased infant were analyzed at the National Institutes of Health laboratories in Bethesda, MD. According to the NIH report, genotype comparisons indicate that the "London male is excluded" and could not be the father.

The new information will have no immediate effect on the National Zoo's giant panda breeding plans. National Zoo scientists will continue to be prepared to use artificial insemination as a back-up to natural mating during Ling-Ling's annual spring breeding season.

Hsing-Hsing, who in years past had not bred with Ling-Ling even though the pair showed strong sexual interest, is now documented as one of the handful of proven giant panda sires.

Christen Wemmer, acting director of the National Zoological Park, expressed his thanks to the staff of the National Institutes of Health and extended special thanks to Drs. Stephen O'Brien and David Goldman, who worked on the project. Wemmer added, "The sophisticated laboratory techniques that allow for the tracking of animal kinship links holds great potential for enabling successful genetic management in endangered species breeding programs."

In other news related to the world-wide effort to breed the giant panda in captivity, the zoo world was saddened to learn of the death on October 23 of Shao-Shao, the nine-year-old female in Madrid, Spain. She was the first panda to have successfully conceived by artificial insemination outside of China, and the first to have delivered a litter as a result of AI. One of the twin cubs survived and is now one year old. "This is a real tragedy for giant panda captive breeding," said NZP panda researcher Devra Kleiman, who noted that Shao-Shao was one of only three breeding females outside of China. "She probably was one of the very few captive-born animals to reproduce successfully."

---NZP News Release



Publications Available

The Endangered Species Technical Bulletin is once again available to the general public. The Wildland Management Center is making annual subscriptions available at cost. The subscription, \$12.00 annually, is based on a minimum of 2,000 subscribers. An "Insert", containing feature articles, short news items, book reviews and announcements of meetings and conferences, has been added to the reprinted material. To subscribe send name, address, telephone and organization affiliation along with a check for \$12.00 (made payable to University of Michigan) to: Endangered Species Technical Bulletin, Wildland Management Center, School of Natural Resources, The University of Michigan, Ann Arbor, MI 48109.

TURTLE TRUST TURTLE BOOK is scheduled for publication early this year. It will contain 500 plus pages of information, range maps, 300 plus illustrations and will include the work of many author's personal experiences with turtles. A solid tool designed particularly for those interested in captive breeding. The format is loose-leaf to allow for updates. Each species is discussed on one sheet. If ordered during January 1984, the price is \$35.00; the price will rise to \$50.00 on 1 March 1984. Direct order inquiries to Turtle Trust, Westport Point, MA 02791.

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Legislative News

Compiled by Kevin Conway
Legislative Coordinator

TWO FLORIDA MAMMALS LISTED AS ENDANGERED IN EMERGENCY RULE

An emergency rule listing as Endangered two small mammals known only from one area in the Florida Keys was published by the USFWS on 21 September and took effect immediately. The Key Largo woodrat (*Neotoma floridana smalli*) and Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*) are jeopardized by the loss of their forest habitat to residential and commercial development. An emergency determination was necessary to allow full consideration of the welfare of these animals and their habitat during consultation on a Federal construction loan that could result in accelerated habitat loss. During the 240-day life of the emergency rule, the Service will proceed with development of a permanent listing.

Both woodrat and cotton mouse subspecies are endemic to Key Largo, in Monroe County, Florida. Currently, they are found only on 1,150 acres in the northern section of the key where they depend on tropical hardwood hammocks for their survival. With their floristic affinities to the West Indies, these hammocks support a rich biota, including many rare plant and animal species. Many of the tropical hardwood hammocks in the U.S., which reach the northern limits of their range in the southern peninsular Florida, have been lost to development, and this habitat type is one of the most limited and jeopardized ecosystems in Florida. The hammocks of north Key Largo represent some of the best remaining tracts, but they are the proposed site of a large number of residential tracts. A section of new water pipeline now extends into the area, and is expected to accelerate the pace of residential, commercial, and recreational development. Such intensive development in the Florida Keys generally results in destruction of the hardwood hammock ecosystem, even if individual large trees are left in place. The Key Largo woodrat and cotton mouse are both considered by the State of Florida as Endangered, but their habitat is not protected under State law.

On 19 May, 1980, Dr. Stephen R. Humphrey of the Florida State Museum petitioned the USFWS to add the Key Largo woodrat and cotton mouse to the U.S. List of Endangered and Threatened Species. The petition included a status report prepared under contract to the Florida Game and Fresh Water Fish Commission. On 28 July, 1980, the Service published in the *Federal Register* a notice of petition acceptance and status review, and announced its intention to propose listing the two rodents.

In June 1983, the Rural Electrification Administration (REA) requested immediate consultation with the Service on a proposed loan to the Florida Keys Electric Cooperative for construction of a substation that would provide increased delivery of electricity to northern Key Largo. Such consultation is required under Section 7 of the Endangered Species Act because the REA is a Federal agency whose action may affect two federally listed species in the area, the Threatened Schaus swallowtail butterfly (*Papilio aristodemus ponceanus*) and the Endangered American crocodile (*Crocodylus acutus*). The proposed electricity delivery system, which could serve up to 6,000 new residential units, would probably have even greater adverse effects on the Key Largo woodrat and cotton mouse, which prior to the emergency rule were not federally listed.

If the Key Largo woodrat and cotton mouse were not on the U.S. List of Endangered and Threatened Species, their welfare could not initially be given full consideration during the REA consultation. If instead these two mammals had been only proposed for listing, REA would have been required under Section 7(a)(4) of the Act only to informally "confer"

LEGISLATIVE NEWS, Continued

on actions that are likely to jeopardize their continued existence, and the Service would have made recommendations to reduce any adverse effects. Upon a final listing, the REA would have been required to reinstate consultation if the action may affect the species. This could have resulted in delays and increased project costs.

Effects of the Rule

The Key Largo woodrat and cotton mouse are now listed as Endangered and benefit from the conservation measures authorized under the Endangered Species Act. Taking, possession, or engaging in interstate/international trafficking in these species are among the prohibitions in 50 CFR 17.21. Certain exceptions apply for agents of the Service and State conservation agencies, and permits for otherwise prohibited activities can be issued, for certain scientific, conservation, or economical hardship purposes.

A designation of Critical Habitat for the two mammals was not included in the emergency rule because the process for making such a determination would have delayed the listing, probably beyond the time needed to give consideration to the species during Section 7 consultation with the REA. However, the Service intends to include Critical Habitat when a permanent listing rule is proposed. In the meantime, the Key Largo woodrat and cotton mouse, along with their habitat, still will receive protection in accordance with Section 7. All Federal agencies (including, but not limited to the REA) shall ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of the species by directly affecting the animals or by adversely modifying their habitat.

---Endangered Species Technical Bulletin
Vol. VII, No. 10, October 1983

EPA CANCELS STRYCHNINE USE AGAINST PRAIRIE DOGS

Because "non-target" animals, such as the Endangered black-footed ferret, are being killed, Environmental Protection Agency moved on 19 October to cancel use of strychnine as a poison to kill prairie dogs and other rodents. Despite opposition from the Agriculture Department and the cattle industry, EPA announced in a *Federal Register* notice that it intends to cancel within 30 days registration of all pesticide products that contain strychnine and are used to kill prairie dogs, rabbits, opossums, chipmunks and mountain beavers. Strychnine used to kill ground squirrels, porcupines and some species of rats and birds will be allowed if product labels are modified.

Nearly half of the 498,700 pounds of strychnine baits manufactured last year were used to kill prairie dogs, which can spread plague and destroy hundreds of acres of rangeland. According to Ron Michieli, vice president of the National Cattleman's Association, besides destroying vegetation, prairie dog villages cause havoc in irrigation areas and stepping in a prairie dog hole can break a steer's leg. "We're sure as hell not calling for the destruction of the black-footed ferret," Michieli said, "but we would like fair play in protecting our resources."

A number of alternative poisons are available, EPA said, though none has proven as effective as strychnine against prairie dogs, and they will cost an estimated \$1 million more to use.

---ECOLOGY USA
October 24, 1983

BIGHORN SHEEP IN QUIET CRISIS

Bighorn sheep, common from the Rockies of British Columbia to the wastelands of Mexico's Baja Peninsula, are being threatened by a vast change in habitat and by disease. "There's a quiet crisis going on," according to wildlife biologist James A. Bailey, who also noted that while the bighorn is not in danger of extinction, the herds are now only 2%-3% of what they once were. "The long-term trend has been downhill, and I don't think we've done much to stop it," Bailey added.

With state and federal budgets being slashed, the financial ability to slow this trend rests with private enterprises. Bailey is advising Colorado's Martin Marietta Corp. in such a program. Waterton Canyon, home to one of Colorado's few low-altitude bighorn sheep herds, begins at the back door of Marietta's headquarters in the foothills of the Colorado Rockies.

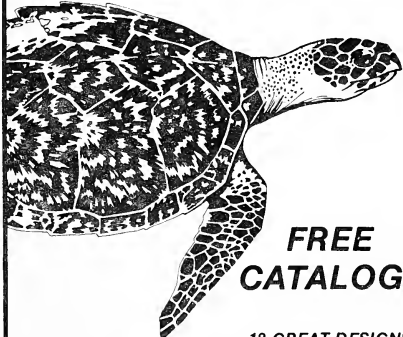
Disease killed off roughly 80% of a nearby herd in less than a year, and its numbers dwindled from about 90 in 1980 to less than 20 in 1981. In order to improve the animals' habitat, volunteers spent hundreds of hours clearing 60 acres of scrub to provide open grazing areas close to the rocky locations favored by the sheep. The cost to Marietta was minimal. Marietta is now developing a program for volunteers to perform controlled burns on the land, opening up summer and winter range for the animals.

The aim is to allow the sheep to be healthy, migrate freely, and maintain the same habitats they've always had. The obvious threat to bighorns is human encroachment on their territory. In desert lands such as the Baja, man competes for water sources, and there are other troubles that stem from man's tampering with the fragile ecological balance.

In the last 60 years, since natural fires in national forests have begun to be fought consistently, vegetation once controlled by those fires has begun to creep into bighorn territory. Because bighorns don't have large, sensitive ears like deer and elk, they rely on their eyes to look for food and enemies. The encroachment of trees and brush makes it difficult for them to see either. The underbrush also makes it difficult for bighorn to move from summer to winter ranges. A sedentary herd eats and defecates in the same place and thus is more susceptible to diseases, particularly lungworms.

Even a low level of lungworm, carried by snails that inhabit vegetation eaten by sheep, can kill off more than 90% of lambs at birth, and when the infection begins to destroy lung tissue, it can cause "die-offs" of 80-90% among adults.

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Today just about every sheep herd has some level of lungworm infection. In treating the sheep for lungworms, "we're only treating the symptom, not the causes. Unless we can commit a lot of money to habitat manipulation, you're not going to see any dramatic changes," Bailey concluded.

NORTHERN SHEEP ALSO THREATENED

Bacterial pneumonia is killing large numbers of sheep in Canada. In one basin 20 miles north of the Montana border, 400 of a herd of 500 sheep were killed by the bacteria. Nearly a quarter of British Columbia's 2,400 sheep have been killed in the past few years, and biologists fear it will spread to the herds of the United States.

Little is known of the origin of the bacteria. There is no known cure. Some animals are receiving experimental treatments, however, if this disease spreads to Glacier Park, the herds will not be treated because park policy requires that natural occurrences such as forest fires and disease run their natural course.

Canadian biologist Peter Davison believes a major factor in the spread of the disease was stress. Winter ranges have been lost to subdivisions, industry, and fire. "Some of these herds will be wiped off the face of the earth," Davison said. Bighorn sheep evolved to their present state in the last Ice Age and are not very resistant to disease in the present warmer climate. In Yellowstone National Park in 1981, more than 100 sheep became blind with keratocconjunctivitis and fell from the cliffs.

----*ECOLOGY USA*
September 12, 1983



Imminent Herpetologist Dies, Memorial Fund Established

Submitted by Susan Barnard, Atlanta Zoo

Dr. Edward Elkan, who was recognized internationally for his work on the pathology and diseases of reptiles and amphibians, died at the age of 88 on 4 July 1983.

A fund in memory of Dr. Elkan has been established and will be used to perpetuate his name and work. A number of commemorative ventures have been proposed and will be considered in due course. The most pressing requirement, however, is to ensure that Dr. Elkan's unique collection of microscope slides and other pathological specimens is properly collated, mounted and maintained. Much of the material is already housed at the Royal College of Surgeons of England as the "Edward Elkan Reference Collection of Lower Vertebrate Pathology". Dr. Elkan passed this collection on to J.E. Cooper before he died and was anxious that it should remain intact and serve as a working collection. This will be supplemented with a number of Dr. Elkan's drawings, reprints and reference books. It is intended that this collection be widely used for study by herpetologists, pathologists and researcher workers from a range of disciplines. All colleagues, friends and admirers of Dr. Elkan are invited to contribute to this Fund. Checks should be made payable to "The Edward Elkan Memorial Fund" and forwarded to the address below. Comments and suggestions concerning the Fund will be welcomed. Acknowledgement will be sent upon request only. However, a full list of subscribers will be compiled and affixed to the Collection. Reports of the Fund's progress will also appear regularly in the herpetological literature. Please include full name, title and complete mailing address with your contribution. Return to: J.E. Cooper, Royal College of Surgeons of England, 35-43 Lincoln's Inn Fields, London WC2A 3PN, England.



CAPTIVE BREEDING OF HOODED VULTURES

Necrosyrtes monachus

By

John Cohen, Keeper I
Denver Zoo, Denver, CO



The Denver Zoo received its breeding pair of Hooded vultures (Necrosyrtes monachus) on 11 October 1974. They came to us as wild caught adults with no previous history. The birds were moved into our outdoor flight cage on 24 June 1975 and they have remained there ever since. On 10 April 1982, they hatched and subsequently raised a chick. This is, as far as we can determine, the first reported rearing of a Hooded vulture chick in captivity in the United States, and possibly the world.

The flight cage is an iron mesh outdoor exhibit, 29.5m long by 7.75m deep. The front of the exhibit is 7.75m high sloping down to 3.8m at the rear. The rear of the exhibit is formed of concrete rock to resemble a cliff face. There is a small waterfall that flows into two pools at ground level. The cage floor is planted with sod throughout. There are several natural wood perches and three living pine trees at the north end of the exhibit.

The exhibit is the permanent home for two Cinereous vultures (Aegypius monachus), four Golden eagles (Aquila chrysaetos), one Red-tailed hawk (Buteo jamaicensis) and two Turkey vultures (Cathartes aura) in addition to the two hooded vultures. From July to October, two Egyptian vultures (Neophron percopiterus) are also in residence.

The birds remain in the exhibit throughout the year with the exception of the Egyptian vultures. All appear to be quite winter hardy. It snowed once after our Hooded vulture chick hatched. The female was observed to be lightly dusted with snow, but she brooded the chick with no apparent difficulty. The temperature at night during this time was in the low 20's. In the summer, prior to fledging, the temperature reached into the low 90's. During these hot periods, one parent would crouch over the chick and spread its wings. The chick would then sit in the shade provided by the adult.

Our Hooded vultures began breeding in October 1975. They built their first nest in mid-January 1976. They began producing eggs in 1976 and have continued to produce yearly since then. (See Table I)

On 8 February 1976, two eggs were observed in the nest. The eggs were described as white with pinkish/tan splotches. The eggs were found broken later on the same day. Two other eggs were subsequently found broken in the nest. A fifth egg was laid on 31 March 1976. The birds incubated this egg through 31 May 1976, at which time it was pulled and candled. It was determined to be fertile but dead in the shell. No other eggs were produced that year.

Courtship behavior began again in September 1976, breeding was observed in October. The pair began adding new materials to their nest in November. After the first egg of 1977 was found broken in the nest, it was decided to set future eggs under Banty hens for incubation. The Banty hen broke the first egg placed under it but set the second. The embryo subsequently died in the shell.

CAPTIVE BREEDING OF HOODED VULTURES, *Continued*

In 1978, the first three eggs were set under Banties. The fourth was left with the parents. The parents abandoned this egg after one week. Candling disclosed that it was fertile. The attempt at artificial incubation of that egg failed. The three eggs under the Banty hens died in the shell.

Since the parents abandoned their egg in 1978, it was decided to pull the first egg laid in 1979 and let the parents set on any future eggs. It was felt that this would give them an egg fairly early in the season and hopefully they wouldn't abandon it. Both eggs laid subsequently died in the shell.

We planned to use the same strategy in 1980 but we ran into difficulties. The first egg of 1980 was pulled and set under a Banty. She broke the egg the next day. The second egg of 1980 was found to be infertile. There were no other eggs that season.

After four years of unsuccessful attempts of incubating eggs utilizing Banties and various combinations of artificial incubation, the 1981 eggs were pulled as they were laid and placed in an incubator. Three fertile eggs all died in the shell.

For 1982, a completely different approach was decided upon. We would try for only one egg. We would pull the first egg laid and replace it with a dummy. We would then attempt incubation of the egg in a Turn-X(A) and replace it under the parents prior to hatching. This proved to be a successful formula.

On 17 February 1982, an egg was observed in the nest. It was pulled and the dummy substituted on 23 February 1982. The egg was placed in a Turn-X. Dry bulb temperature was 38°C. Wet bulb was 32°C at 59% humidity. The parents accepted the dummy egg without problems.

The egg was candled weekly and development was observed. On 5 April 1982, the 48th day of incubation, the egg looked completely developed. However, no movement was seen. Additionally, the egg showed indications of having died. We were ready to discard the egg when the curator remembered a similar experience that we had with the egg of a Cincereous vulture. In that instance, we opened a supposedly dead egg and found a live embryo. Thus, we placed the egg back under the female.

Normal incubation for the Hooded vulture is 46 days (Bannerman, 1953). Our chick hatched on 10 April 1982 after 52 days of incubation. The chick was first observed on 11 April 1982. It was covered with dark brown down and its eyes were open. There were two small dark blue patches located bilaterally, just posterior to the cere. These disappeared by the 45th day. It began to moult its down on 25 April 1982. It fledged on 15 July 1982 at 92 days of age. Presently the chick retains subadult plumage with a dark brown head.

The nest was built in an artificial nest pocket on the top of the cliff face in the southwest corner of the exhibit. The same nest site is used every year. Branches and twigs were placed on the ground by zoo staff to provide nest material. Additionally, the female stripped fresh pine boughs from the trees at the north end of the exhibit. She would then use these to line the nest (Grossman & Hamlet, 1964; Brown & Amadon, 1968). Both parents assisted in nest building but most of the work was accomplished by the female.

The Hooded vultures seemed to establish a territory in the southern one-fourth of the exhibit. Once the egg was laid, they defended this territory

CAPTIVE BREEDING OF HOODED VULTURES, *Continued*

from the other birds of prey. The female would set on the egg, the male perched on a branch just in front of and below the nest. He would attack and chase other birds who entered the defended territory. Shortly after the Hooded vultures began defending this territory, it was noted that the other birds stayed in the remaining three-quarters of the exhibit.

Daily, at about 1530 hrs., a keeper would enter the exhibit through a service door in the cliff face. He would distribute two tubes, approximately 4.15k of commercial Birds of Prey diet (B) throughout the exhibit. We have established 12 feeding sites throughout the exhibit. Food is distributed in varying proportions to these sites. At least twice a week, mice, rats or guinea pigs were added to the diet. The male would eat first, then he would set the egg while the female ate. In contradiction to the literature (Grossman & Hamlet, 1964; Brown & Amadon, 1968), the male was never seen bringing food to the female.

After the chick hatched, the remaining three-quarters of the exhibit was fed as usual. The protected area got additional food. Four freshly-killed mice were added three times per day. In addition, approximately 0.23k of Birds of Prey diet was tossed onto the ledge next to the nest at the regular feeding time. The parents were observed feeding strips of mice and pieces of Birds of Prey diet to the chick. The parents appeared to eat first, then they fed the chick. They were never seen to regurgitate food for the chick. This again contradicts the literature (Grossman & Hamlet, 1964; Brown & Amadon, 1968).

The chick was observed feeding itself by mid-June. The parents would bring it mice, which it would dismember and eat on its own. It would walk to the Birds of Prey diet thrown onto the ledge and eat from it.

While the chick remained in the nest, it was often exposed to human contact. There was considerable activity on the roof above him. There were frequent observations and videotaping. On several occasions, keepers reached down to touch the chick while the parents were off the nest. The parents appeared to be nervous when humans were around but they didn't become aggressive or overly protective of the chick. The chick itself never showed any aggressive or defensive postures, other than facial flushing.

Several points were viewed by staff as important for the successful rearing of Hooded vultures. These are:

1. The birds will apparently incubate only one egg at a time in captivity, but will lay another if the first egg is taken; provided that conditions are conducive to egg laying.
2. The parents will accept a dummy egg without problems even though the dummy does not look like their egg. Vulture eggs are splotched, the dummy egg was plain white.
3. Although the nest is made of twigs and branches, the female acquires soft material to line the nest. If pine boughs are not available, some soft material should be provided.
4. The pair protected the territory against all other species. If they are kept in a multispecies exhibit, sufficient space must be provided for the other birds.
5. Contrary to the literature, two points regarding egg incubation/chick rearing and male-female feeding behavior while incubating should be noted.

CAPTIVE BREEDING OF HOODED VULTURES, Continued

The female left the nest to feed; she was not fed by the male. During these periods the male incubated the egg. Additionally, the parents did not regurgitate food for the chick at any time.

6. Literature cited indicates an incubation period of 46 days. We have observed an incubation period of 52 days in this instance.

The successful rearing of this chick was a collective effort, involving people in different areas of the Zoo. The author wishes to acknowledge the efforts of these people: Ed Schmitt, curator and Bruce Kane, Keeper I, breeding program development; Bill Loessberg and Archie Paulson, Keeper I's, management of Birds of Prey exhibit; Rick Haeffner, Keeper I, artificial incubation of the egg. Questions may be directed to these people care of the Denver Zoo, City Park, Denver, CO 80205.

TABLE I - EGG SUMMARY

Year	#laid	#infertile	#died in shell	#hatched
975	0	0	0	0
976	5	4	1	0
977	3	2	1	0
978	4	0	4	0
979	2	0	2	0
980				
981	4	1	3	0
982	1	0	0	1

BIBLIOGRAPHY

- The Birds of West and Equatorial Africa, Vol I. Bannerman, David, 1953
Oliver & Boyd London pp 340-341
- Eagles, Hawks and Falcons of the World. Brown, Leslie & Amadon, Dean 1968
McGraw-Hill New York pp 314-315
- Birds of Prey of the World. Grossman, Mary Louise and Hamlet, John, 1964
Clark N. Potter, Inc. New York pp 341-342

PRODUCTS MENTIONED

- Turn-X Incubator - Marsh Farms, 14232 Brockhurst St., Garden Grove, CA, 92643.
- Nebraska Brand Birds of Prey - Animal Spectrum Inc., 5801 Locust St., Lincoln, NE 68516.





*Riverbanks
Southeastern Regional
AAZK Conference
April 19, 20-21, 1984 Columbia S.C.*

The Riverbanks Southeastern Regional AAZK Conference will be held April 19-21, 1984 at the Riverbanks Zoological Park, Columbia, S.C.

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 & zookeeping. Abstracts and/or outlines should be submitted

by February 15, 1984. The conference registration fee will be reduced for those people presenting papers.

Tentative Conference Schedule

Thursday, April 19

Registration
Icebreaker

Friday, April 20

Announcements/Welcome
Tours of Riverbanks Zoo
Presentation of papers
Presentation of keynote speakers
Workshop/Discussion

Saturday, April 21

Presentation of papers
Presentation of keynote speakers
Bar-B-Q Supper/Volleyball game
Auction/Party

Sunday, April 22 -- Post-conference trip to Congaree National Monument

Tentatively scheduled keynote speakers include: Bill Ziegler, General Curator, Miami Metrozoo; Guy Smith, Director, Knoxville Zoo; Dr. Joe Erwin, Curator of Primates, Brookfield Zoological Gardens; Les Schobert, General Curator, North Carolina Zoological Park; and Dr. Kenneth Gould, Head of Reproductive Physiology, Yerkes Primate Center, Atlanta, GA.

Please make checks payable to: "Riverbanks Zoo AAZK Chapter". Send papers, completed registration forms with the registration fee to: Stephen J. Danko, Riverbanks Zoo AAZK Chapter, 500 Wildlife Parkway, Columbia, SC 29210.

Registration Form

Name: _____
Address: _____
City: _____
State: _____ Zip code: _____
Phone No: (____) _____
Name of Zoo: _____
Area of interest: _____
No. attending BBQ/Conference: _____
Vegetarian: YES NO
Transportation: _____
FEES:
Member or spouse -- \$25.00
Non-member -- \$30.00
Late registration fee after
3/1/84 -- \$5.00 additional
TOTAL fees enclosed: \$ _____

Hotel Reservation Request Form
Riverbanks Southeastern Regional
AAZK Conference

Name: _____
Address: _____
City: _____
State: _____ Zip code: _____
Phone No.: (____) _____
Arrival Date: _____ Time: _____
Departure Date: _____ Time: _____
Total No. of Nights in Hotel: _____
Please check the type of room you wish to reserve:
 Single \$20.95 daily
(one person)
 Double \$24.00 daily
(two people)

Name of roommate: _____
Please send one night's deposit with this form to: COMFORT INN, 827 Bush River Rd., Columbia, S.C. 29210, care of J.K. Mehta. Deposits will be returned on reservations cancelled 24 hours in advance of arrival.

LIMITED EDITION

SPECIAL COMMEMORATIVE AKF TENTH ANNIVERSARY T-SHIRT

ANIMAL KEEPERS' FORUM



Dedicated to Professional Animal Care

TENTH ANNIVERSARY

1974 - 1984

AKF will be ten years old in October 1984. To commemorate ten years of continuous publication, a special T-shirt is being issued.

The Puget Sound AAZK Chapter has taken this on as a fund-raising project for the 1984 AAZK Conference. All profits will benefit the Conference and AKF.

The T-shirts will only be available from October 1983 through October 1984. A check must accompany your order. Please allow 3-4 weeks for delivery. The price of \$7.50 each includes postage and handling. The shirts are 100% cotton; if you wash or dry at high temperatures, order a size larger.

AKF COMMEMORATIVE T-SHIRT ORDER FORM

NAME: _____

ADDRESS: _____

Color choice: powder blue beige

Size: Small Medium Large Extra Large

Make checks payable to: The Puget Sound AAZK Chapter Conference Account
Mail to: Woodland Park Zoological Gardens, 5500 Phinney Ave., N., Seattle,
WA 98103. ATTN: Judie Steenberg

TOTAL AMOUNT ENCLOSED \$ _____

The following "Positions Available" listings were received at the office of AKF. 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. Due to the early holiday deadline, the AAZPA listings were not received in time and therefore not included in this issue.

ELEPHANT HANDLER--experienced handler to assist trainer. Includes participation in African elephant husbandry program and exotic hoofstock management. Salary \$924-\$1,224/month, plus benefits. Send resume to: Mike Blakely, Curator/Mammals, Kansas City Zoo, Swope Park, Kansas City, MO 64132.

AVES KEEPER/ASSISTANT MANAGER--responsible for care of large number of birds in Chicago quarantine and holding stations. Current driver's license, passport and previous experience with birds required. Basic knowledge of aves medicine, Spanish and carpentry helpful. Contact: Jill Grade, Station Manager, International Birdhouse, 956 West Huron Street, Chicago, IL 60622 or call (312) 412-5458.

ZOOKEEPER--responsible for care of small mammals, hoofstock, reptiles and amphibians. Requires six months' experience in the care and maintenance of wild animals. Starting salary \$5.26 per hour, plus benefits. Apply by 31 January, 1984 to: Gordon B. Henley, Jr., Director, Ellen Trout Zoo, P.O. Drawer 190, Lufkin, TX 75902-0190.

Seasonal positions at Oceana Marinelife Center, C.N. 5006, Cedar Point., Inc., Sandusky, OH 44870. Application deadline is 15 February 1984/interview required.

MARINE MAMMAL HANDLER--(3 positions) - to assist trainers in care of dolphin and sea lion and in presentation of shows. Responsibilities include cleaning animal quarters and lab areas, record keeping, limited food preparation and maintenance of filtration system. Position requires public speaking abilities. Two openings are from 1 April-23 September and one from early June through 23 September 1984.

AQUARIST--responsible for preparation of food for marine mammals. Monitors water quality and equipment used to control it. From 1 April to 23 September 1984. Requires background in biological sciences and aquarium systems.

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MOVING????

Please send complete name and address changes to:

Dolly Clark, Administrative Secretary
AAZK National Headquarters
635 Gage Blvd.
Topeka, Ks 66606

AAZK MEMBERSHIP APPLICATION

Name _____ *Check here if renewal []*

Address _____

_____ \$20.00 Professional
Full-time Keepers

_____ \$10.00 Associate
*Individuals not connected
with an animal care facility*

_____ \$25.00 International
*All members outside the
U.S. and Canada*

_____ \$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
<p>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.</p> <p>Membership includes a subscription to the <i>Animal Keepers' Forum</i>. The membership card is good for free admission to many zoos and aquariums in the U.S. and Canada</p>		

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.

**American Association
of Zoo Keepers
Topeka Zoological Park
635 Gage Blvd.
Topeka, KS 66606**

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Animal Keepers' Forum

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Dedicated to Professional Animal Care

FEBRUARY 1984



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

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 NATIONAL HEADQUARTERS, 635 GAGE BLVD., TOPEKA, KS 66606
 Dolly Clark, Administrative Secretary

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<u>Keeper Accomodations List</u> Oliver Claffey, Metro Toronto	<u>Exhibit Design</u> Diane Forsyth, Akron Zoological Park
<u>Keeper Data Survey</u> Mary Slaybaugh, San Antonio & Dave Orndorff, Sea World Shark Institute	

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

This month's Keeper/Artist is Delores Schmidt who works at the Akron Zoological Park in Akron, OH. The sketch is a composite of three age groups (4 wks., 6 wks., and 8 wks.) of an African Lioness which Delores hand-raised in the Fall of 1982. Thanks, Delores!

Scoops and Scuttlebutt

ANIMAL CARE REGISTRY OPEN THIS MONTH

The Animal Care Registry for the Washington D.C. Civil Service Area will be open from 2 February until 21 February 1984. The Register is only opened every 1½ to 2 years and is the only way of securing a position at the National Zoo. Interested persons must secure and fill out Form 171 plus Supplemental Personal Information Form. Forms are available from:

Office of Personnel Management
Attention: Room 2R52
Washington Area Office
1900 E St. NW
Washington, D.C. 20415

or

Mike Johnson
National Zoo
Personnel Office
Office of Animal Programs
Washington, D.C. 20008

FROM THE OUTGOING AAZK PRESIDENT

Dear Fellow AAZK Members,

Thank you for all your support during my time as president. I know that the association is at a stage of growth and activity that will continue with your enthusiasm and with the guidance of our new president, Kevin Conway; Vice-President Jean Hromadka, and our new board members Mike Carpenter and Verona Barr. I am excited about continuing on this board for another two years and see the transition of offices going smoothly.

We owe thanks to Mike Maybry, Connie Cloak and Steve Taylor for all their efforts during their terms in office.

Thank you all for reflecting your professional enthusiasm in AAZK's growth. You have made my presidency a satisfying experience.

Patricia E. Sammarco
Past President
Board Member
Zoo Keeper

GRANTS COMMITTEE SEEKS HELP ON RESEARCH GUIDE

The AAZK Research Grants Committee is currently working on "A Keeper's Guide to Research in Zoos". The guide will consist of sections discussing research methods, ethograms, information gathering, data analysis and a section on applied research in which designs for research on specific animal families are discussed.

SCOOPS AND SCUTTLEBUTT, Continued

The guide is intended to provide a keeper with a framework for organizing and carrying out a research project. Although it will be written by keepers, it is hoped that non-keeper zoo staff and non-zoo persons will also benefit from the guide.

Keepers are currently being sought who would be interested in working on the guide committee. If you have a desire to contribute and have an interest and/or background in any form of research, please contact me as soon as possible.

Frank Kohn
Department of Zoological Research
National Zoological Park
Washington, D.C. 20008

From the Membership Directory Editor

Dear Fellow AAZK Members,

With many thanks for your patience, I must make some explanation and apologies for the lateness of the new edition of the MEMBERSHIP DIRECTORY. I think that you will find that the DIRECTORY contents are continuing to improve, more information is available for our use in contacting members with common concerns, and the technology of typesetting is adding to the appearance of the publication. You may or may not notice that we now have a kerning program that places letters together where appropriate, instead of wasting the space between them.

The work of putting the DIRECTORY together involves inputting it to a computerized typesetter after filing entries in proper order. Your help in indicating your zoos, chapter affiliations and correct addresses is a great help. The new renewal cards are working fine. Once all the information is in, it is up to Rick the Printer to format line lengths, spacing, page sizes, etc. This is the art, and takes some time after the cut-off date for inputting information.

The DIRECTORY is ready to print and will be in your hands soon. It is, unfortunately, a bit behind since the cut-off date for input was early summer and it has taken a long time to coordinate my days off with Rick's to get it all done. Those of you who have moved, changed status, or joined the association within the last six months will understandably be disappointed with your listing or lack thereof. I apologize for this and promise that I will be better at keeping up with the DIRECTORY from now on.

You will note that awards and grants are listed for the periods that were not previously published. An easy guide to finding Chapters is in the index and the separate pages that duplicated Chapter information from the main body are gone. Our membership has increased by over 13%, adding pages to accommodate these new members and the expanded Incorporation Papers and By-Laws.

Even with its limits, I think you will find the DIRECTORY useful and I will welcome your suggestions.

Sincerely,

Patricia E. Sammarco
DIRECTORY editor



Births & Hatchings



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

December 1983 B&H include: 0.0.9 Blue tongue skink, 0.0.1 Diamond dove, 0.0.6 Common marmoset (0.0.2 DNS), 0.1 Patagonian cavy (DNS) and 0.3 Meerkat.

DALLAS ZOO.....Tami Jones

The November and December 1983 B&H at Dallas include: Mammals - 0.3 Suni antelope, 1.1 Kirk's dik dik, 0.1 Blackbuck antelope (DNS), 0.0.1 African crested porcupine, 1.0 Gerenuk, 0.1 Yellow-backed duiker, 0.1 Dusky leaf monkey; Birds - 0.0.1 Yellow-fronted canary, 0.0.1 White-winged dove, 0.0.4 Spur-winged lapwing, 0.0.5 Black swan; Reptiles - 0.0.1 Cuban boa *Epicrates angulifer*.

RIVERBANKS ZOO.....Diane Krug

The second half of 1983 brought many interesting births and hatchings to Riverbanks. We had our first acouchi birth and the first birth of a siamang to be accepted and raised by its mother.

Mammal births include: 0.0.1 Black howler monkey (DNS), 0.1 Siamang, 0.0.1 Lion-tail macaque, 0.0.1 Debrazza's monkey, 1.1.2 Acouchi (1.1.1 DNS), 1.4 Capybara (DNS), 0.1 Baird's tapir, 1.1 Greater kudu (1.0 DNS), 2.0 Reticulated giraffe (1.0 DNS), and 0.0.2 Cotton-top tamarin.

Hatchings from the bird house include: 2.3 Radjah shelduck, 1.2 Mandarin duck, 0.0.2 Black-footed penguin, 0.0.2 Sun conure, 3.4.8 Cape teal, 0.0.5 Crested barbet, 0.0.1 Red-crested cardinal, 0.0.8 Crimson seed-cracker, 0.0.1 Stella lory, 0.0.3 Lilac-breasted roller, 0.0.3 Roul-roul, 0.0.5 Bluebill, 0.0.3 Luzon bleeding-heart dove, 2.4 Black-necked swan and 0.0.3 Burrowing owl.

MEMPHIS ZOO.....Robert L. Evans

B&H at the Memphis Zoo for the month of December 1983 include: Mammals - 1.0 Llama, 3.0 Cape hunting dog, 0.0.1 Red kangaroo; Birds - 0.0.1 Hartlaub's touraco, 0.0.2 Gouldian finch and 0.0.2 Chattering lory.

LINCOLN PARK ZOO.....Randy McMahon/Susan Moy

The following are the B&H for December: Mammals - 0.0.1 Lion-tailed macaque, 1.0 Mandrill, 0.0.1 La Plata three-banded armadillo, 0.0.1 Patagonian cavy; Birds - 0.0.1 Double-striped thick-knee.

BROOKFIELD ZOO.....John S. Stoddard

B&H for November and December 1983 include: Mammals - 0.0.27 White-toothed shrew, 0.0.3 Spiny mouse, 2.0 Collared peccary, 0.0.2 Callimico monkey, 0.0.2 Squirrel monkey, 0.0.2 Guinea baboon; Herpetiles - 0.0.1 Brown anole.

BIRTHS AND HATCHINGS, Continued

TAMPA--BUSCH GARDENS.....Sandy Moher

December 1983 B&H include: Mammals - 1.0 Thomson's gazelle, 0.1 Grant's gazelle, 0.1 Sable antelope, 0.1 Addax, 1.1 Scimitar-horned oryx, 1.1 Roan antelope, 0.1 Kafue (Red) Lechwe, 0.0.1 Chimpanzee, 1.0 Hunter's hartebeest; Birds - 0.0.3 Cereopsis goose, 0.0.2 Blue and gold macaw, 0.0.1 Crested tinamou and 0.0.1 Jandaya conure.

LITTLE ROCK ZOO.....Chris Rasums

The last quarter of 1983 produced the following B&H at Little Rock: 1.0 Scimitar-horned oryx, 1.0 Guanaco, 1.0 Zebra, 2.0 Serval, 0.0.2 Sloth bear (1 DNS), 0.1 Diana Monkey (DNS) and 0.0.1 Crested screamer (DNS).



Coming Events

AAZPA WESTERN REGIONAL CONFERENCE

March 18-20, 1984

Sacramento, CA

AAZPA SOUTHERN REGIONAL CONFERENCE

April 1-3, 1984

Little Rock, AR

AAZPA CENTRAL REGIONAL CONFERENCE

April 15-17, 1984

Omaha, NE

AAZK SOUTHEASTERN REGIONAL CONFERENCE

April 19-21, 1984

Columbia, SC

Hosted by the Riverbanks Zoo AAZK Chapter. Registration fee is \$25.00. for members and \$30.00 for nonmembers. Contact person at Riverbanks Zoo is Stephen J. Danko. Watch AKF for registration forms and information.

Keeper's Alert

The AAZPA Western Regional Conference is to be held in Sacramento, CA the week of March 18-20. Realizing that the expense of registration plus lodging can often prevent keepers from attending, the Sacramento Zoo staff is willing to provide bed and sleeping bag space to help cut costs.

Please contact us at least two weeks prior to the conference. At that time provide us with the following information:

- Your name, affiliation, address and phone number
- The number of people in your party
- Whether you wish single or double accommodations
- Dates you will need accommodations
- How you are arriving (car, train, bus or plane)

As soon as this information is received, we will contact you to confirm your accommodations and give your further information. Send information to: Sacramento Zoo, 3930 W. Landpark Dr., Sacramento, CA 95822, Attn: Jane Hansjergen, Keeper Accommodations or call (916) 447-7383.



1983 State of the Association Report

as submitted by President Pat Sammarco

The American Association of Zoo Keepers continues its growth in both numbers of members and in activity. Over 1700 members are contributing their enthusiasm and time to the exchange of ideas that makes AAZK a truly professional association of people committed to ever improving animal care.

Administration within the association is changing as three board members are assuming their responsibilities, and as board officers take on their duties as of the first of the new year. Thanks are due to Mike Maybry, Steve Taylor and Connie Cloak who are finishing their terms, and congratulations are in order for new board members Verona Barr, Mike Carpenter and Jean Hromadka. Kevin Conway and Pat Sammarco continue on the board with Kevin elected to serve as the President for the next two years. Jean Hromadka will be our Vice-President. To fulfill the requirements of the incorporation papers, the president will also assume the titles of Secretary and Treasurer, with the duties delegated to National Headquarters and Administrative Secretary Dolly Clark. The oversight of various committees has been distributed among the board members to facilitate the coordination of association activities and to better serve the members.

Within national association administration there has been a change in Chapter Affairs Coordination, with Gerald Payne of the Detroit Zoo taking over for Patti Kuntzmann. International Affairs Coordinator Randy Adolph continues to keep AAZK in communication with our sister associations overseas. Mike Carpenter remains at the head of the Regional Coordinator System, with plans for revamping the program and increasing regional activity. Already there are plans for regional conferences and symposia hosted by a number of chapters.

Lynne Villers is to be thanked for the fine job of coordinating the national elections of the AAZK Board.

Without a doubt, the most active group within AAZK is the Continuing Keeper Education Committee. This group of sub-committees and programs has been incredibly busy locating and assessing existing keeper training programs, sources of information pertinent to our profession, and developing Keeper Training Videotapes. A video program on Keeper Safety was previewed at the National Conference and is now available. Other tapes are in the planning stages, and other technology in this committee includes a computerized list of resources. Adding the Staff Exchange program to the list of projects, and the undertaking of writing a book to consolidate zookeeping information under one cover, and a few new data collection projects, leads to the recommendation that the best way to keep track of the education activities is to watch their column in Animal Keepers' Forum each month.

At the same time that we are looking at the need to continue our professional education, AAZK has established a new committee to assess the zoo keeper's role in public education.

The film project, "Looking To The Future", unfortunately exceeded its original concepts and has been terminated.

As we continue to share the information vital to improving captive animal care, the notebook projects near publication, and data banks are filling. Information on ourselves and our professional concerns is being accumulated by the Keeper Data and Professional Standards committees.

STATE OF THE ASSOCIATION REPORT, Continued

Research grants made to keepers by the association have born fruit, and further grants are available to assist keepers in their quest for knowledge. Connie Cloak's and John Brannian's study of the Echidna has been published; Sue Barnard's atlas of reptile parasites and Stan Held's Tailed-frog study are near completion. The second edition of "Biological Values" has funding, and a study of elephant nutrition is underway. Four grants will be available in 1984.

Our liasion with ZOO BIOLOGY has been enhanced with Frank Kohn being named consulting editor of that journal.

The health and activity of the American Association of Zoo Keepers is a tribute to our members--keepers who are dedicated to professionalism, people who are committed to improving captive animal care through the exchange of ideas and expertise. In a moment of immodesty, we can all be proud of ourselves and our association.



from the President

Dear Fellow AAZK Members:

Effective on January 1, 1984 AAZK has a new national board with three new enthusiastic keepers. We also have a new President and Vice President for the association. Jean Hromadka has been elected Vice President by her fellow board members. Other new board members are Mike Carpenter and Verona Barr. Pat Sammarco and I continue as board members through 1985. We will be working to keep AAZK the fine organization it is while continuing its progress as a professional association. The AAZK national board's purpose is to guide the association in the directions indicated by the membership.

It is also the time of year to turn our thoughts to attending regional conferences and workshops. I urge all our members to consider attending a conference in their region if at all possible. I think we should consider giving priority to the first AAZK regional conference. It will be hosted by the Riverbanks Zoo AAZK Chapter April 19-21, 1984 in Columbia, SC. For those of you who have attended conferences but never visited the Riverbanks Zoo, don't miss this opportunity to see a fine zoological facility.

Also consider the numerous AAZPA regional conferences. Exchange of information is the primary conference purpose coupled with the opportunity to visit other facilities. Zookeepers have always attended these conferences in large numbers so think of attending yourself.

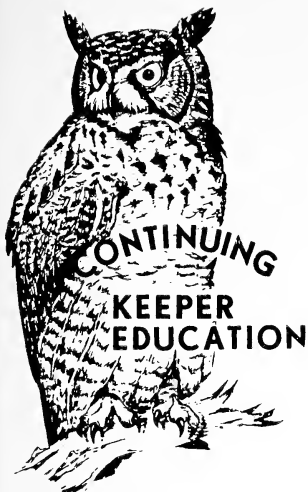
When you attend any conference as a member of AAZK, remember those of us who couldn't make it. Once you're back write something up about it for AKF. And if you're going to attend a regional conference, please act as an ambassador of AAZK while you're there, both to other keepers and curators/directors as well. Dates and locations of all the regional conferences can be found in AKF.

Finally, on behalf of the board of directors and our members, thanks are in order to the outgoing board members. Connie Cloak, Steve Taylor and Mike Maybry deserve many thanks for their contributions on behalf of the association.

Sincerely,

Kevin Conway
AAZK President





EDUCATION COMMITTEE UPDATE

By

*Judie Steenberg, Coordinator
AAZK Education Committee*

Roster:

At the 1983 AAZK Conference the following list of committee members was confirmed by the Board of Directors. During the past year a few names have been added to the list as a place on the Committee became available. This list will now stand until the 1984 Conference. A poll was taken of members regarding their willingness to serve on the committee for one year or two years; the majority have agreed to serve for two more years.

* indicates Project Coordinators

*Elandra Aum Staff Exchange Liaison	Woodland Park Zool. Gdns., Seattle, WA
*Wayne Buchanan Keeper Training Videotapes	Woodland Park Zool. Gdns., Seattle, WA
*Bruce Clark Zoonoses Reference Guide	Toledo Zoo, Toledo, OH
Connie Cloak	Cheekwood Botanical Gdns., Nashville, TN
Mike Coker	Topeka Zool. Park, Topeka, KS
Marilyn Cole	Metro Toronto Zoo, Toronto, Ontario, Canada
Kevin Conway	Conservation & Research Center, Front Royal, VA
Bela Demeter	National Zool. Park, Washington, D.C.
*Jim Ellis Zookeeper Husbandry Fundamentals	Santa Fe Community College Teaching Zoo, Gainesville, FL
*Diane Forsyth Exhibit Design Form	Akron Zool. Park, Akron, OH
John Jaffee	Potawatomi Zoo, South Bend, IN
Jay Jason	Turtle Back Zoo, West Orange, NJ
Dwight Knapik	Calgary Zoo, Calgary, Alberta, Canada
Frank Kohn	National Zool. Park, Washington, D.C.
Brenda Scott-Lodge	17245 SW Heritage, Ct. #37, Aloha, OR 97006
*Liz MacGlaughlin Reference Search	Roger Williams Park Zoo, Providence, RI
Russ Mennard	Roger Williams Park Zoo, Providence, RI
*Beth Poff Manual Review	Mill Mountain Zoo, Inc., Roanoke, VA
Chris Rasums	Little Rock Zoo, Little Rock, AR
*Jenny Rentfrow Reference Search	1951 Eden Rd., Mason, MI 48854
*Douglas Richardson Animal Management Correspondence Course	Howletts Park Zoo, Kent, England

EDUCATION COMMITTEE UPDATE---Committee Roster, Continued

*Pat Sammarco	Lincoln Park Zoo, Chicago, IL
Board Representative and Zookeeper Husbandry Manual	
*Judie Steenberg	Woodland Park Zool. Gdns., Seattle, WA
Education Committee Coordinator	
Laura Trechsel	Folsom Children's Zoo, Lincoln, NE
Adrienne Wright	Roger Williams Park Zoo, Providence, RI

The following members were unable to remain on the Committee due to other commitments. We would like to acknowledge their support and thank them for their contributions: Chris Parker, Metro Toronto Zoo; John Chapo, Potowatomi Zoo; Diana Quintero, Vancouver Aquarium; Robert Keel, Seattle, WA; Bill Hunt, Abilene Zoo; Kelli Westbrook, Little Rock Zoo; Mike Crocker, Dickerson Park Zoo; Rick Gutman, St. Louis, MO.

Goals for 1984:

- to identify and phase in a new Education Committee Coordinator by October, 1984.
- to establish a liaison from the Education Committee to the AAZPA.
- distribution of the Keeper Safety tape and the production of two additional training tapes.
- to investigate and pursue the possibility of having a special session or panel discussion on staff training at the AAZPA Conference in Miami.
- to re-evaluate and redirect the manual review project.
- additional development of the reference search project.
- completion of the Zoonoses reference guide.
- development of the Zookeeper Husbandry Fundamentals project.

It was also decided that no additional projects would be considered until the 1984 Committee meeting at the AAZK Conference in October 1984.

Next month the list of participating institutions in the AAZK Staff Exchange project will be published along with the name of who to contact at each institution.



Chapter News

DALLAS AAZK CHAPTER

Newly elected and re-elected officers of the Dallas Chapter are:

President.....Kathy Maley
Vice President.....Teri Hermann
Sec/Treas.....Tami Jones

LITTLE ROCK ZOO AAZK CHAPTER

New officers for 1984 at the Little Rock Zoo AAZK Chapter are:

President.....Debbie Jackson
Vice President.....Lisa Peach
Treasurer.....Mark Dameron
Secretary.....Chris Rasums

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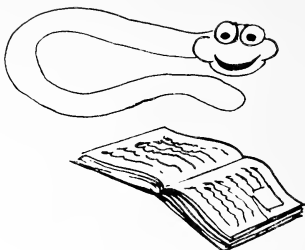
For registration information, write Debbera Stecher
c/o Woodland Park Zoo, 5500 Phinney Avenue North
Seattle, Washington 98103 (206) 625-5402

**1984 AAZK Conference/Seattle, Washington
September 30 - October 4**

Book Review

SURVIVAL IN THE WILD--Sexual Strategies

By Tim Halliday
University of Chicago Press
5801 S. Ellis Ave., Chicago, IL 60637
147 pp. with Glossary and Bibliography
Published 1982. Price \$10.95



*Review by James L. Powell
Senior Keeper, Rare Animal
Breeding Compound
Oklahoma City Zoo*

This is one book in a series entitled "Survival in the Wild". The series' purpose is to describe and explain the bewildering diversity of strategies displayed by the living world. Each book selects a biological activity vital to survival and describes the array of physical and behavioral adaptations which have evolved as a result of fierce competition.

Other books in the series are: Camouflage and Mimicry by Dennis Owen and Feeding Strategy by Jennifer Owen.

Survival in the Wild--Sexual Strategies is light reading with most examples being amphibians. There are over 25 color photos and over 50 black and white photos. The cover is an excellent photograph of Golden Toads mating in a cloud forest in Costa Rica. There are good photographic and graphic examples for description in all the chapters.

The chapter on sex is basic biology using elementary examples. It highlights sexual selection and reproductive effort. "Mating Systems" is a chapter thoroughly explaining the immense variety of sociosexual situations.

"Finding a Mate and Choosing a Mate" describes tactics from sessile aquatic animals that shed their eggs and sperm to animals that modify their environment to attract mates, to more sophisticated means such as visual, olfactory and auditory means of mate attraction. Mate selection is treated objectively and it is made clear that the idea of animals choosing their mates is interesting yet lacks scientific support. The chapter on mating deals largely with amphibians, arthropods and birds and their various methods of mating.

Human sexual strategy is the topic of the final chapter. It is intriguing and offers biological interpretation of sociology--not a new idea but one worth repeating.

My favorite chapter is "Sex, the Family and Society", which cites kin selection, cooperative breeding and sexual conflict in social groups. This book not only is an adequate reference to mating patterns in animals, but it also offers important behavioral examples which zookeepers can use in their day-to-day task of creating better situations in which exotic animals may propagate.



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. . . Feed Bag

By
Sergio Oyarzum, P. Agr., M. Sc.
Animal Nutritionist
Metro Toronto Zoo, Toronto, Ontario, Canada

Q. Is thawed frozen smelt an acceptable diet for Maribou storks?

Anonymous

A. According to the literature, this species is primarily a scavenger in its natural habitat, feeding mainly on carrion and also acting as a predator of other species of birds, small mammals, reptiles, amphibians, and insects (locusts). So you can see that their natural diet includes a wide variety of foodstuffs and even though they may also consume fish, apparently this is of secondary importance.

Unsupplemented smelt, as the sole ration, definitely cannot be considered as an adequate diet for this species, and as a matter of fact for any species. If you take the time to look at the data presented in the accompanying table, you will see that certain nutrients (calcium, potassium, magnesium, zinc, and perhaps iron) are provided at levels that could be considered adequate, some others (protein, fat, phosphorus, energy) are at levels in excess of possible requirements but should not cause any problems, particularly for a carnivorous species such as the Maribou stork. The selenium level, although extraordinarily high, considering the dietary requirements of birds and mammals (0.3ppm) is still below what is normally considered toxic (5 ppm).

Vitamin A is also far in excess of requirements (2 to 4 times) if we consider that a commercial birds of prey diet provides approximately 4.41 IU/g, and pelleted feeds for zoo birds provide 10 IU/g, which in turn correspond to what is normally recommended for poultry rations. I am not certain whether the high levels of these two nutrients will have deleterious adverse effects on your animals if kept on such a diet for an extended period of time. It certainly has not caused any problems in penguins, although this is a completely different species and the comparison may not be valid.

There are other things that need to be considered when feeding fish to either mammals or birds. Fish, in general, and smelt in particular, contain very high levels of enzymes (thiaminases) that destroy thiamine or vitamin B₁. Consequently this vitamin must be added. This problem can be easily overcome by supplementing at the recommended level of 30-50 mg of thiamine per kilogram of fish.

Furthermore, considering the high level of polyunsaturated fatty acids in fish, it would be advisable to supplement vitamin E. A level of 50-80 IU/Kg of fish is perhaps adequate (!?). The need to supplement B-complex vitamins is another concern, particularly if fish is thawed in water.

Keeping in mind the natural dietary habits of the Maribou stork and the problems with a fish diet, perhaps it would be advisable to feed

FEED BAG, Continued

these animals on one of the commercially-prepared birds of prey diets as the sole ration or supplemented occasionally with certain prey foods such as mice, hamsters, chicks etc.

If, for reasons that you did not mention, smelt is your only alternative, I think that you may be able to obtain reasonable success with this diet providing you only use the very best quality fish, you supplement it with adequate levels of minerals and vitamins, and at the same time you closely monitor all factors that may cause deterioration of fish quality and loss of nutritional value.

S. Oyarzun

CHEMICAL COMPOSITION OF SMELT USED AT THE METRO TORONTO ZOO (*)

		LAKE SMELT		ATLANTIC SMELT	
		SMALL(EYE) SIZE	JUMBO	MEDIUM	EXTRA
Dry matter	%	22.77	22.92	20.46	22.75
Crude protein	%	59.50	67.30	71.50	68.10
Fat	%	33.99	19.80	12.84	15.20
Crude fiber	%	0.33	0.28	0.20	0.33
Ash	%	7.48	10.10	9.39	9.51
Gross energy	kcal/g	6.20	5.67	5.05	5.48
Calcium	%	1.55	1.27	2.20	1.39
Phosphorus	%	1.50	1.45	2.15	1.90
Magnesium	%	0.10	0.09	0.12	0.12
Potassium	%	1.05	1.08	1.07	0.91
Sodium	%	0.20	0.41	0.43	0.34
Manganese	ppm	5.	9.	10.	8.
Copper	ppm	2.	2.	2.	2.
Zinc	ppm	76.	84.	92.	80.
Iron	ppm	43.	25.	43.	38.
Selenium	ppm	1.05	1.20	1.00	1.22
Vitamin A	IU/g	36.7	38.3	18.7	24.6

(*): All nutrients are expressed on a 100% dry matter basis. Data presented correspond to whole raw smelt (one sample of each only) analyzed at the University of Guelph, Dept. of Animal & Poultry Science Feed Advisory Programme, July 1982.



THIS ARTICLE HAS NO TITLE FOR A GOOD REASON!!!

By

Jim Albert

Caretaker, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX

In this article, the first of a series, I'd like to introduce you to a tool, one that many people (including many grad students) are "afraid" of. In spite of the feelings of dread that this tool generates in many people, it doesn't have whirring blades or mashing pistons and doesn't even produce heat or high voltage; in fact, it can't inflict damage at all (unless you become addicted to its use, perhaps).

Use of this tool, unlike most in the zookeeping craft (such as hoses, brooms, shovels, etc.) is very much optional. As such, it probably isn't for everyone in the profession; but since you are sufficiently dedicated to belong to AAZK and to read AKF--why not read on and base a decision about the usefulness of this tool in your own work on my full argument?

I am referring to the computer, specifically the "micro" or "personal" computer. The purpose of this article and those that will follow is to present a usable system that costs less than \$100 and to explain how it can meaningfully be applied at the zookeeper level in a zoological park. I will as much as possible avoid the use of arcane words and cryptic phrases, but words--like computers--are nothing to be afraid of. The essential point of this article is simply that what you don't know as a result of not using a computer may be far more frightening than any electronic device--these are times of declining wild populations and unstable captive ones, and a specie's future may depend on your being able to sift through mounds of records and layers of confounding factors.

Even though your zoo may have access to a mainframe (big!) computer, or have its own microcomputer such as an Apple, TI, or IBM, I think it is important that this critical tool be put into the hands of the individual keeper for personal investigations. Too often, institutionally-owned machines fall under the control of a "computer elite," or classes in programming might be "required", or at the very least, you have to wait your turn. With your own computer, none of this is a factor; and with the declining prices in the lower-end personal computer market, a zookeeper could very well be able to afford his own. I want to encourage you to consider buying a computer, and in the next article will look at the best buys.

So, what can a zookeeper do with a computer? Applications include manipulating animal census data--by copying parts of the ISIS Species Distribution reports into your machine, you can reformat them to your own needs. I very usefully did so with colobine primates when I worked with several such species at the Dallas Zoo. The computer will allow you to juggle information so as to see patterns that you would otherwise miss.

Also, you can use a computer to do statistics. Statistics are simply a method of reducing information into meaningful patterns, and are, like computers, nothing to be afraid of. Sources of data that could be beneficially looked at statistically could be as close as your daily report forms.

The computer is also a useful tool for record keeping. The cassette

THIS ARTICLE HAS NO TITLE FOR A GOOD REASON!!!, *Continued*

storage system that budget limits most of us to is very slow; I still catalog my books on file cards. However, I do keep a listing of the 68 monkeys that I work with on the computer, and as a result I can keep track of who has lost name tags and adjust a group's food ration when membership shifts.

I presented a paper at a conference last year that made use of graphic slides generated by my computer. I wrote a brief program that moved typed text around on the screen; when it looked the best, I photographed the screen, and mounted the resulting black-and-white negatives in slide mounts. The results were very readable. Charts and diagrams can be made in a similar fashion.

The computer can be employed as a learning aid, asking you questions at random from memory, and even timing your responses. And it doesn't even know if you answer incorrectly.

I intend to cover all the above practical applications in greater detail in upcoming articles. But, I must say that I cannot teach you in this series how to program or to "do" statistics. I'm trying to give you good reasons to teach yourself those things. I am convinced that the average person can teach himself BASIC, the most common microcomputer language, with little difficulty.

To conclude this installment: the computer is a useful tool for zookeepers. A personal computer can allow the keeper to concentrate on what interests him when it interests him, and at an affordable price. Some learning is required, but it is not difficult, and is an excellent personal investment. This series of articles in AKF is designed to introduce you to the usefulness of computers and to encourage their use by zookeepers.

COMING ARTICLES:

- the affordable computer
- sorting it all out
- figuring it all out
- self-tutorial programming
- theory and the zookeeper computerist

Any comments or questions about this series are welcome. Write to: W. Albert, Department of Anthropology, University of Texas at Austin, Austin, TX 78712.



AMERICAN FIELD SERVICE SEEKS HOST HOMES FOR CONSERVATION STUDENTS

American Field Service International, the leading non-profit, volunteer supported youth exchange organization, is this year inaugurating a new program: the Multi-national Conservation Program. This summer program will bring 60 to 100 young adults from around the world to the U.S. for three weeks of conservation/environmental studies and "hands-on" conservation work, followed by five weeks homestay experience with a U.S. family. Students range in age from 15-30 and come from 19 different countries. If you are interested in offering your home and serving as a host to one of these students from July 29 through 30 August, 1984 contact: Carolyn Yohannes, AFS International/Intercultural Programs, 313 East 43rd St., New York, NY 10017 (212) 661-4550. Deadline for application is 15 March 1984.

FOR LOVE OF PIPPEN----A Bat Rescue That Beat The Odds

By

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

(Editor's Note: The following is an account of a very unusual young lady and her chance encounter with an animal in desperate need of help. Only her caring concern and sacrifice along with her determination to "beat the odds" make this story a reality.)

On 11 June 1983, Karen Peterson was expecting to spend a pleasant afternoon with old friends at an annual school picnic. Arriving at Moss Park, Orange County in Florida for the event, Karen was disappointed to find that only one other person had come and so went down by the nearby lake to write and enjoy the sunshine.

In her own words, these are the events that transpired that afternoon: "Near one of the benches sat a fat squirrel. I was whistling trying to coax him closer when I was startled by squeaks answering me. Looking to my left, I saw a star-shaped black icky thing crawling towards me. I jumped off the seat away from it!

The bat followed me dragging two large red ants. One was clinging to its right claw and the other to its right rear foot. Once I recognized that it was a bat, I flicked off the ants and threw out the coke in my paper cup. I squiggled it into the cup just before the pavement ended.

I went to the ranger--no help. I went back to St. Cloud to the vet, Dr. Andrix. The bat was still in the cup, at least till I got to Dr. Andrix. By that time the bat has crawled out of the cup (which was slanted to provide shade). Dr. Andrix couldn't help and he suggested the Serpentarium. That's where I got Susan Barnard's name. After calling Susan, I called George at the Serpentarium for help on the list of things you said I needed. After traveling to three different places for supplies, I discovered I did not have Espilac[®] but Peidolyte[®], an electrolyte water solution. By this time the poor thing had been traveling with me in the heat and I knew it needed something desperately.

I gave the electrolyte solution to the bat and it drank greedily. I soaked the soft cloth she was on and she lapped it up from there. Then I used a damp cloth to clean off any coke that might have clung to her. She then slept peacefully with a pillow case puffed over her. Then I called Susan who told me to get Similac[®]. She liked that much better.

To put it frankly, I am an animal amateur. Bats are out of my league. For some reason I just couldn't let the little thing die. That's when I decided to bring the bat to Susan in Atlanta.

That night Pippen (now identified as an Eastern Pipistrelle, the smallest bat species on our continent) crawled out of the box, under the bathroom door, through the bedroom, through the hall (past the dog and cat), under my bedroom door and ended up clinging to the bottom of a broom. The only way I found her was by whistling and Pippen would answer.

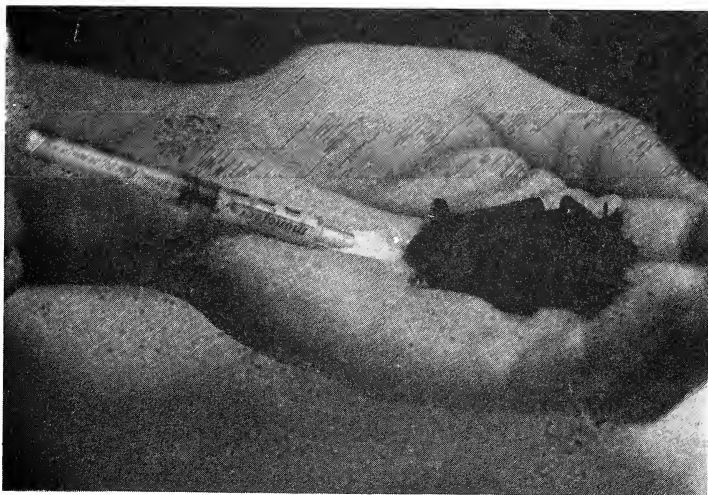
When I fed her Similac[®] again, she wasn't satisfied. The next day I left for Atlanta, a 500 mile journey. While traveling toward Atlanta I tried

to keep the box out of the sun because the car's air conditioning wasn't working. Everytime she moved I would try to feed her a little more, but it was soon apparent that she didn't like the Similac.[®]

When we stopped to eat, I brought the box with me, fearing if I left it in the car she might escape again."

Karen's car broke down in Cordele, GA (150 miles from Atlanta) at 2:50 p.m. The Atlanta Zoo was sponsoring a festival and her expected time of arrival was 5 p.m. I informed her that she would not be able to get in touch with me until then. I told her that I would be at the phone at 5 p.m. in case she needed instructions on how to get to the zoo. She had to wait from 2:50 to 5 p.m. before she could let me know that she was still 150 miles away.

Near 5 p.m. we traveled to a nearby Pizza Hut to call Susan and my friend Mary's husband, Hal. We were on foot with a human infant as well as a bat in a box."



Pippen being hand-raised by Susan Barnard. Photo by: Rick Perry.

When I received Karen's distress call, I hopped in my car to make the 100 mile round-trip to save the bat. I told them to walk to the near-Holiday Inn to find some comfort in the lobby while I was enroute to get them.

Hal agreed to send money as soon as we knew where we were staying. While I awaited Susan's arrival, we decided to eat. I covered Pippen in the fuzzy and placed the pillowcase like a hill over her to keep out the world. Crawling and straining, she climbed to the highest spot on the pillowcase and began flapping away. Mary and I had been so careful not to say "bat" while we were around people, knowing that they would probably not feel too comfortable eating there with a (horrors!) bat! Boy was I mortified to see those wings aflapping. I could just imagine chasing that dinky thing all over the place. I wanted to move. So we quickly left and waited in the Holiday Inn lobby.



By: Karen J. Peterson

His fur, so soft to the touch,
he squeaks to show he cares so much!
A webbed wonder, flying in the night,
traveling by sound, not by sight.

A mammal like you and me
and nature endowed them with feelings, you see.
Although much too often misunderstood,
I have known bats that were only good.

An upside down miracle, so small
ready to eat pesky insects, one and all.
Filling his niche in nature's plan
trying to co-exist with his enemy & friend, man.



DR LOVE OF PIPPEN, Continued

It was mostly luck that Pippen got to Susan in time. I thank her so much for restoring my dying faith in humanity. I was beginning to feel like "one bat against the world" battle 'til she came along."

I arrived 2½ hours after their SOS. I found two exhausted young girls and one screaming infant human and an unconcerned infant bat. I made some arrangements to have their car serviced for the next day as it was Sunday evening. I scouted around to find the nearest Western Union so they could let Hal to wire money and I paid for their motel room for the night. Shortly thereafter, I wished them good luck on their long day ahead in getting their car repaired and returning home. I departed with one 2.8 gram, hungry bat. It was too small for the carrying case I had brought so it traveled the 2½ hour trip to Atlanta in my uniform pocket. I keep an emergency supply of food at home for baby animals. At midnight it got its first substantial meal since 9 a.m. the previous day.

Today Pippen is learning to fly. She is a very stubborn brat and is months overdue for flying. To inspire flight, she received no food (wax worms) until she puts in a good showing in the air. Like the big brown bat Egore (See August 1983 AKF Page 246), she lives in a converted snake cage. Although Egore and Pippen routinely share my pocket each evening, they are not fond of each other. Since bats are not aggressive they express their lack of friendship with irritation squeaks. It is very convenient for me that these critters are basically sweet animals. Egore is three times larger than Pippen and not having to maintain them separately is a pleasure.

The first to leave my pocket is Pippen. She bops around the place slightly moth-like, slightly crab-like and always cute as she struggles to get off the ground. Egore is then set into motion. Being a year old and fairly experienced at flying, Egore wings through the air like a Sopwith Camel.

Both animal have their own homes to eliminate competition and needless stress. Egore knows her home and when it's time to return I open her door and she gladly flies in to feed on her evening meal (wax and meal worms). Pippen still has a long way to go to master what Egore has, but with time and patience, she too will be able to do the things Egore does.

Editor's note: The above material was submitted in August following the bat rescue". The following is a New Year's update on how Pippen is doing under the rehabilitation efforts of Susan Barnard.)

Pippen holds her weight at 5 grams (overweight by about 1 gram but still smaller than my thumb) and has changed little. She has reached her peak flight for this year which is a far cry from a Sopwith Camel! We still play the "boomerang" game. I throw her in the air and she flies one revolution around the living room and I catch her as she passes to land in the dining room. Then we repeat the process until one of us tires (usually me).

From her behavior I do not think Pipistrelles hibernate as do such bats as the Big Browns (Egore). Egore's activities all but completely halt from November to April. Pippen, on the other hand, remains active.

On 14 November 1983, I had a terrible scare. Little Pippen fell with her perch in her cage. She was pinned between the perch and her dinner bowl. I heard the thud and immediately rescued her, however she was in deep shock for over an hour. I almost lost her. I sat with her for several hours to keep her warm. When she recovered I was able to examine her body and no bones appeared broken. She was maintained on a heating pad for two days after which she regained her normal bitchy ways.



THE 1983 ANIMAL DATA TRANSFER FORM SURVEY

ATTENTION: All Keepers! Please answer the following questions. (1) Please send this survey right from the AKF or (2) photocopy the survey from the AKF and complete the photocopy or (3) use a piece of paper for your survey. Send completed survey to: Bernie Feldman, Miller Park Zoo, 1020 S. Morris Ave., Bloomington, IL 61701.

- 1) Have you seen or are you familiar with the Animal Data Transfer Form?
YES NO
- 2) Are you satisfied with the style of the ADTForm?
YES NO
- 3) Have you used the ADTForm at your Zoo/Aquarium?
YES NO
- 4) Have you received the ADTForm from other Zoos or Aquaria?
YES NO
- 5) If you've received the ADTForm, has it been helpful to you?
YES NO
- 6) When you received the ADTForm, is it properly & completely filled out?
YES NO
- 7) Are you able to properly fill out the ADTForm?
YES NO
- 8) Are you aware that ANYONE can make an order for any amount they want?
YES NO
- 9) Are you aware that the ADTForm is FREE, a professional courtesy of AAZK to anyone?
YES NO
- 10) Would your zoo/Aquarium pay a nominal fee for use of the ADTForms?
(e.g. \$___/100 ADTForms)
Yes NO
- 11) Would you recommend the use of the ADTForm for all Zoo/Aquaria?
YES NO
- 12) If your Zoo/Aquaria doesn't currently use the ADTForm, would your management welcome its use?
YES NO
- 13) Are you aware that photocopying the ADTForm is discouraged because it has a self-duplicating feature and is intended for Keepers, Veterinarians, and Management?
YES NO
- 14) Do you like the self-duplicating feature of the ADTForm?
YES NO
- 15) Are you aware of how to order the ADTForm and whom to contact?
YES NO
- 16) What changes or suggestions would you recommend on the ADTForm? Please use the space provided for your comments or add additional sheet of paper if necessary.

Comments/Suggestions: _____

THANK YOU FOR YOUR TIME
Bernie Feldman, ADTForm Coordinator

Animal Data Transfer Form Survey Results

By
Bernie Feldman, Coordinator
ADT Form Project
Topeka Zoological Park, Topeka, KS

In the April 1983 AKF I had submitted the Animal Data Transfer Form Survey for all Keepers to respond to. By late summer I had received the last response and began compiling and summarizing the results. Thirty-one surveys were returned.

The survey reflects the attitudes Keepers have towards their animals when they are shipped to another zoological institution and their concern that a continuance of professional care be ensured. I would like to acknowledge the assistance of Verona Barr of the Miller Park Zoo, Bloomington, IL for helping me to develop the survey. I would also like to heartily thank all the Keepers who took the time to send me their completed survey. Here, therefore, are the results of the survey (See survey opposite page).

Question #1 -- 93.5% of the returned surveys said yes, they have seen or are familiar with the ADTForm. 6.5% said no.

#2 -- 93.5% said they were satisfied with the style of the Form. The remainder said they'd like to see the following changes: On the top of the Form the white copy have : Keeper receiving animal; the yellow copy have: receiving Zoo/Veterinarian; the pink copy have: Keeper/Zoo sending animal. Another change suggested is that the dam/sire numbers should be mentioned on the sheet. 6.5% said they weren't sure they were satisfied with the style of the Form.

#3 -- 87% said they have used the Form at their Zoo or Aquarium while 13% said they had not.

#4 -- 58% have received the Form from other institutions; 35% have not received the Form from other Zoo or Aquaria and 7% don't know.

#5 -- 58% who have received the Form said it was helpful to them, 3% said it was not helpful to them and 39% gave no answer.

#6 -- 39% said it is properly and completely filled out when received, 39% gave no answer and 9% said not always.

#7 -- 93.5% said they were able to properly fill out the Form and 6.5% said they are sometimes able to properly fill out the Form.

#8 -- 77% are aware that ANYONE can make an order for ANY amount they want and 23% were unaware of this feature.

#9 -- 84% are aware that the Form is FREE, a professional courtesy of AAZK to anyone and 13% are unaware of this feature while 3% gave no reply.

#10 -- 39% said their Zoo/Aquarium would pay a nominal fee for use of the Form, 16% said their Zoo/Aquarium would not pay a fee, 6% gave no answer and 39% added the following remarks: maybe, unsure, possible, probably, do not know and AAZK Chapters might pay a nominal fee for use of the Form. One respondent said, "I spoke to my Curator about this. He uses the Forms and highly recommends them. However, being practical minded, he wouldn't pay for a service already provided for free. Good luck."

#11 -- 100% of the returned surveys said they recommend the use of the Form for ALL Zoos and Aquaria!

#12 -- 29% said yes, their management would welcome the use of the Form if it doesn't currently use the Form, 16% said maybe or don't know and 55% gave no answer.

ANIMAL DATA TRANSFER FORM SURVEY RESULTS, Continued

#13 -- 68% are aware that photocopying the Form is discouraged because it has a self-duplicating feature and is intended for Keepers, Veterinarians and Management. 26% are unaware of this feature and 6% gave no answer.

#14-- 90% like the self-duplicating feature of the Form, 3% did not like the feature and 7% gave no answer.

#15 -- 77% are aware of how to order the Form and whom to contact while 23% are unaware. FYI: The ADTForm is available from the National Headquarters AAZK, Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

#16 -- The following are the comments, suggestions or changes that the respondents have mentioned: 1) I am satisfied with the Form as is. 2) I think they are wonderful but I think if AAZK began charging for them people would make up their own. 3) I really like knowing who sent the information and have often times called this person for more information. I keep the Form in the animal's file and find it useful over the years as a quick reference and for diet suggestions. 4) There may be cases where management does not give the Keeper his/her copy. Is there something that can be done about this problem? Answer: At this point AAZK cannot do anything about this problem. Persevere. 5) Knowing how much I appreciate the information forwarded on the ADTForm when I get a new animal, I make sure every animal that leaves my area is accompanied by a Form. It's a great resource! 6) An older version of the Form is still being used in several places. Space needed for entry under any given heading is more than adequate to thoroughly fill out the Form. 7) ADVERTISE! Would it be possible to send samples to some zoological institutions not currently using the Form? We don't receive enough of them. It is disappointing because the ADTForm is a great tool. The Forms do not accompany many animals we receive. FYI: The AAZPA Newsletter and the AKF regularly publish notices of the ADTForm's availability. 8) After using the original ADTForm for two years and having seen the revised ADTForm, I have no suggestions, only praise for all the work you've put into this valuable piece of information. 9) Have the Form at the 1983 Conference in quantities for Keepers to take back to their Zoos. Present a update at the 1983 Conference and show a sample for those who haven't become familiar with it. FYI: At all Zoological Conferences the ADTForm is available to everyone. 10) On some animals I find the comments sections does not have enough room so I type a supplemental sheet, photocopy it 3 times and attach a copy to each copy of the ADTForm. Usually that's with hand-raised animals or ones we've had a long time and have a long history. I think the ADTForm is invaluable--info from other Keepers has saved me lots of trial and error with new animals. (It's also started some correspondence and friendships with other Keepers when I let them know how their animal is doing.) 11) Would be helpful to have more space for comments and data i.e. legal sized paper. 12) Get AAZPA backing! 13) After personal comments an i.e. of suggestions like distinguishing marks or attitude toward Keepers should be added. 14) Works fine when we get enough lead time to fill them out. 15) I think it's great. 16) Dam/sire numbers should also be mentioned on the sheet.

As we can see through the results of this survey, the ADTForm is well-received and continues to provide valuable information about animals when they are shipped from one zoo to another. Encourage their use at your Zoo or Aquarium.



Legislative News

Compiled by Kevin Conway
Legislative Coordinator

TWO FOREIGN REPTILES PROPOSED FOR LISTING, ONE FOR DELISTING

Two lizards that occur on islands under the jurisdiction of Spain have been proposed for listing under the U.S. Endangered Species Act due to threats from habitat destruction, overcollection and predation. At the same time, a turtle from India and Sri Lanka was proposed for removal from the provisions of the Act because a review of its status indicates that it is much more common than previously believed.

The Hierro giant lizard (*Gallotia simonyi simonyi*) is a large species, up to 70 cm from the snout to the tip of the tail, and is found only on the Canary Islands. It is one of 18 foreign reptiles included in a notice of review published by the USFWS in August, 1980. Based on information received that the lizard was extinct, the Service decided that no further action was warranted. The Service subsequently received further information on *G. s. simonyi* from Dr. Brian Groombridge of the International Union for the Conservation of Nature and Nature Resources (IUCN). A 1982 article by J.P.M. Rica stated that the lizard survives on a steep, rocky, arid cliff. Reproduction is occurring on this refugium, as about half of the estimated population of 200 lizards in 1975 were juveniles.

Although concerns about the species' extinction appear to have been, fortunately, premature, threats to its survival persist. A stone-breaking facility has been proposed for construction at the cliff. This development would directly impact the lizard and adversely affect its plant food sources through excessive deposition of dust. *G. s. simonyi*, which is entirely herbivorous, also could be in competition for young plant leaves with goats that graze the area. Several European scientists have indicated that overcollection is another problem that has contributed to the precarious status of the species. Predation of juvenile lizards by gulls could also be a factor, although the degree of impact is not known. The lizard is considered a top priority for action and research by the Conservation Committee of the Societas Europa Herpetologica.

The Ibiza wall lizard (*Podarcis pityusensis*) is a small reptile found in the Balearic Islands, mainly on Ibiza and Formentera, and on some parts of Mallorca, in the Mediterranean Sea. Because of the large number of small islands within its range, considerable evolutionary divergence has occurred, and there are 35 subspecies. In a 1982 report, Rica and A.M.C. Costa reviewed the status of 32 of these subspecies. The vast majority of the lizard populations were found to have been reduced by 1) destruction and alteration of habitat by tourist developments, 2) direct killing by poisoning, 3) overcollection for commercial and scientific purposes, 4) hybridization of some subspecies resulting from transport and release of lizards among various islands by fishermen, and 5) predation by gulls and other animals (thought to be a minor problem).

The Indian flap-shelled turtle (*Lissemys punctata punctata*) is a softshell species found on the Indian subcontinent and on Sri Lanka. Male turtles are usually less than 6 inches in length and females less than 11, and both have brown, somewhat domed shells. This turtle was listed in 1976 as Endangered after being placed, upon recommendation by Bangladesh, on Appendix I of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES).

As part of the Service's continuing efforts to ensure that the U.S. List of Endangered and Threatened Wildlife and Plants reflects the true bio-

LEGISLATIVE NEWS, *Continued*

logical status of the species it includes, a literature review was conducted recently to determine if current evidence justified an Endangered classification for the Indian flap-shelled turtle. No such supporting data could be found. The Service then contacted a number of scientists and the unanimous opinion was that the turtle is common in India and that there is no justification for listing it under the Act. After considering the currently available information, the Service concurs that keeping it on the list is not warranted.

If the proposed rule is approved as published, all prohibitions of Section 9(a)(1) of the Act would apply for the Hierro giant lizard and Ibiza wall lizard. The prohibitions, in part, would generally make it illegal for persons under U.S. Jurisdiction to import, export, or engage in interstate or international trafficking in these species. Permits to carry out otherwise prohibited activities for scientific, conservation or economic hardship purposes could be applied for under 50 CFR 17.22, 17.23, and 17.32. All of the above prohibitions would no longer apply for the Indian flap-shelled turtle. This proposal does not affect the turtle's status as a CITES Appendix I species, however, and all CITES restrictions on import and export will remain in effect.


--Endangered Species Technical Bulletin
Vol. V111, No. 10

TWO FISHES REMOVED FROM ENDANGERED SPECIES LIST

Two fishes once common in the Great Lakes, the blue pike (*Stizostedion vitreum glaucum*) and the longjaw cisco (*Coregonus alpenae*), are now thought to be extinct throughout their range in the U.S. and Canada and have been removed from the U.S. List of Endangered and Threatened Wildlife and Plants. (F.R. 9/83).

Historically, the blue pike occurred in Lakes Erie and Ontario, and in the Niagra River. This subspecies was abundant in the Great Lakes commercial fishery of the late 1800s, but by 1915 landings began to fluctuate extensively. Fishery biologists have evidence, which disputed self-stabilizing mechanisms within the population, led to the extreme population fluctuations and ultimate crash of the fishery. The longjaw cisco, which once was found in Lakes Michigan, Huron, and Erie, was another commercially important fish that suffered the effects of overexploitation. Both species may have also been af-

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LEGISLATIVE NEWS, Continued

ected by water pollution and by competition and predation from non-native fishes. Hybridization with closely related species may have also contributed to the extinction of these fishes. By 1960, they were all but extinct. The longjaw cisco was listed as Endangered in 1967, and the blue pike in 1970.

An official review of their status was initiated in 1979. No confirmed specimens of the blue pike have been taken since the 1960s, and the last collection of the longjaw cisco was in 1967. Based on the lack of recent sightings, the USFWS concluded that both fishes are extinct and it proposed on 25 May, 1982, to remove them from the list of Endangered species. Twelve comments dealing specifically with the proposal were received, most of them in support of delisting one or both of the fishes. None of those responding provided evidence that either species survives.

The final rule removes both species and their former habitats from the provisions of the Endangered Species Act; however, this action could be reversed if confirmed evidence is ever provided that either species still exists.

---Endangered Species Technical Bulletin
Vol. VIII, No. 10

PROPOSAL TO LIST NINE SPECIES FROM THE MARIANA ISLANDS

On 29 November, the USFWS issued a proposed rule to list the following species of birds and mammals as Endangered: Micronesian kingfisher (Halcyon cinnamomina cinnamomina), Guam broadbill or chuguanguang (Myiagra preycineta), bridled white-eye or nossa (Zosterops conspicillata conspicillata), Mariana gallinule or pulattat (Gallinula chloropus guami), Vanicoro swiftlet or yayahauak (Aerodramus vanikorensis bartschi), Guam rail or koko (Rallus owstoni), Mariana crow or aga (Crovus kubaryi), and the Mariana fruit bat or fanihi (Pteropus mariannus mariannus), and the little Mariana fruit bat (Pteropus tokudae). These nine species are found in the Commonwealth of the Northern Mariana Islands. If the species are found to be endangered, they will be protected under the Endangered Species Act. Comments may be made to: Mr. Sanford Wilbur, Chief, Division of Endangered Species, USFWS, 500 N.E. Multnomah St., Portland, OR 97232 (503) 231-6131. Comments period ends 29 February 1984.

---AAZPA Newsletter
January 1984

WOODLAND CARIBOU EMERGENCY LISTING EXTENDED

On 25 October, the USFWS extended its emergency rule which listed the population of woodland caribou (Rangifer tarandus caribou) as Endangered. The prior emergency rule was limited to six months. This extension will remain until the permanent protection of the Endangered Species Act becomes effective. (In June, 1983, the Fish and Wildlife Service began the regular process for listing the woodland caribou as Endangered.)

---K. Vehrs in
AAZPA Newsletter
January 1983

LIMITED EDITION

SPECIAL COMMEMORATIVE AKF TENTH ANNIVERSARY T-SHIRT

ANIMAL KEEPERS' FORUM



Dedicated to Professional Animal Care

TENTH ANNIVERSARY

1974 - 1984

AKF will be ten years old in October 1984. To commemorate ten years of continuous publication, a special T-shirt is being issued.

The Puget Sound AAZK Chapter has taken this on as a fund-raising project for the 1984 AAZK Conference. All profits will benefit the Conference and AKF.

The T-shirts will only be available from October 1983 through October 1984. A check must accompany your order. Please allow 3-4 weeks for delivery. The price of \$7.50 each includes postage and handling. The shirts are 100% cotton; if you wash or dry at high temperatures, order size larger.

AKF COMMEMORATIVE T-SHIRT ORDER FORM

NAME: _____

ADDRESS: _____

Color choice: ___ powder blue ___ beige

Size: ___ Small ___ Medium ___ Large ___ Extra Large

Make checks payable to: The Puget Sound AAZK Chapter Conference Account
Mail to: Woodland Park Zoological Gardens, 5500 Phinney Ave., N., Seattle,
WA 98103. ATTN: Judie Steenberg

TOTAL AMOUNT ENCLOSED \$ _____

The following "Positions Available" listings were received at the office of AKF. 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.

ZOOKEEPER I...Due to major expansion of our zoological park, the Jackson Zoo is not accepting applications for the entrance level of Zoo Keepers. Salary range \$893-\$1,298 per month. Standard benefits. Duties include the general care and maintenance of a wide variety of mammals, birds and reptiles. Applicants must have a high school education and some practical experience is necessary. This is an excellent opportunity to be part of a progressive, expanding zoological park. Certified candidates will remain on an active list for six months. Send resume to: James L. Swigert, Director, Jackson Zoological Park, 2918 West Capitol Street, Jackson, MS 39209.

KEEPER...ambitious person needed to handle keeper duties. Responsible for care of hooved stock, small mammals, birds and herps. Experience in exhibit construction and maintenance desirable. Salary commensurate with experience. Apply by 20 February, 1984 to: Harry Gregory, Director, Hutchinson Zoo, Carey Park, Box 1567, Hutchinson, KS 67504-1567. Phone: (316) 665-2659.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within the Conservancy Nature Center in Naples, FL. Involves wildlife as well as educational programs and special projects. Interested applicants must be available for up to five months. Housing and \$55/week stipend provided. Internships available year round. To apply send resume, statement of goals and three references to: Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy Nature Center, 1450 Merrihue Dr., Naples, FL 33942. Phone: (813) 262-2273.

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Information Please

Information is requested on the care, feeding and especially training of Macaws, Cockatoos and Parrots. Please send to: Mrs. D. H. Luce, Rt. 3, Box 410, Trenton, FL 32693.

The Little Rock Zoo is seeking information on the birth of Sloth Bears (*Melursus ursinus*) in captivity. We would appreciate any information regarding gestation length, number of cubs born, number surviving, and any medical problems developing within the first year. Please send any information to: Debbie Jackson and Lisa Peach, Little Rock Zoo, #1 Jonesboro Drive, Little Rock, AR 72205.

The Topeka Zoo is seeking information on the captive maintenance of Colomus monkeys with particular emphasis on diet and reproduction. Anyone with pertinent information is asked to send it to: Ron Ringer, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606.

AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

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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.

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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Animal Keepers' Forum



Dedicated to Professional Animal Care

MARCH 1984



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

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This month's artist is Yoshi. Yonetani who works for ZooDEL (Zoo Design and Education Lab) in Kobe, Japan. His drawing emphasizes the importance of interaction between Zoo staff and visitors in the promotion of public education. Thanks, Yoshi.!

Scoops and Scuttlebutt

NEW PHONE NUMBERS LISTED FOR SANTA FE TEACHING ZOO

Santa Fe Community College has been changing its telephone system over to a new direct dial computerized system. Unfortunately, unexpected difficulties have arisen which have temporarily interrupted service for the Teaching Zoo/Biological Parks Program. The new number is expected to be (904) 395-5601. Service to the security office can relay messages to the zoo via radio. Their number is (904) 395-5518, Ext. 19 & 20. Santa Fe Community College's main campus operator is (904) 395-5000. In addition, the night zoo number as listed in the AAZPA Zoo and Aquariums of the Americas can be used as it is my personal home number (Jim Ellis: (904) 357-6326). The continued understanding of our colleagues is appreciated.

FOURTH ANNUAL ELEPHANT WORKSHOP PROCEEDINGS AVAILABLE

Proceedings of the Fourth Annual Elephant Management Workshop held in Kansas City in October 1983 are now available. This 60-page publication includes all papers presented at the workshop in addition to the panel discussion, list of registrants and budget information. While complimentary copies are sent to those who attended the workshop, copies are available from the Kansas City Zoological Gardens, Swope Park, Kansas City, MO 64132. Please send check or money order in the amount of \$2.00 for each copy ordered.

NEW EXECUTIVE AND ASSOCIATE EDITORS NAMED

Due to expanding professional responsibilities in his role as Area Supervisor at the Topeka Zoo, Mike Coker has resigned as Executive Editor of Animal Keepers' Forum. While not retaining a formal position on the editorial staff, Mike hopes to continue to be involved in AAZK publications as time permits. Alice Miser, formerly Associate Editor, will assume Mike's position immediately. Bernie Feldman has been recruited to assume the position of Associate Editor and will be working on soliciting advertising patrons for AKF.

KEEPER TRAINING VIDEOTAPE NOW AVAILABLE

The first Keeper Training Video Tape, entitled "Zoo Keeper Safety, An Attitude Adjustment", is now available for purchase for use in Zookeeper training. This first tape attempts to create a safety attitude and presents a systematic safety approach to the job of zoo keeping. All proceeds generated from future sale of training tapes will be used to finance production of future tapes. A copy of the Purchase Agreement can be found on Page 12 of the January 1984 issue of AKF of interested parties may write to B. Wayne Buchanan at the Woodland Park Zoo for further information.

Births & Hatchings

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

The following are the B&H for December 1983 and January 1984: Mammals-- 0.0.1 Titi monkey, 0.0.2 Tree shrew, 0.0.1 Pygmy marmoset, 1.1.3 Geoffroy's tamarin, 0.0.5 Capybara (0.0.3 DNS), 0.1 Grant's gazelle (DNS), 0.0.2 Chimpanzee (stillborn), 0.0.1 Lowland gorilla (stillborn), 0.0.2 Cotton-top marmoset; Birds -- 0.0.1 Yellow-fronted canary.

BRONX ZOO.....*Margaret Price*

B&H for November and December 1983 include: Mammals--1.0 Lesser long-tongued bat, 0.1 Gaur, 3.0 Minnie Down's mouse, 2.0 Lesser spear-nosed bat, 1.0 Axis deer, 4.0 Pen-tailed bettong, 0.2 Brow-antlered deer, 3.0 Lesser galago, 0.2 Red brocket deer, 0.2 Sambar deer, 2.0 Polar bear, 1.1 Large Malayan mouse deer, 1.0 Pudu, 2.0 Cottontop marmoset, 1.0 Blackbuck, 1.0 Maxwell duiker; Birds -- 1 Mauritius pink pigeon; Reptiles -- 9 Brazilian rainbow boa.

JACKSONVILLE ZOO.....*Anne E. Wiggins*

December and January B&H include: 1.1 Golden spider monkey (1 DNS), 0.0.1 Nanday conure and 0.0.4 West African dwarf crocodile.

TAMPA--BUSCH GARDENS.....*Sandy Moher*

B&H for January 1984 include: Mammals -- 1.1 Addax, 0.1 Gerenuk, 1.0 Roan antelope, 0.1 Grant's gazelle, 1.0 Gemsbok, 0.1 Scimitar-horned oryx, 0.1 Ankole; Birds - 2 Crested tinamou, 2 Hahn's macaw, 4 Cereopsis goose, 5 Sun conure, 7 Golden-capped conure, 1 Golden conure, 3 Jandaya conure and 3 Senegal parrot.

DALLAS ZOO.....*Tami Jones*

January 1984 B&H include: Mammals -- 1.1 East African oryx, 1.0 Nile Lechwe, 1.0 Hamadryas baboon, 1.0 Suni, 0.0.1 Black howler monkey; Birds -- 0.0.2 Alexandrine parakeet.

MIAMI METROZOO.....*Lori Bruckheim*

The following January 1984 B&H were recorded: 0.1 Chimpanzee, 1.3 European brown bear (0.1 DNS), 1.1 Thomson's gazelle, 0.1 Defassa waterbuck, 1.1 Scimitar-horned oryx; Birds -- 0.0.2 Green junglefowl (0.0.1 DNS).

ASSINIBOINE PARK ZOO.....*Barb Haffner*

Reported B&H from November 1983 through January 1984 include: Mammals -- 3 Bush pigs, 1.0 European bison, 1.0 Bennett's wallaby, 0.1 Lion-tailed macaque, 0.1 Llama and 2.2 Addax.

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

January 1984 B&H include: Mammals -- 0.0.8 White-toothed shrew, 0.0.5 Ermine, 0.2 Collared peccary, 0.0.1 Callimico, 0.0.1 Squirrel monkey, 0.0.1 Spot-nosed guenon, 0.0.1 Guinea baboon; Birds -- 0.0.2 Inca tern and 0.0.1 Red and white crane.



Coming Events

AAZPA SOUTHERN REGIONAL CONFERENCE

April 1-3, 1984 Little Rock, AR

AAZPA CENTRAL REGIONAL CONFERENCE

April 15-17, 1984 Omaha, NE

AAZK SOUTHEAST REGIONAL CONFERENCE

April 19-21, 1984 Columbia, SC

Hosted by the Riverbanks Zoo AAZK Chapter. For information contact: Steve Danko, Riverbanks Zoological Park, 500 Wildlife Parkway, Columbia, SC 29210 (803) 779-8717. See registration forms in this issue of AKF.

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 29-May 1, 1984 Philadelphia, PA

CONFERENCE ON ZOO ANIMAL PATHOLOGY

May 25-26, 1984 Cincinnati, OH

For information contact: Dr. Betsy Dresser, Cincinnati Zoo, 3400 Vine St., Cincinnati, OH 45220 (513) 281-4701.

10TH ANNUAL CONFERENCE OF THE AMERICAN FEDERATION OF AVICULTURE

August 1-5, 1984 Redondo Beach, CA

For information, write AFA, P.O. Box 1568, Redondo Beach, CA 90278 or call (213) 372-2988.

1984 AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984 Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at the Woodland Park Zoological Gardens, 5500 Phinney Avenue North, Seattle, WA 98103. Watch upcoming issues of AKF for conference hotel site, registration forms and additional information. "*Finders Keepers, No-shows Weepers!*"

AAZPA ANNUAL CONFERENCE

Sept. 9-13, 1984 Miami, FL

REQUEST FOR NOMINEES FOR AAZK AWARDS

Nominations are being sought for awards for 1984. These awards will be presented at the 1984 AAZK Conference in Seattle, WA. 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 1984. 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 excel 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.

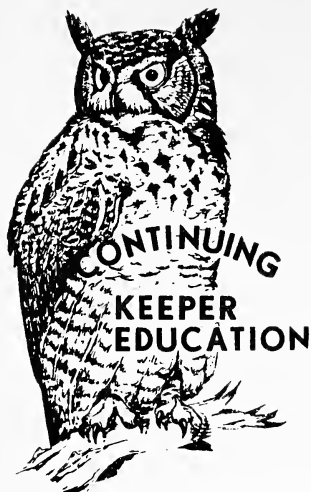
SELECTION PROCEDURE

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





STAFF EXCHANGE PROGRAM UPDATE

By
Judie Steenberg, Coordinator
AAZK Education Committee

The Puget Sound Chapter has nearly completed the master list of institutions interested in participating in the Staff Exchange Program. Copies of the master list will be sent to all institutions that registered with the project. Individuals and unregistered institutions that want a copy may obtain one by sending their request to: Elandra Aum at Woodland Park Zoological Gardens, 5500 Phinney Avenue N., Seattle, WA 98103.

A list comprising only institutions' and contact persons' names is included below. Individuals and institutions engaging in exchanges do so on their own responsibility; as facilitators, the persons working on this project do not share in that responsibility.

INSTITUTIONS INTERESTED IN STAFF EXCHANGE

Akron Zoological Park, Akron, OH; Dave Ford
Atlanta Zoological Park, Atlanta, GA; J.S. Dobbs
Arizona-Sonora Desert Museum, Tucson, AZ; Peter Siminski
Beardsley Zoological Gardens, Bridgeport, CT; Gregg Dancho
Binder Park Zoological Society, Inc., Battle Creek, MI; Everett Harris
Buffalo Zoological Gardens, Buffalo, NY; Gerald Aquilina
Cheyenne Mountain Zoological Park, Colorado Springs, CO; Bill Aragon
Cleveland Aquarium, Cleveland, OH; Ed Bronikowski
Como Zoo, St. Paul, MN; Brint Spencer
Dallas Zoo, Dallas, TX; Larry O. Calvin
Dickerson Park Zoo, Springfield, MO; Mike Crocker
Dreher Park Zoo, West Palm Beach, FL; Sally Lieb
Greater Baton Rouge Zoo, Baker, LA; Ralph Minor/Jerry Hendry
Honolulu Zoo, Honolulu, HI; Jerome S.W. Marr
Indianapolis Zoo, Indianapolis, IN; Julian Duval
International Crane Foundation, Baraboo, WI; Shirley Russman/Jane Fordham
Jo-Don Farms, Inc., Franksville, WI; Don J. or Bob E. Meyer
Lafayette Zoological Park, Norfolk, VA; Connie Sweet
Los Angeles Zoo, Los Angeles, CA; Ed Alonso
Louisville Zoological Garden, Louisville, KY; J. Douglas Porter
Metropolitan Toronto Zoo; West Hill, Ontario (Canada); Ken Thompson
Milwaukee County Zoological Gardens, Milwaukee, WI; Ken Kawata
Minnesota Zoological Garden, Apple Valley, MN; Brint Spencer

Institutions Interested in Staff Exchange (continued)

National Aquarium, Baltimore, MD; Jackson Andrews
New England Aquarium, Boston, MA; Paul L. Sieswenda
Northwest Trek, Eatonville, WA; Scott Ransom
Oakland Zoo, Oakland, CA; Val De Leon
Philadelphia Zoological Garden, Philadelphia, PA; Wilbur B. Amand
Potter Park Zoo, Lansing, MI; Jerry Miller
Rio Grande Zoological Park, Albuquerque, NM; Ingrid Schmidt
Roger Williams Park Zoo, Providence, RI; Roger Valles
San Antonio Zoological Gardens & Aquarium, San Antonio, TX; Russell L. Smith
Seattle Aquarium, Seattle, WA; Laura Mumaw
Sedgwick County Zoo, Wichita, KS; Ken Redman
Topeka Zoological Park, Topeka, KS; Craig Dinsmore
Tulsa Zoological Garden, Tulsa, OK; D. Zuconni/B. Fiore
Utica Zoo, Utica, NY; Steven U. Matthews
Washington Park Zoo, Portland, OR; Steve McCusker
Woodland Park Zoological Gardens, Seattle, WA; Elandra Aum



A Keeper Exchange Experience.....

"MY PENGUIN ENCOUNTER"

By

Helen Shewman, Assistant Keeper, Bird Crew
Woodland Park Zoological Gardens, Seattle, WA

Recently I had the special opportunity to participate in a keeper exchange program with Sea World of San Diego. As part of my work at Woodland Park I am responsible for eleven Humboldt's penguins (*Spheniscus humboldti*). In the past year, particularly during breeding season, we have consulted with keepers at Sea World in the Aviculture department about various problems that arose with the husbandry of our Humboldt's. Although a lot of valuable information was acquired over the phone and through reading various articles, I felt there was something lacking in my knowledge, and that was hands-on experience. I thought if I could go to Sea World and work directly with their staff, things that were somewhat confusing would become clearer. I was especially interested in learning hand-raising techniques from people familiar with the routine and in acquiring practical experience under their supervision. Along with obviously increasing my expertise, I believed this opportunity would increase my confidence as well.

In September 1983 I was able to attend the AAZPA Conference in Vancouver, Canada. Walter English, Curator of birds at Woodland Park Zoo introduced me to Frank Todd, Corporate Curator of birds at Sea World. We discussed the best time for me to go--I wanted to spend time at Sea World when as many species of penguins as possible would be hatching. Frank informed me that any time from December through March, during the Adelie breeding season, sounded great. Also, Todd, Scott Driescham and Frank Twohy would

"MY PENGUIN ENCOUNTER", *Continued*

be returning in mid-December from a collection trip to the Antarctic Peninsula. They would be bringing eggs from Gentoo (*Pygoscelis papua*) and Chinstrap (*Pygoscelis antarctica*) penguins. These eggs would be hatching almost immediately and would require many people to help feed and care for the chicks. Hence, we decided that the best time for me would be the month of December.

I arrived the second week and was assigned to Sea World's "Penguin Encounter". This is a new, multi-million-dollar Antarctic exhibit that houses six species of penguins: Emperor (*Aptenodytes forsteri*), King (*Aptenodytes patagonicus*), Adelie (*Pygoscelis adeliae*), Gentoo (*Pygoscelis papua*), Rockhopper (*Eudyptes crestatus*), and Macaroni (*Eudyptes chrysolophus*). It has an elaborate air and water filtration system, plus an artificial light system that provides the exact photoperiod penguins would experience in the southern hemisphere; so, during our winter it is austral summer and breeding season in the Penguin Encounter.

The exhibit contains over three hundred penguins. Walking into the enclosure itself that first day -- feeling the gust of freezing cold air (not to exceed 28°), seeing the snow on the ground (10,000 pounds blown in per day), and being surrounded by hundreds of penguins -- was truly like stepping off the edge of the world and landing on the South Pole. The level of noise was the first thing that really astounded me; Emperors trumpeting, Adelies growling at anyone that tried to come near their nest, and Rockhoppers singing in a mutual display. Penguins were everywhere, completely outnumbering their human counterparts, and practically oblivious to them.

For a student of penguin behavior, here was a gold mine. Everything I had read in books and seen in documentaries was suddenly materialized in flesh and blood right before my eyes: a pair of Kings exchanging an egg; an Adelie stealing a pebble from another's nest, another one feeding its chick, an Emperor tobogganing over the ice, and a pair of Macaronis mutual preening.

As if that wasn't enough, there was a whole colony (over 50) of Humboldt's penguins to observe. Plus there were two eight-week-old Emperor chicks being hand-raised (chicks? 12 pounds and two feet tall?) and Adelies, Chinstraps and Gentoos hatching almost everyday.

One of my main goals was to master the art of feeding baby penguins and I had lots of opportunity. I learned how to make the formula which consists of filleted herring, krill, half-n-half, vitamins, and minerals all blended together into a milkshake. This is drawn up through a syringe with a tuberculin tube and placed in the chick's mouth past the trachea and partly into the esophagus. The feeding response is elicited by putting two fingers over the chick's head and pressing its bill slightly. The detailed procedure can best be read in the literature Sea World has written so I will not elaborate on it here. My main point is that the experience of getting to see this technique in operation and practice it myself was invaluable.

One of the highlights of my stay included the day we had to change bands on Emperors because they were molting and swelling up. It was quite an experience to be involved in trying to tackle a 100-pound Emperor and restrain it while someone removes and replaces the band. Less glamorous jobs included helping thaw and bucket over 800 pounds of fish and stuff them with over 2,000 vitamins and minerals per day. Whatever the work was I happened to be doing, it was fun, educational and rewarding. Many of my questions were answered regarding the husbandry of penguins in captivity, not only what was being done, but why it was done.

"MY PENGUIN ENCOUNTER", *Continued*

I want to make special note of how kind and patient everyone on the Sea World aviculture staff was. Without their professional attitude and willingness to take some time, I never would have learned all I did. A special thanks to a member of the staff, Michael Barry, who offered to let me have his apartment while he moved in with a friend. It was within walking distance to Sea World and the beach!

My main feeling after having been to Sea World is that of excitement and encouragement as we approach the beginning of the Humboldt breeding season here at Woodland Park Zoo. I feel very grateful for having had the opportunity to go to Sea World. I was paid two weeks regular salary, and I added one week vacation for a total of three weeks. Without Woodland Park Zoo's cooperation the trip would have been impossible.

I encourage other zoos to investigate and participate in such exchanges--whether it be an exchange of actual personnel--or an exchange of knowledge and experience. In my case, it was an exchange of information because it was not arranged for a keeper from Sea World to come up here to work. As we move into the 1980's, professional animal keepers will need to maintain and increase our willingness to share knowledge. After all, we share the same goals: to promote the welfare of the animal kingdom we are privileged to care for, and to enhance their conservation, breeding success, and survival. If we can help each other toward these goals, all of us and the animals we love will gain a great deal in the long run.



ZOO News From Japan

NEW ARRIVAL OF RARE ANIMAL TO JAPAN SEROW CENTER

By
Yoshi. Yonetani
ZooDEL/Zoo Design & Education Lab
Kobe, Japan

On 11 November, 1983 1.2 rare Formosan Serows (*Capricornis swinhoei*) arrived at the Gozaisho Alpine Zoo which belongs to the Japan Serow Center, Mie prefecture. The three specimens came from the Taipei Municipal Zoo, Taiwan. This event represents the first time this species has been in captivity at a foreign zoo. The animals are estimated to be between two and three years old. This species has been on the decrease in its natural habitat and thus exportation has been banned.

The above Zoo is located on a mountain side 1210 meters above sea level and is surrounded by natural environment including wild Japanese Serows (*Capricornis crispus*). We can reach there by the ropeway that extends 2159 meters with an unevenness of 718 meters. The Center was founded in December 1973 and is organized and managed as a juridical foundation. Included in the animal collection there are: 2.2 Rocky Mountain Goats (*Oreamnos americanus*), 2.2 Chamois (*Rupicapra rupicapra*), 4.2.1 Chinese Grey Goral (*Nemorhaedus goral*) and three Japanese Serows.

The first pair of Rocky Mountain Goats in Japan came from the Los Angeles Zoo to the Alpine Zoo in March 1977. The first pair of Chamois came from the Helsinki Zoo, Finland in December 1980. The pair of Goral arrived in December 1978 from the Peking Zoo, Republic of China and are believed to be the first to come to our country since the war. A pair of Saiga are scheduled to be introduced this spring season. When this is accomplished, that big event shall be a first in Japan. The Alpine Zoo is the only Japanese Zoo to keep Chamois, Goral and Formosan Serow now and they had the first experience of raising of Pronghorn several years ago.





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Keepers and Computers...Part Two

BUYING YOUR OWN COMPUTER OR THE JOY OF ZX

By
Jim Albert
Caretaker, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX

The revolution in microelectronics has made available to the average individual information processing capabilities that were strictly the province of government and big business until very recently. These capabilities may be extremely useful in captive animal management, and are both inexpensive enough and sufficiently easy to master to allow zookeepers direct access to them.

If you are considering the purchase of a computer already, don't let me persuade you to buy the cheapest possible one! I would encourage you to read the buyer's guide that appeared in the October 1983 issue of Radio-Electronics magazine. There are many excellent machines available for less than \$500, many priced substantially lower than that. I personally like the Commodore 64, a well-designed computer that has been discounted as low as \$150, but let your own tastes and inclinations be your guide.

If you are not already considering a computer purchase--this article was written primarily for you! It will try to tell zookeepers who are not considering buying a computer what less than one hundred bucks will get them, in hopes that they will consider buying one.

For some years, the British firm of Sinclair Research Ltd. has been manufacturing an extremely small computer. Previously available only by mail order as the Sinclair ZX-81[®], Timex[®] bought the U.S. marketing rights and has been selling it through retailers as the Timex/Sinclair 1000.[®] I ordered a ZX-81 for \$100 a couple of years ago; today the T/S 1000 has been priced as low as \$19.95!

I purchased a memory expansion pack -- also a must for the T/S 1000 -- at the same time for \$50, bringing my investment to \$150. Even at what by today's standards was a high price, I think that it was worth it. I have used the machine to plan my budget and play games as well as to do more animal-related tasks such as cataloging. What statistical sophistication I possess is due at least in part to the computer, since it allowed me to "pick apart" various procedures and thereby understand how they work.

The T/S 1000[®] is being phased out (thus its incredibly low price), to be replaced by the very similar T/S 1500.[®] The latter machine is essentially the same as the 1000, but with a slightly improved keyboard and the extra memory already built in, and costing about the same as the 1000 plus the memory pack. Both computers require an ordinary (non-stereo) cassette recorder to store programs on, and a TV for display.

Can anything so cheap be any good? I certainly think so, though my feelings are not universally shared. I wired a full-sized, typewriter style keyboard to my ZX, which eliminated the problem of the tiny keyboard. The cassette storage of programs is rather slow, and the connection between the computer and the memory pack which plugs into it is really quite shabby. But the BASIC language that is uses is a powerful version, and most commands can be entered by a single key-stroke--a unique and very handy feature. The ZX family of machines are as a result excellent "trainers".

Too much emphasis has been placed, in my opinion, on "software availability" in computer marketing. Most small computers are used either for very general or specifically business-related purposes, and the software--prewritten programs that you buy from your dealer--are for that market. For zookeepers' application, or for any scientific uses, you can expect to have to write your own programs, whether you own a T/S 1000[®] (for which there isn't a lot of software available) or an IMB PC[®] (for which there's lots--mostly the wrong kind!). By the way, it really isn't very hard at all to write a program that will do what you want. (More on that later in the series.)

What can you do with your computer, in more specific terms? I'll address that question in two major ways in the next couple of installments: the cataloging and sorting of information, and the statistical examination of information. I'll try to include some short examples in BASIC that will illustrate that some very simple programs can accomplish some pretty amazing things. And if you're the extremely eager sort, you can address questions in the meantime to me at:

J. W. Albert
Department of Anthropology
University of Texas at Austin
Austin, TX 78712



Chapter

TOPEKA ZOO AAZK CHAPTER

The Topeka Zoo AAZK Chapter was recently reactivated and members are in the process of reorganizing. The Chapter is considering various fund-raising possibilities and would be interested in hearing from other chapters on their successful and not so successful ideas. The members also hope to plan some special activities for National Zoo and Aquarium Month in June. It is hoped that the Topeka and Kansas City Zoo Chapters may be able to coordinate some activities in the future.

Newly elected officer at Topeka are:

*President....Bernie Feldman
Vice President....Tori Williams
Treasurer....Alice Miser
Secretary....Piper Kimball*

PHILADELPHIA ZOO AAZK CHAPTER

Newly elected officers for the Chapter are:

*President..... Denise Robinson
Vice President...Mark Thurston
Treasurer..... Gene Pfeffer
Recording Sec...Bob Berghaier
Corresponding Sec...Gina Blyther*

News

ATTENTION ALL CHAPTERS: Dolly Clark, Administrative Secretary for AAZK wishes to notify all AAZK Chapters that National Office will no longer supply free stationary and envelopes to individual Chapters. Due to the increased costs of printing and mailing such materials, this is no longer a viable option in the AAZK budget. Chapters who do not already have their own stationary may have such printed using their Chapter name, address and may use the AAZK logo. National Office will continue to supply stationary needs for Board of Directors members, Project Chairmen and Committees.



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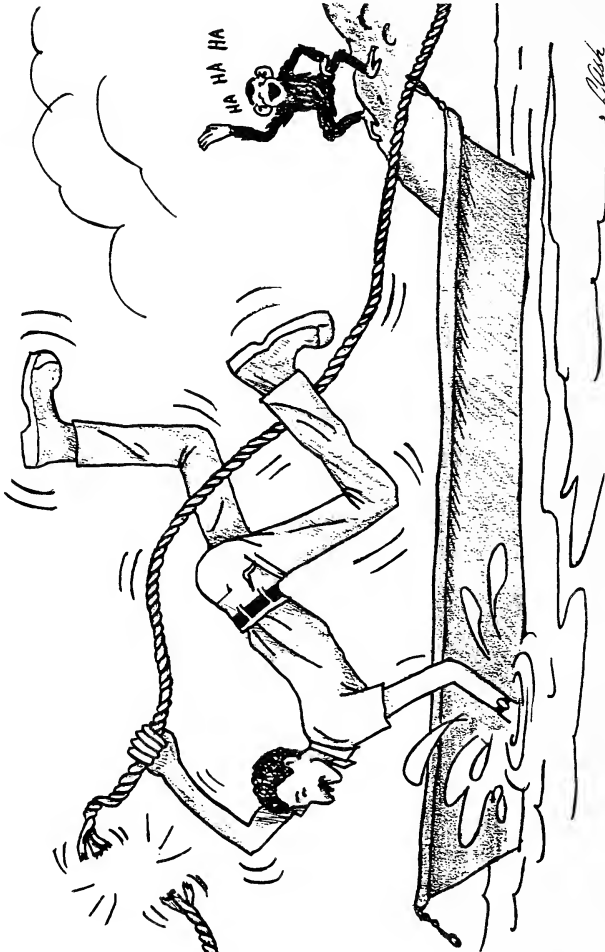


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A ZOOKEEPER'S REFLECTIONS OF PERU

By
Robert Berghaier, Senior Keeper
Philadelphia Zoological Gardens
Philadelphia, PA

After my participation in an Earth Watch project in July 1983, I spent two weeks traveling through Peru visiting several wildlife areas and the Lima Zoo.

My trip started in Lima, the most disliked city (next to Buffalo, NY) I have ever come across. This feeling is shared by Peruvians and foreign residents alike. There is a common saying in Peru - "Does the sun ever shine in Lima?" Because of its location, between the sea and the Andes, the sky is often overcast. It is also a dirty city and, sometimes dangerous due to street crime and more recently to a Maoist terrorist movement, the Shining Path. The night before I flew into the city, the Shining Path set off bombs and sprayed a major city square with machine gun fire. On a more positive side, the food in Lima is great. It is reputed to have some of the best restaurants in South America.

The Lima Zoo is also a pleasant surprise. The older section of the zoo is rather plain. The newer part contains an outdoor rainforest exhibit of native Peruvian fauna. The animals exhibited here include tayra, spectacled bear, spider monkeys, black-capped and white-fronted capuchin, collared and white-lipped peccary, tapiers, jaguar and puma among others. The exhibits were large, well kept and most animals, including the primates, had offspring. The zoo has the potential to be one of South America's best. On its grounds are pre-Inca ruins which make a most unusual and attractive setting. While talking to the staff I was shown the zoo's masterplan which would bring the collection up to the status of a major world zoo. However, it cannot be implemented without government money--something which may be a long time coming.

The first wildlife area I visited was the Paracas Reserve on the Pacific coast. The area is a contrast between the richness of the sea and the bleakness of the arid coastal desert. The Paracas coastal area normally supports huge numbers of seabirds along with good populations of sea-mammals due to the influence of the cold Humboldt current. This current forms an upswelling of nutrients which supports large schools on anchovys which in turn supports both animal life and the Peruvian fishing industry. During the time of my visit, environmental disaster was occurring. A phenomenon of warm water called the El Niño (the child) which blocks the upswelling had extended its normal stay or several months to over a year. Bird populations have dropped to 10% of their former levels due to starvation or migration. I often saw dead seabirds and an occasional dead sea-lion or fur seal. The extended El Niño has also caused the collapse of the Peruvian fishing industry, a factor which has severely hurt Peru's economy.

Even though the ecosystem was in turmoil, the sights at Paracas were spectacular. I saw Andean condors, Chilean flamingos, Humboldt penguins, and Inca terns, along with huge flocks of cormorants, boobies, petrels and pelicans. Also present were schools of dolphins and herds of sea lions and fur seals, called seawolves by the Peruvians (an excellent name I thought).

In marked contrast to this diversity and numbers of living organisms is the almost lifeless coastal deserts. This area sometimes does not receive

A ZOOKEEPER'S REFLECTIONS OF PERU, Continued

rainfall for years. It is certainly the most barren area I have ever seen. I vividly recall one two-hour drive in which the only living things spotted were two tint plants and a small lizard. The area is primarily sand with wind sculptured, strangely shaped rock formations. It creates an awing environment.

Both ecosystems make the Paracas Reserve a "must stop" for a naturalist in Peru. Excellent accommodations are found at the Paracas Hotel. The prices were moderate by U.S. standards, and the food great. The grounds are beautifully planted and the colorful flowers attract lots of humming-birds.

My next stop was the plains of Nazca. The drive south from Paracas was quite an experience. The Pan American Highway is two lanes wide in this part of Peru and, of course, the best way to drive along it is right down the middle. I believe the national sport of Peru is trying to see if you can force the oncoming driver to swerve before you do. At this game of chicken my driver excelled at the expense of a few new grey hairs on my head. Another interesting Peruvian tradition is the custom of placing crosses as memorials to those killed in traffic accidents on that sight. The highway is sprinkled with them every ten miles or so. The effect is sobering. What is truly unnerving is coming down a narrow, winding mountain road, turning a sharp bend and seeing a dozen crosses and hearing how a bus or truck left the road there killing all aboard.

Nazca is famous for its vast system of lines and animal shapes dug into the ground. Its method of creation and purpose have puzzled westerners for years. In the book "Chariots of Fire" Eric Van Danikan theorized that the area was used as a landing sight by extraterrestrials. Scientists have known for sometime the lines and shapes were dug by pre-Inca peoples who used it as a vast astrological chart. As a joke, the local Indians have carved the figure of an E.T. in the side of a hill so it can be seen from the air by visiting gringos.

I stopped in Nazca because it was a convenient place to stay while I visited the Pampa Galeras Reserve in the puna zone of the Andes. The puna is a dry grassland found on the eastern side of this mountain chain and is home to the llama-like vicuna. The Galeras Reserve was created specifically to allow vicuna populations some protection after a period of heavy hunting. The goal of the reserve has been realized and vicuna numbers have greatly increased. In fact, the reserve has probably worked too well since overgrazing is now a problem.

The drive to Galeras was another battle with the Peruvian road network. The distance from Nazca to the reserve is 90km as the crow flies, but it is 180km by vehicle. The reason, the route climbs from the plains to the 4000 ft level. The road is a narrow 1½ lane winding course often with sheer drops of 500 ft straight down on the sides. Amazingly large buses and trucks use this road and traffic being two ways one often meets them coming in the opposite direction. Again crosses are placed at the site of fatal accidents. Understandably there are many crosses on this road.

When we finally reached the plateau of the puna we were rewarded by the sight of hundreds of vicuna. Not since Africa have I seen so many large mammals in so short a time. I watched the antics of the territorial male vicunas patrolling their holdings; chasing off the bachelor herds that strayed near the family groups. The reserve is also used by the local people for the grazing of livestock. Both parties coexist and the Galeras shows that a conservation area need not be a strict nature reserve to protect wildlife.



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First call for papers

This year's topic for presentation papers, *Working in zoos and aquariums: today and tomorrow*, was chosen to

encourage all conference delegates to participate in writing about their professions. Working in zoos and aquariums today is complex, challenging, and exciting requiring many skills such as public speaking, computer use, construction technique and nutritional analysis, in addition to caring for animals. The ability to share this knowledge and to educate others is a great asset. In the future, it will be even more important to exchange ideas and information.



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Send papers, information,
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Phil Pennock
AAZK Conference
Woodland Park Zoo
5500 Phinney Ave. N.
Seattle, WA 98103-5897

Watch for more informa-
tion in upcoming issues
of the *Forum*, or contact:
Debbie Stecher,
625-5402.





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papers will be limited to 10 minutes with a 5-minute question/answer period. Please submit an outline or abstract by July 15, 1984. AAZK national committees that plan to have meetings at the conference should submit time and meeting space requirements by this date.

Send papers, information, or questions to:

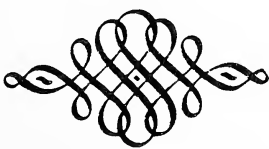
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AAZK Conference
Woodland Park Zoo
5500 Phinney Ave. N.
Seattle, WA 98103-5897

Watch for more information in upcoming issues of the *Forum*, or contact:
Debbie Stecher,
625-5402.

The next wildlife habitat I visited was the cloud forest of the Eastern Andes. When people think of Macchu Picchu, they know it as the site of the magnificent Inca ruins found there. However, the area which is a national park, also has wildlife which, unfortunately, is depleted in numbers. Spectacled bear, huemul and pudu roam the area. In spite of getting up at dawn and walking the forest trails, I had to be content viewing the numerous birdlife and the viscach, a sort of overgrown chinchilla. The cloud forest is a mystical place with the morning mist enveloping the surrounding peaks. The effect of walking through the ruins of Macchu Picchu, covered by the morning fog, was an incredible experience.

After leaving the Andes, I traveled to the South Eastern Peruvian jungle at Tambopata Reserve. The Explorers Inn Tourist lodge runs the area and provides comfortable accommodations. Tambopata is a birders paradise. Flocks of blue/gold, scarlet and military macaw were sighted daily. Other birds seen included toucans, toucanettes, king vultures, guans, trogons, horned screamer, anis, hoatzins along with numerous tanagers and antbirds. Mammals are present, but not so easily observed. Primates are the most often spotted. In a three day stay I saw Dusky Titi, Red Howler, black-capped capuchin and saddleback tamarin. Other mammals sighted were coati, three-toed sloth and forest squirrels. Mammals that were seen by other parties during my stay included jaguarundi, tayra, peccary, giant anteater, and brocket deer. The reserve also has a resident jaguar who is seen an average of once a month. Caiman are present in the Tambopata River. Most are small; a sign of poaching pressure. I also saw iguana, an unknown species of snake and numerous anoles and frogs. The insect life is diverse with army and leaf cutter ants abundant. Seeing army ants foraging with accompanying antbirds was fascinating. The Tambopata Reserve is one of the most biologically diverse areas in the world and through Explorers Inn, one of the most accessible.

As this article can attest to, Peru is the most ecologically diverse country in South America. If a person can make only one trip south of the border, I would recommend they visit Peru. Compared to a trip to Africa or India, it is relatively moderate financially. Last year's airfare, roundtrip from Miami, was running \$550 to \$700. Accommodations can be good while inexpensive and food is cheap. A U.S. visitor will find their dollars go far in Peru. Many organized tours leave from the States and interested readers should glance over the travel advertisements in Natural History or Animal Kingdom magazines to contact various touring groups. Doing Peru on your own is also practical and cheap and you will come across lots of other Americans and Europeans doing the same. Remember if you visit that you are in what is essentially a third world country, so expect possible delays with transportation. Peru is an incredible country with great natural beauty; a contrast of several ecosystems which in turn have a diverse flora and fauna. For a nature lover, Peru may be the best kept secret in the hemisphere.



Dusky Seaside Sparrow Notes

Submitted By Jim Ellis
 Professional Specialist/General Curator
 Santa Fe Community College Teaching Zoo
 Gainesville, FL

On September 27 & 29, 1983 the remaining four male dusky seaside sparrows (*Ammodramus maritima nigrescens*) were transferred from the Santa Fe Community College Teaching Zoo facility back to the United States Fish & Wildlife Service and Florida Game & Fresh Water Fish Commission. These agencies had reached the conclusion of their contractual/financial agreements with the Teaching Zoo regarding this group of birds and have decided to make the specimens available to other agencies/facilities.

The Teaching Zoo has been actively involved in a maintenance agreement with the U.S. Fish and Wildlife Service since April, 1981. During the past year (Sept. '82 to Sept. '83) an additional service agreement was reached with the Florida Audubon Society. This agreement under the permission of the U.S. Fish and Wildlife Service involved the Teaching Zoo staff in an effort to breed the male duskies with Scotts seaside sparrows and existing captive intergrades of said races.

Initial efforts to use the wild caught specimens of Scotts and Wakulla seaside sparrows developed serious veterinary problems. Mortality of specimens caught in the wild and transferred to the Teaching Zoo proved to be high. Necropsy reports on said specimens revealed considerable parasitism difficulties: (*Acanthocephala sp.*), potential *Aspergillus sp.* difficulties, as well as possible bacterial hazards. Due to the lack of baseline information on the species as a whole, our veterinary care staff (University of Florida) recommended a cautious approach. The only female birds used involved one captive-held Scotts female, one 50% intergrade and a 25% intergrade. The only success was achieved on 25 August, 1983 when, after repeated nesting/clutches with a different male, the 50% female hatched one intergrade chick which survives to date and was transferred with the adults. Although nomenclature remains to be established, it is presumed that taxonomically this individual would be appropriately listed as *Ammodramus maritima penninsulae* x *nigrescens*.

Finally on 10 September, 1983, a male dusky #23613-Red died following a week of abnormal behavior and intensive veterinary observation. Preliminary necropsy results indicated a large anterior abdominal growth pressing on the lungs. Final results following histopathology determined the growth to be a fungal granuloma. Cloacal cultures taken three days prior to death indicated *Aspergillus sp.* (clavatus group). Although source, transmission, and definitive results were not possible, the implications for future management of the species in captivity are important. None of the remaining individuals showed signs of difficulty although all were showing possible age related behavioral activities.

Currently the Santa Fe Community College Teaching Zoo is working with the Florida Game and Fresh Water Fish Commission in an attempt to continue its work in the modeling of captive propagation of the species as a whole. Although funding appears to be limited, the Florida Game and Fresh Water Fish Commission has expressed continued interest in determining those techniques for the captive propagation of small native passerines which may be threatened or endangered. Special interest in applying those techniques exist for the currently endangered Florida Grasshopper sparrow.

Anyone currently working with or having an interest in our data or experiences should feel free to contact us.



AAZK Kenya Safari 1983

By
Margaret Price
Group Sales Dept., Bronx Zoo
Bronx, NY

Have you ever dreamed of going on a safari? Well, for 16 AAZK members their dream became a reality in October 1983 when they boarded a plane bound for Kenya, East Africa.

During the safari, the mini-bus stopped frequently as cameras, lenses and binoculars were excitedly assembled to enhance the sighting of, for example: buffalo, lion, leopard, elephant, rhino, Thomson's gazelle, Grant's gazelle, reneek, genet, lilac-breasted roller, Grevy zebra, Grant's zebra, impala, oryx, hippopotamus, alligator, giraffe, bush buck, waterbuck, white-tailed mongoose, comorant, warthog, spotted hyena, wildebeest, topi, cheetah, olive baboon and vervet monkey. The animals, in most instances, were undisturbed by the presence of the mini-bus. Some priceless photos were taken during this memorable trip.

The airfare, lodging and most meals were included in the special rate of \$1975 offered exclusively to AAZK members by Park East Tours of New York. The accommodations were impeccable. Personally, I believe this trip was well worth the money.

This trip was an exhilarating learning experience about the animals and culture of Kenya. It also gave me the opportunity to meet fellow AAZK members from Toronto, Ontario, Los Angeles, Florida, Rhode Island, Colorado, Missouri and New York. An AAZK Kenya safari trip is the ultimate dream vacation for an animal enthusiast.

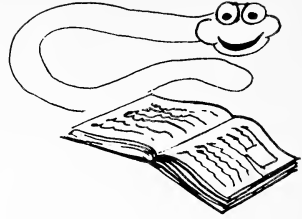
Editor's Note: Due to the enthusiastic response to the 1983 Kenya safari, Park East will again be offering a specially priced trip this year. The itinerary will be the same and Park East is also holding to the 1983 price. Tentative departure dates are August 3, 1984 and October 26, 1984. Members should watch their mailbox for a special safari notification in the coming months.)



Book Review

The Fall of the Wild, The Rise of the Zoo

By Robert Bendiner
E.P. Dutton, New York, 1981
212 99 with Appendix and Bibliography
Price: \$15.50



*Review by John David Pool
Noah's Ark Zoo, Sulphur, LA*

The author, Robert Bendiner, has served as a member of the editorial board of the New York Times, a free-lance writer for magazines and as managing editor of Nation. He is chiefly concerned with environmental matters.

Bendiner begins his book with an interesting account of how animals have been of enormous practical value to man in medical research and the ecological balance. Example -- "...alligator tongue oil produces a steroidal action in the human body that is claimed to give temporary relief for asthma, rheumatism, and arthritis." Through this he makes a very practical appeal for the preservation of endangered species.

From this beginning, the author delves into the reasons for species becoming endangered--such as the destruction of natural habitats and their predation by man. If Bendiner were a lawyer, he would win his case--man is the endangering species.

This book shows in a forceful way that the better zoos and preservation projects can and are making the difference in the survival of many animal species. The author parries the critical charges leveled against zoos and defends them in an artful manner.

Bendiner has a lengthy list (derived from the Red Data Book) in the book's appendix of endangered, vulnerable and rare species of animals. The author also lists a Selected Bibliography which can't possibly cover all the sources he used; and, because of this, the work is bordering on useless for research.

As a whole, the 196 pages of text and 16 pages of photographs are interesting, entertaining and informative. The book is well worth purchasing and placing in your personal or zoo library.



An Encouraging Word.....

MISSISSIPPI KITE HACKING PROJECT-- MEEMAN-SHELBY FOREST STATE PARK/ MEMPHIS ZOOLOGICAL GARDENS

By
John Stokes, Assistant Curator of Birds
Memphis Zoo, Memphis, TN

INTRODUCTION

The Mississippi Kite is a medium-sized raptor found primarily in the southeastern and south-central United States. The kite is a graceful and marvelous flyer, sometimes spending hours on the wing. Incredible aerobatics have been seen when this bird is engaged in pursuit of flying insects such as grasshoppers, dragonflies or cicadas. (It also takes occasional snakes, toads, small birds and bats.)

It is found in extremely local colonies but has recently begun rapid range expansion in Texas, Oklahoma and Kansas. It is, however, considered as an Endangered species in Tennessee, found only in the western portion of the state. It is Endangered primarily due to loss of habitat since 50-70% of the river bottomland habitat they prefer has been converted to soybean fields.

The kites' main strongholds in west Tennessee are Memphis, Meeman-Shelby State Park, Ft. Pillow State Park, and Reelfoot State Park/National Wildlife Refuge. In order to bolster local populations of the Mississippi Kite, a hacking program was conducted at the Memphis Zoo and Meeman-Shelby State Park from August-October 1983. The kites were hacked into known kite colonies/habitat areas. (Memphis Zoo/Overton Park has three pairs and Meeman-Shelby has 10-15 pairs.) Hacking was done in these areas due to availability of personnel who could participate in the project, but future hacking programs might include areas that are of slightly different habitat. If habitat loss continues in west Tennessee at its present rate, then new colonies may have to be established in other portions of the state. In this case, hacking may become a very valuable tool for transplanting kite populations.

This project, a successful one, was the result of the cooperation of the Tennessee Wildlife Resources Agency, Kansas Fish and Game Commission, Tennessee Department of Conservation, Tennessee Ornithological Society, Memphis Audubon Society, and the Memphis Zoo and Aquarium. Thanks to all who helped...

August 19, 1983-9:30 a.m.--Mississippi Kites (12 in all, 2 adults and 10 immatures) arrived at Memphis International Airport from Wichita, KS via Kansas Fish and Game. We took them to the Zoo hospital and opened their shipping crates, of which there were three in all. Joe Schaefer, the man who located and climbed to the kite nest, did an excellent job of packing the birds safely. Upon opening, we discovered that the kites were roughly of two age groups. Four were about four weeks old and were designated for the hack site at Meeman-Shelby State Park. Five were too young for placement in the hacking box at the Zoo, so three were sent to Martha Waldron, a licensed raptor rehabilitator and a member of the Tennessee Ornithological Society, for hand-rearing. Two were kept by me for the same purpose (the hand-rearing consisted of placing the kites in a large cardboard box with nest material in the bottom. A feeding flap

MISSISSIPPI KITE HACKING PROJECT, Continued

and observation flap were cut in the box to permit feeding of the birds without them associating the food with humans). One additional nestling was intermediate in size between the two groups, so I kept it with my two youngsters to use as a leader bird in the zoo's hacking station.

August 19, 1983-3:30 p.m.--Transferred the four older kites to Meeman-Shelby. This state park is located some 20-25 miles north of downtown Memphis and offers excellent kite habitat. In fact, it probably has the largest single concentration of kites in west Tennessee. The hacking station here was located in the unused, very private group camp and was situated atop a 10-foot high metal shed that was formerly used to house the TWRA's radio equipment. Charlie Norvell, a Ranger-Naturalist at Meeman-Shelby, supervised the hacking of the kites and used several seasonal ranger-naturalists to care for the birds during their two-week stay

The hacking boxes used for this project were constructed out of 2" x 4" frames covered with $\frac{1}{2}$ " plywood. They measured 4' x 4' x 3' high and had two doors on the left side for feeding and watering. The doors were arranged where we could feed and water without the birds seeing us. One side of the box had a long door approximately 3' x 1' with $\frac{1}{2}$ " wooden dowels spaced 1" apart. This door was hinged and folded down to allow release of the birds. The opposite side had a window of the same dimensions, but did not fold down.

All the kites in Group A, as they were called, adjusted well to this new situation, but were a little leary of each other. None of these birds were nestmates and were not used to seeing three other birds with them. They settled in however and continued on with their business of growing.

August 20-29, 1983--All ten kites were doing well at this point. Group A birds as well as Group B birds were all eating voraciously. They were being fed a diet of Nebraska Brand Birds of Prey[®] diet enriched with Wings[®] bird vitamins and crickets dusted with Wings[®]. The B.O.P. diet was fed about 90% of the time.

August 22, 1983--Received an immature kite from the Lichterman Nature Study Center in Memphis. This bird was a native Memphian and apparently was blown out of its nest in a passing storm. It was placed with the Group A birds and worked in rather well since it was approximately the same age.

August 30, 1983--7:00 a.m.--Brought a kite from Group A to the Zoo hospital for treatment. I observed this bird gasping on 8/29 on a routine check and at first thought this bird was gasping due to the heat. After a while, I noticed that it was still gasping and decided that something was wrong. I caught the kite using a net constructed from a clothes hanger, a rainsuit hood and a broom handle. I took it home for the night and it ate well. The kite was examined by Dr. Mike Douglass, Zoo Veterinarian, and he suspected *Aspergilliosis*, a dreaded lung fungus that is virtually untreatable and usually kills its victim. This time was no exception. The bird died about two hours after it was brought in and was necropsied to show that the fungus was indeed the culprit. We watched the other kites closely to make sure that they didn't show signs of infection (as if we could have really done anything if they did).

September 2, 1983-3:30 p.m.-- Released Group A. One kite left almost as soon as the door was opened. Two left after three minutes and the last, the Lichterman bird, left after fifteen minutes. They all flew very well and flew no farther than 75-80 yards. All landed in nearby trees to get an idea of where they were. One kite even tried to emulate

MISSISSIPPI KITE HACKING PROJECT, Continued

at-like behavior by hanging upside down on a limb for a few minutes. After it figured the world didn't look correct from this unusual position, the kite did one and one half somersaults to a lower limb. All of the scoring judges gave the bird a score of 9.8 for this incredible and difficult maneuver. (Watch out 1984 Olympics)

September 3, 1983-10:00 a.m.--Placed six kites, Group B, into hacking box at the Memphis Zoo. This station was atop the Birdhouse above the visitor's entrance. Martha Waldron banded all six with two being banded on the left side and were designated as transmitter recipients. All six were placed in the box with no problems.

September 4-20, 1983--All the kites in Group B were doing fine except two that had some feather problems. Apparently, these birds had whacked their wings on their perches and damaged some of their primaries while they were still in the blood. These birds will be held until next spring when their feathers grow back. All the kites ate well during this period and ate an average of two pounds of B.O.P. diet a day with crickets substituted two-three days a week. This food was placed in two spots--one being the flip door and the other a metal chick feeding pan placed in the bottom of the box. Water was also provided in a plastic bowl in a corner away from the upper perches. The water was very important since they all drank from the container almost as soon as it was put in the box. During this two-week period, all of the kites' feathers became hard-penned and grew to their full lengths. By the 20th, nearly all the kite had lost their down. They also became very restless and began to dash against the vertical bars trying to get out. Perhaps they sensed that freedom was a few days away.

September 21, 1983-12:00 p.m.--Placed transmitters (provided by the Memphis Audubon Society) on two of the four kites that would be released on the 22nd. They were sewn on the two central tail feathers with a synthetic suture that would last around three months, about as long as the transmitter batteries. A drop of Super Glue was placed on each knot. These transmitters weighed a mere 7 grams apiece and their frequency numbers were 150.994 and 151.040 MHZ. Both transmitters were checked with the receiver both before and after they were put on.

September 22, 1983-12:00 p.m.--Released kites. Two kites left within thirty seconds after the door was opened. Another left after 30 minutes and the last to do so left after 52 minutes. Both transmitters were sending clearly and indicated that the birds were in some trees about 50 yards east of the hacking station.

September 22, 1983-2:20 p.m.--I scanned the area with the receiver and found one kite perched in a tree by the bird house. It soon launched into a thermal and began soaring. I could clearly see the antenna sticking out beyond its tail as it passed overhead. I picked up the signal of the other kite in a tree at the southwest portion of the Zoo.

September 22, 1983-5:00 p.m.--Scanned the area again and found both signals just south of the Birdhouse.

September 23, 1983-8:30 a.m.--I scanned the Zoo grounds and found both birds inside the Zoo again. One was in a tree by the Birdhouse and the other was in a tree at the southwest corner of the Zoo.

September 23, 1983-10:00 a.m.--Checked food pan which was left on top of the hacking box and discovered that all of the food, about two pounds, was

MISSISSIPPI KITE HACKING PROJECT, *Continued*

gone. Apparently, the kite were returning in the late afternoon to feed.

September 23, 1983-3:00 p.m.-- Scanned the area and found 151.040 within the Zoo grounds and 150.994 very faint to the southwest of the Zoo.

September 24, 1983-10:00 a.m.--I scanned the Zoo and found both signals, although 150.994 was very faint to the southwest.

September 24, 1983-10:15 a.m.-- After scanning for 15 minutes, 151.040's signal became very strong and suddenly three kites appeared, soaring together as they passed over the hacking box. Two landed, including 151.040. This bird sat in a tree on the northeast corner of the Birdhouse and stayed there for about 20 minutes. Afterwards, this bird and another that landed close by, departed for airspace north of the Zoo. I observed all three of these birds until 1 p.m.

I saw one of the untransmitted birds today make an attempt at prey. The kite was soaring about 200 feet above the western portion of the Zoo. Suddenly it folded into a 60 degree dive and began to rapidly change directions. I first thought that it was merely engaged in play but I soon saw what he was doing. Approximately 70 feet up a migrating Monarch butterfly was winging its way over the Zoo and the kite intended this migration to be the Monarch's last. As the kite closed in it looked like the butterfly was going to be the main dish. But, at the last possible instant, the Monarch "side-stepped" the kite with a move that Chicago Bears runningback Walter Payton would have been proud of. Not too ruffled by the miss, the kite flew off in search of easier prey that hasn't been reading NFL playbooks, (the immature kite showed all the grace and flashy aerobatics that the adults are known for. The birds are born graceful.). After this I went out of town for two days and was unable to track the birds.

September 26, 1983--Two Memphis Zoological Scoeity members spotted two kites soaring and calling over the Birdhouse.

September 27, 1983-9:20 a.m.--Scanned the Zoo grounds (and sky) and found nothing.

September 27, 1983-12:35 p.m.--Scanned Wolf River, north of Zoo, and found nothing in this excellent kite habitat.

September 27, 1983-1:00 p.m.-- Scanned Mississippi River south of downtown Memphis and found nothing. Apparently the transmitted birds have left the area.

September 28, 1983-- No sign of kites.

September 29, 1983--No sign of kites. In fact the species has yet to be discovered by European man. The native Americans on this date, however, named the Mississippi Kite. The Choctaws came up with the name "Umpatagalalametrohackalotta". Roughly translated the name meant "One that will someday become Endangered due to greedy land gobbling and will have to be hacked to help them out" (just seeing is anyone was still with me this far along in the report!).

September 29, 1983--Spotted an immature kite soaring over the western portion of the Zoo. It had a cloud of gnat-like Chimney Swifts following it around. This bird was visible for about 5 minutes and disappeared to the south end of the Park. It did not have a transmitter on it. This bird was seen at 10:04 a.m. and was not seen the rest of the day.

MISSISSIPPI KITE HACKING PROJECT, *Continued*

September 30, 1983-12:00 p.m.--Dave and Susan Hill of the Zoo spotted an immature kite today, possibly the same one from yesterday. It was unknown whether or not it was a hacked kite or a stranger.

October 1, 1983--No kites seen. All have left for the South.

This project was a success. Of course, the real measure of success will be determined in the spring of '84 if any of the kites return to the hacking areas. It would be interesting to see if kites could be hacked in some hilly areas, say at Land between the Lakes (Kentucky-Tennessee), and to see if an upland population of kites could be established. If so, it would probably help the kites as far as the species in Tennessee, especially if more lowland habitat is lost to agriculture. The upland population might very well carry the species.



Information Please

Would appreciate hearing from any zoos that are keeping harbor seals and sealions in fresh water. I am interested in knowing if you have had problems with loss of hair or skin diseases and what, if anything, has been done about it. Send information to: Betty Krohn, Lincoln Park Zoo, 200 Cannon Drive, Chicago, IL 60614.

Persons having experience with captive breeding of Brazilian Tapir (*Tapirus terrestris*) are urged to contact the Mesker Zoo. We are interested in factors that improve or enhance reproduction including dietary, housing, and social conditions. Please contact: Pam Rogers, Academy Keeper, Mesker Park Zoo, Bement Ave., Evansville, IN 47712.

On 1 December, 1983 our 19-year-old female Polar Bear gave birth to twins (one survived) in a recently modified den. An integral part of the den setup was a special video monitor connected via cable to our main building--a run of approximately 200 feet. As of this writing we have over 50 hours of tape tracing the development of the cub from day 1; all captive periods are taped. At present I am editing much of the footage into condensed tapes with emphasis on development/mother-cub interaction/local changes, etc. I would like to make contact with any other zoo having similar tapes to compare notes. If anybody has any footage on newborn Polar Bear cubs, please contact me at: Mike Schofield, Curator of Animals, Worcester Science Center, Worcester, MA 01604.



Legislative News

Compiled by Kevin Conway
AAZK Legislative Coordinator

FWS RECLASSIFIES THREE NATIVE SPECIES OF WILDLIFE

The Fish & Wildlife Service has recently changed the status of two native species and determined a third to be Endangered. Please update your Legislative Manual.

The Texas population of the American alligator (*Alligator mississippiensis*) has just been downgraded from Endangered to Threatened status. This action was taken because of the Texas population's recovery within most parts of its range. Biologists in Texas feel that the population has reached the maximum, or at least optimal, carrying capacity of the habitat and warrants this change in status.

The Santa Barbara song sparrow (*Melospiza melodia graminea*), which was found only on Santa Barbara Island in Los Angeles County, CA, has been removed from the Endangered Species List because of its apparent extinction. This form was common on Santa Barbara Island until a severe fire in 1959 swept much of the island; no live birds have been seen since.

The Kentucky cave shrimp (*Palaemonias ganteri*) was provided Endangered status and its Critical Habitat has been determined. This species is found only in Mammoth Cave National Park in Kentucky and is threatened by the contamination of the cave's ground water supply through improperly treated sewage from nearby communities and from toxic spills and highway runoff. Mammoth Cave is listed as the shrimp's Critical Habitat.

---A. Shoemaker in
AAZPA Newsletter, Dec. 1983

PROPOSAL TO REMOVE BROWN PELICAN IN SOUTHEASTERN U.S. FROM ESL

On 10 November, the Fish and Wildlife Service published a proposal in the *Federal Register* to remove the brown pelican (*Pelecanus occidentalis*) from the List of Endangered and Threatened Wildlife in Alabama, Florida, Georgia, South Carolina, North Carolina and points along the Atlantic coast. This proposal would not change the status in Mississippi, Louisiana, Texas, California, Mexico, Central and South America and the West Indies. The proposed change is based upon the increase in the stabilization in population numbers and productivity.

---AAZPA Newsletter, Dec. 1983

FISH AND WILDLIFE SERVICE REVIEWS THE STATUS OF THREE FISH

The status of the amber darter (*Percina antesella*), trispot darter (*Etheostoma trisella*) and reticulate logperch (*Percina sp.*) is being reviewed by the Fish and Wildlife Service to determine if they should be listed. The species are known only to be from Georgia and Tennessee.

---AAZPA Newsletter, Dec. 1983

TRADE IN PANDA SKINS REVEALED

World Wildlife Fund and IUCN have alerted the world to what may be a new threat to China's giant panda (*Ailuropoda melanoleuca*)--trade in the panda's fur. One skin reportedly was sold to a Taiwanese company for

LEGISLATIVE NEWS, Continued

US \$50,000 and then imported into Japan. Other skins are currently being offered for US \$25,000 each. This is the first solid evidence of a trade that could devastate the 400-1000 pandas remaining in the wild. In response to this dangerous new development, the People's Republic of China urges immediate inclusion of the species on Appendix I by postal procedures. The CITES Secretariat fully supports China's request. On 7 September, 1983, the panda was placed on Appendix III as an interim measure by the Chinese government.

---from TRAFFIC (U.S.A.)

LEGISLATION INTRODUCED PROHIBITING TAKING OF KILLER WHALES FOR PUBLIC DISPLAY

Several members of the House of Representatives from the state of Washington introduced legislation on 17 November which would prohibit the taking of killer whales for public display purposes. Congressman Rod Chandler authored the bill, and it was co-sponsored by Mike Lowry, Sid Morrison, Norman Dicks, Al Swift and Thomas Foley. At the press conference following the introduction of the bill, Congressman Chandler stated that the method of capturing killer whales was harmful to the population, that there is great uncertainty with reference to the size of the wild population, that the life expectancy in captivity is only four or five years, that the commercial interest in killer whales overshadows the interest in research and that after one year in captivity, killer whales become despondent and disoriented. The bill was referred to the Merchant Marine and Fisheries Committee, but no hearing have as yet been scheduled. AAZPA is not surprised at the introduction of the bill and will monitor it closely to keep our members informed.

---R. Wagner in
AAZPA Newsletter

MARINE MAMMAL PROTECTION ACT REAUTHORIZATION

The Marine Mammal Protection Act of 1972 expires on 31 October, 1984. The Act will be considered for reauthorization early in 1984. AAZPA members, in particular those who hold (or plan to hold) marine mammals in their collections, need to review the Act and its accompanying regulations. AAZPA will be involved in the reauthorization of the Act and we need your thoughts on what areas, if any, you believe need to be changed, deleted or expanded. Address comments to: Chuck Bieler, Donald Bruning, Kris Vehrs, and Bob Wagner at AAZPA.

---AAZPA Newsletter, Jan. 1984

PROPOSED ENDANGERED STATUS FOR FRESNO KANGAROO RAT AND SMOKY MADTOM

On 21 November, the Fish and Wildlife Service proposed endangered status for the Fresno kangaroo rat (Dipodomys nitratoides exilis) a small hopping mammal restricted to the grasslands in San Joaquin Valley, CA. The FWS is also proposing critical habitat of 857 acres in Western Fresno County. Most of the mammal's habitat is threatened by grazing of domestic livestock or by agricultural development. Also proposed for endangered status is the smoky madtom (Noturus baileyi), a small catfish. FWS also proposes its critical habitat. This species, thought to be extinct in 1957, was rediscovered in Tennessee in 1980. The only population known to exist is limited to a 6.5 mile area in Monroe County, TN. The species is vulnerable due to its limited distribution and its habitat could be threatened by logging activities and road construction. A June 1982 review found that almost all state agencies and federal activities located in Tennessee support the listing.

---AAZPA Newsletter, Jan. 1984



RAISED HOPE FOR SURVIVAL.....

Endangered Species Act's First 10 Years

The Endangered Species Act celebrated its 10th anniversary December 28, and Interior Secretary William Clark, speaking of the act, said, "Perhaps the most significant achievements of the Endangered Species Act are that it focused public attention on these species and established a workable government mechanism to bring about their recovery. Although we still face many difficult problems, the law has enabled some species to make significant progress toward recovery." Clark continued, saying, "As a result of the Endangered Species Act, the odds for many U.S. species are better today than they were 10 years ago."

The act directs the government to keep a list of species considered "endangered" and those that are slightly less imperiled, called "threatened," and authorizes programs to protect them, ranging from biological research to prosecution of people who kill or traffic in endangered species. It also authorizes DOI to hold up any projects requiring a federal permit which might "jeopardize the continued existence of" vanishing species, and creates federal grants to foster state protection programs.

One of the act's major accomplishments has been the successful involvement of state and federal agencies in endangered species conservation, with thousands of consultations having been held between Federal Wildlife Service and other federal agencies under a provision of the law designed to prevent projects from jeopardizing the survival of endangered species.

Victories under the act--the whooping crane, the Aleutian Canada goose, the bald eagle comeback in several states due to research and the ban on DDT, the survival of the manatee despite threats to Florida estuaries, the rallying of an obscure green parrot whose habitat was nearly wiped out in Puerto Rico, a rare primrose holding on in the Antioch Dune--are important but tiny in a global context. World Wildlife Fund scientist Thomas Lovejoy said, "We know we're not just talking about a whooping crane here and a white rhinoceros there, but a potential biological transformation of the planet unequalled perhaps since the disappearance of the dinosaur."

Nearly a species a day is lost to development in southeast Asia, Africa, and South America's rain forests. The chief cause of extinction is destruction of habitat and the trend in the United States is also serious. Twenty-two animal species became extinct in the U.S. between 1700 and 1920; in the next 50 years, the toll was 25.

The list of threatened and endangered species has grown to include 300 American species and 438 from foreign countries. The Smithsonian Institute reports 1,800 plants alone in enough peril to qualify for listing. Some scientists estimate there could be 2 million species lost by the year 2000, mostly because of man's intrusions into nature's environment. International efforts to control trade in rare species, law enforcement, and recovery programs are growing.

The increased need for the act does not take away from the successes it has spawned. The bald eagle population, about 3,000 in 1970, is now estimated at 5,000. The Puerto Rican parrot, numbering 14 in 1975, is now up to 40. Through experiments at the Patuxent Wildlife Research Center in Laurel, MD, done with its near-twin the Andean condor, the California condor may survive. The bird's decline has halted for the first time in

ENDANGERED SPECIES ACT'S FIRST 10 YEARS, *Continued*

several decades, and condors now number about 20 in the wild and 9 in captivity, some of which will be released into the wild in 1985.

The whooping crane, counted at 15 in 1974, now numbers 148. The Aleutian Canada goose, in decline after Arctic foxes were introduced to its nesting habitat in the Aleutian Islands, now numbers 3,500, up from 800 in 1975. DDT so devastated the American peregrine falcon that it no longer nested east of the Mississippi, but with assistance from state and federal wildlife agencies, the Peregrine Fund, and falconers, peregrines have been bred in captivity. Since 1975 nearly 1000 such peregrine offspring have been returned to the wild and once again nest in habitat where none had nested for 30 years.

The black-footed ferret, considered extinct as recently as 1981, was rediscovered that year when the body of one was found apparently killed by a rancher's dog. Since then 88 ferrets have been counted around 18 Wyoming prairie dog towns. The Delmarva fox squirrel, one of the first mammals to be listed as endangered, has been translocated by FWS in cooperation with biologists from Maryland and Virginia wildlife agencies, to reestablish breeding populations, and is now doing quite well. Perhaps most remarkable of all, the American alligator has made so strong a comeback that most estimates place the total U.S. alligator population at more than 2 million, and FWS, with the support of conservationists will now approve alligator hide exports through 1985, rather than on a year-by-year basis.

The Endangered Species Act has also achieved broader objectives. The law embraces not only mammals, birds and other vertebrates, but plants and creatures without backbones such as insects, crustaceans and mollusks. The law also strives to conserve the ecosystems on which endangered and threatened species depend.

A desert wetland at Ash Meadows, NV, supports two fishes listed as endangered and seven plants and one insect that have been proposed for listing, but until recently, the species' survival was threatened by construction of a housing development. Congress has now appropriated funds to preserve this unique area as a national wildlife refuge. And several western trout (California's Paiute cutthroat, Colorado's greenback cutthroat, and Arizona's Apache trout) were reclassified from "endangered" to "threatened" status during the 1970's as a result of habitat restoration, elimination of introduced, competing trout species, and hatchery rearing and restocking programs.

According to Clark, "One of the greatest obstacles to saving many species is our lack of knowledge about them. But biologists have learned a great deal in the past 10 years and these advances will continue."

To many environmentalists, much of the act's importance lies in the implicit warning to humans that if man's works are making the planet unlivable for so many species, at what point could it become unlivable for man as well?

*from ECOLOGY USA
January 16, 1984*





Riverbanks

Southeastern Regional AAZK Conference

April 19, 20-21, 1984 Columbia SC.

The Riverbanks Southeastern Regional AAZK Conference will be held April 19-21, 1984 at the Riverbanks Zoological Park, Columbia, SC.

FINAL CALL FOR PAPERS--Each paper will be limited to 20 minutes with a 5 minute question/answer period. Topics should pertain to zoos and zoo-keeping. Abstracts or outlines should be submitted by March 1, 1984. The conference registra-

tion fee will be reduced for those people presenting papers.

Tentative Conference Schedule

<u>Thursday, April 19</u>	<u>Friday, April 20</u>	<u>Saturday, April 21</u>
Registration	Announcements/Welcome	Presentation of papers
Icebreaker	Tours of Riverbanks Zoo	Presentation of keynote speakers
	Presentation of papers	Bar-B-Q Supper/Volleyball game
	Presentation of keynote speakers	Auction/Party
	Workshop/Discussion	

Sunday, April 22 -- Post-conference trip to Congaree National Monument

Tentatively scheduled keynote speakers include: Bill Ziegler, General Curator, Miami Metrozoo; Guy Smith, Director, Knoxville Zoo; Dr. Joe Erwin, Curator of Primates, Brookfield Zoo; Les Schobert, General Curator, North Carolina Zoological Park; Dr. Kenneth Gould, Head of Reproductive Physiology, Yerkes Primate Center, Atlanta, GA and Al Valenzuela, Curator, St. Catherine's Survival Center, GA.

Please make checks payable to: "Riverbanks Zoo AAZK Chapter". Send papers completed registration forms with the registration fee to: Stephen J. Dank Riverbanks Zoo AAZK Chapter, 500 Wildlife Parkway, Columbia, SC 29210.

Registration Form

Name: _____
 Address: _____
 City: _____
 State: _____ Zip code: _____
 Phone No: () _____
 Name of Zoo: _____
 Area of interest: _____
 No. attending BBQ/Conference: _____
 Vegetarian: YES NO
 Transportation: _____
 FEES:
 Member or spouse -- \$25.00
 Non-member -- \$30.00
 Late registration fee after
 3/1/84 -- \$5.00 additional
 TOTAL fees enclosed: \$ _____

Hotel Reservation Request Form Riverbanks Southeastern Regional AAZK Conference

Name: _____
 Address: _____
 City: _____
 State: _____ Zip code: _____
 Phone No.: () _____
 Arrival Date: _____ Time: _____
 Departure Date: _____ Time: _____
 Total No. of Nights in Hotel: _____
 Please check the type of room you wish to reserve:
 _____ Single \$20.95 daily
 (one person)
 _____ Double \$24.00 daily
 (two people)

Name of roommate: _____
 Please send one night's deposit with this form to: COMFORT INN, 827 Bush River Rd., Columbia, S.C. 29210, care of J.K. Mehta. Deposits will be returned on reservations cancelled 24 hours in advance of arrival.

LIMITED EDITION

SPECIAL COMMEMORATIVE AKF TENTH ANNIVERSARY T-SHIRT

ANIMAL KEEPERS' FORUM



Dedicated to Professional Animal Care

TENTH ANNIVERSARY

1974 - 1984

AKF will be ten years old in October 1984. To commemorate ten years of continuous publication, a special T-shirt is being issued.

The Puget Sound AAZK Chapter has taken this on as a fund-raising project for the 1984 AAZK Conference. All profits will benefit the Conference and AKF.

The T-shirts will only be available from October 1983 through October 1984. A check must accompany your order. Please allow 3-4 weeks for delivery. The price of \$7.50 each includes postage and handling. The shirts are 100% cotton; if you wash or dry at high temperatures, order a size larger.

AKF COMMEMORATIVE T-SHIRT ORDER FORM

NAME: _____

ADDRESS: _____

Color choice: ___ powder blue ___ beige

Size: ___ Small ___ Medium ___ Large ___ Extra Large

Make checks payable to: The Puget Sound AAZK Chapter Conference Account
Mail to: Woodland Park Zoological Gardens, 5500 Phinney Ave., N., Seattle,
WA 98103. ATTN: Judie Steenberg

TOTAL AMOUNT ENCLOSED \$ _____

The following "Positions Available" listings were received at the office of AKF. 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.

ZOOKEEPER I...Due to major expansion of our zoological park, the Jackson Zoo is NOW accepting applications for the entrance level of Zoo Keepers. Salary range \$893-\$1,298 per month. Standard benefits. Duties include the general care and maintenance of a wide variety of mammals, birds and reptiles. Applicants must have a high school education and some practical experience is necessary. This is an excellent opportunity to be part of a progressive, expanding zoological park. Certified candidates will remain on an active list for six months. Send resume to: James L. Swiger Director, Jackson Zoological Park, 2918 West Capitol Street, Jackson, MS 39209.

KEEPER...responsible for care of small mammal and bird exhibits at Point Defiance Zoo and Aquarium. Exhibit fabrication and design experience helpful. Salary \$18,645. Send resumes by April 1, 1984 to: Personnel Director, 10 Idaho Street, Tacoma, WA 98409.

ANIMAL KEEPER...temporary position from April 1 to end of October. Responsibilities include care of collection of mammals, birds and reptiles, with related tasks of building and repairing cages and enclosures. Must be able to work with a minimum of supervision and be willing to learn to give animal talks to groups of visitors. Some experience in a zoological setting required. Salary \$4.50/hour to start. Send resume to: Vince Hall, Claws 'N' Paws Wild Animal Park, RD 1, Lake Ariel, PA 18436.

ZOOKEEPER...responsible for care/maintenance of reptile collection. Experience with felines/primates also desired. Salary range, \$13,619 to \$16,456, plus benefits. Contact City Personnel Department, City Hall, 830 Boonville, Springfield, MO 65802, or call Paul Price, Dickerson Park Zoo, (417) 833-1570. Deadline, 30 March 1984.

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MOVING?????

Please send complete name and address changes to:

Dolly Clark, Administrative Secretary
AAZK National Headquarters
635 Gage Blvd.
Topeka, KS 66606

Delays in sending address changes directly to AAZK Hdqts. may cause you to miss several issues of AKF and other AAZK mailings and also costs the association 25 cents postage due on each item returned due to an old address. Please help!

AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

- | | |
|--|---|
| <p>_____ \$20.00 Professional
Full-time Keepers</p> <p>_____ \$25.00 International
All members outside the
U.S. and Canada</p> | <p>_____ \$10.00 Associate
Individuals not connected
with an animal care facility</p> <p>_____ \$15.00 Affiliate
Other staff and volunteers</p> <p>_____ \$50.00 Contributing
Organizations and Individuals</p> |
|--|---|
- 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, 535 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.

AMERICAN ASSOCIATION

of Zoo Keepers
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Topeka, KS 66606

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Animal Keepers' Forum



Dedicated to Professional Animal Care

APRIL 1984



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

APRIL 1984
 VOLUME ELEVEN
 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:

AMERICAN ASSOCIATION OF ZOO KEEPERS, INC.
 NATIONAL HEADQUARTERS, 635 GAGE BLVD., TOPEKA, KS 66606
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<u>Animal Data Transfer Forms</u> Bernie Feldman, Topeka Zoo	<u>Biological Values Booklet/Gestation</u> Mary Mure, San Francisco Zoo
<u>Program Library</u> Anne M. Payne, Detroit Zoo	<u>Diet Notebook</u> South Florida Chapter, Miami
<u>Infant Development</u> Steve Taylor, Louisville	<u>Membership Directory</u> Pat Sammarco, Lincoln Park
<u>Keeper Accomodations List</u> Oliver Claffey, Metro Toronto	<u>Exhibit Design</u> Diane Forsyth, Akron Zoological Park
<u>Keeper Data Survey</u> Mary Slaybaugh, San Antonio & Dave Orndorff, Sea World Shark Institute	

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Joanie Stinson	Phoenix Zoo	CA, NV, AZ, UT, HI
Vacancy		Canada

This month's Keeper/Artist is Beth Poff, Head Animal Keeper at the Mill Mountain Zoo in Roanoke, VA. Her drawing features "Sampson", a two-month-old female squirrel monkey with its mother. Thanks, Beth!

Scoops and Scuttlebutt

DIET NOTEBOOK Project Update

The Diet Notebook is being developed as reference material for keepers and all others interested in caring for exotic animals. When enough information is collected, it will be presented in loose-leaf fashion which will allow the periodic addition of new material.

Response forms are ready now and can be obtained from the South Florida Chapter, Little Rock Chapter or Sedgwick County Zoo Chapter (addresses below). Little Rock has been appointed as the Bird Collection Center and Sedgwick County as the Mammal Collection Center. For the time being, South Florida will handle reptiles, amphibians and invertebrates (also fish). If anyone is interested in handling reptiles, amphibians, invertebrates or fish--please contact the South Florida Chapter.

Please type or print information on the response form using metric units whenever possible. Also please refer to the ISIS or IUCN listings for scientific names. When forms are complete please send them to the appropriate Collection Center.

BIRD COLLECTION CENTER: Kelli Westbrook
Little Rock Chapter AAZK
#1 Jonesboro Drive
Little Rock, AR 72204

MAMMAL COLLECTION CENTER: Terrie Correl
Sedgwick County Zoo AAZK
5555 Zoo Boulevard
Wichita, KS 67212

ALL OTHERS: South Florida Chapter AAZK
c/o Debbie Burch
17860 SW 112 Court
Miami, FL 33157

PLANT RESEARCH PROJECT

The Woodland Park Zoological Gardens' Plant Research Team is working on a project to identify which species of plants and animals are being successfully interacted in zoo exhibits. Members of the team are: Keepers Gregg Thompson, Chuck Harke and Judie Steenberg; Horticulturist Sue Maloney; and Gardner Aides Kathy Long and Elsa Steele. An interest survey and letter was mailed to the Directors of the Zoos represented on the Association of Zoo Horticulture mailing list and the majority of zoos listed in the AAZPA Membership Directory. If you are interested in participating in this project as a zoo or as an individual working within your Zoo's operation, but did not receive the interest survey, please contact:

Chuck Harke/Sue Maloney (206) 625-5498 or 625-2140
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103

SCOOPS AND SCUTTLEBUTT, Continued

NOTE FROM THE CHAPTER AFFAIRS COORDINATOR

Newly appointed Chapter Affairs Coordinator Lee Payne of the Detroit Zoo wishes to let all Chapters know that this position has again become active and that he is catching up on past correspondence as quickly as possible. A delay in the transfer of files and pending correspondence has contributed to a bit of a backlog, so please be patient. Lee is eager and willing to assist in your Chapter formations, questions, etc. and will be corresponding with individual chapters in the near future. In the meantime, watch for next month's AKF which is scheduled to have an article by Lee updating Chapters on their role in the AAZK organization.

AAZK EXPRESS TRAIN PROPOSED FOR SEATTLE CONFERENCE

Ken Guillaume of the Minnesota State Zoo is looking into schedules, rates, and perhaps a group deal in train travel to the Seattle National Conference. If others are interested, contact Ken. We may be able to arrange an "AAZK Express", maybe starting at the East Coast and adding members at cities on the route. Ken's preference is for the especially beautiful Canadian route. If there is reply enough, another "AAZK Express" could start its course in the Southeast. Please contact Ken to indicate your interest or to learn more. His address is: c/o Minnesota Zoological Gardens, 12101 Johnny Cake Road, Apple Valley, MN 55124.

from the President

The Only Constant Is Change

AAZK has a new International Affairs Coordinator and a new Program Library Project Head. Connie Cloak, who recently served as an AAZK Board member, will replace outgoing IAC Randy Adolph from the St. Louis Zoo.

At the same time, Mike Crocker has resigned as Program Library coordinator. Anne Payne at the Detroit Zoo will be replacing Mike and the Program Library will be moving to Detroit.

Any member wishing to help Connie or Anne with their projects, or wishing information about the projects should contact them directly:

Connie Cloak
International Affairs Coordinator
1032 Granada Ave.
Nashville, TN 37206

Anne Payne
Detroit Zoo
P.O. Box 39
Royal Oak, MI 48068

On behalf of the Board and all AAZK members I want to express my sincere thanks to Randy and Mike for all their efforts while they headed these projects.

Kevin Conway
Kevin Conway
AAZK President

Letters To The Editor

Dear Editor:

After renewing my membership in the AAZPA for the year of 1984, I received a "thank you" form letter from Robert Wagner (Executive Director). In it he states: "In our endeavor to better serve you, we would appreciate receiving any comments you may have for the betterment of the Association." I hope all AAZK member keepers who are also AAZPA Associates took this opportunity to remind the AAZPA of the inappropriateness of including us in the Associate member category, as it includes all non-zoo people as well.

I feel that we, along with other non-management zoo professionals (such as zoo veterinary technicians) should be classed differently. The membership categories in AAZPA seem to need revision. It may have a greater effect if these comments came from the AAZPA's own membership as opposed to coming from the board of an entirely separate organization (i.e. AAZK).

Sincerely,

Jay Jansan, Keeper
Turtle Back Zoo
West Orange, NJ

Dear Editor,

I am writing in regards to Ms. Rachel Roberts' fine paper "The Birth and Development of a Lar or White-Handed Gibbon", which appeared in the Special Edition from the AAZK National Conference 1983, Animal Keepers' Forum. According to recent findings (Prouty, Buchanan, Pollitzer, and Mootnick [1983], "Bunopithecus: A Genus-Level Taxon for the Hoolock Gibbon (Hylobates hoolock)", in the American Journal of Primatology 5:83-87, I would like to update Ms. Roberts' paper with the following.

In 1983 we announced in two separate papers that the Hoolock gibbon has 38 chromosomes not 44 as previously mentioned in past text. With this evidence and along with other morphological traits compared with those of the lar-group gibbons, we proposed that the Hoolock gibbon be placed into a new sub-genus, Bunopithecus.

<u>GENUS</u>	<u>SUB-GENUS</u>	<u>SPECIES</u>	<u>SOURCE</u>
<u>Hylobates</u>	<u>Nomascus</u>	<u>concolor</u>	Prouty, Buchanan,
	<u>Symphalangus</u>	<u>syndactylus</u>	Pollitzer and
	<u>Bunopithecus</u>	<u>hoolock</u>	Mootnick
	<u>Hylobates</u>	<u>klossi</u>	
		<u>pileatus</u>	
		<u>lar</u>	
		<u>moloch</u>	
		<u>agilis</u>	
		<u>muelleri</u>	

Whereas Ms. Roberts states, "3 genera and about 9 species"--the Hylobates is made up of some 7 species of gibbon within 3 subgenera; Hylobates, Bunopithecus, and Brachitanytes.

LETTERS TO THE EDITOR, *Continued*

I hope this information and the reference titles below will be of help to your journal and will aid in our understanding of the gibbon.

Haimoff, E. (1983). AAZPA Regional Conference Proceedings.

Groves, C.P. (1972). Gibbon and Siamang (d. Rumbaugh, ed), vol. 1 Krager, Basel.

Preushoft, H., Chivers, D., Creel, N., & Brockelman, (eds). (1984). In The Lesser Apes; Evolutionary and Behavioral Biology. Edinburgh University Press, Edinburgh.

Sincerely yours,

Alan Mootnick, Director
Gibbon and Gallinaceous Bird Center
Saugus, CA



Coming Events

AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 29-May 1, 1984

Philadelphia, PA

CONFERENCE ON ZOO ANIMAL PATHOLOGY

May 25-26, 1984

Cincinnati, OH

For information contact: Dr. Betsy Dresser, Cincinnati Zoo, 3400 Vine St., Cincinnati, OH 45220 (513) 281-4701.

10TH ANNUAL CONFERENCE OF THE AMERICAN FEDERATION OF AVICULTURE

August 1-5, 1984

Redondo Beach, CA

For information, write AFA, PO Box 1568, Redondo Beach, CA 90278 or call (213) 372-2988.

1984 AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at the Woodland Park Zoological Gardens, 5500 Phinney Avenue North, Seattle, WA 98103. See further information on pages 104-108 of this issue of AKF.



Births & Hatchings

MIAMI METROZOO.....*Lori Bruckheim*

February 1984 B&H at Miami Metrozoo include: Mammals - 0.1 Thomson's gazelle, 1.0 Nile Lechwe, 0.1 Grevy's zebra, 1.1 Malayan sunbear, 1.0 Ringtail lemur (1.0 DNS), 2.1 Chinese golden wolf, 0.1 Reticulated giraffe; Birds - 0.0.1 Grosbeak starling.

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

Included in the February 1984 B&H are: Mammals - 0.0.1 Orang-utan (hybrid), 1.0.3 Central American agouti; Birds - 0.0.1 Double-striped thick-knee.

TAMPA/BUSCH GARDENS.....*Sandy Moher*

B&H for February 1984 include: Mammals - 1.1 Addax, 1.0 Gemsbok, 3.0 Thomson's gazelle, 0.0.1 Guinea (Western) baboon, 0.1 Dama gazelle, 1.0 Scimitar-horned oryx, 1.0 Dorcas gazelle; Birds - 11 Sun conure, 4 Black-masked lovebird, 1 Fischer's lovebird, 6 Jandaya conure, 3 Alexandrine ring-necked parakeet, 3 Chilean pintail, 1 Cockatiel, 2 Golden-capped conure, 6 Red-necked pochard, 3 Cereopsis goose, 2 Forsten's lorikeet, 4 Black swan and 2 Blue and gold macaw.

BRONX ZOO.....*Margaret Price*

January 1984 B&H include: Mammals - 2.0 Axis deer, 1.0 Sambar deer, 3.0 Pen-tailed bettong, 3.2 Nyala; Reptiles - 1 Travancore tortoise and 1 Forest cobra.

DALLAS ZOO.....*Tami Jones*

February 1984 B&H include: Mammals - 0.0.1 Red kangaroo, 0.1 Grevy's zebra, 0.1 Dama gazelle, 0.1 Klipspringer, 1.0 East African oryx, 0.1 Axis deer, 1.1 Suni; Birds - 0.0.1 Plum-headed parakeet, 0.0.1 Double-striped thick-knee.

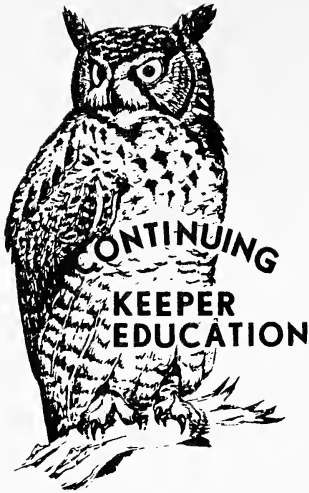
BROOKFIELD ZOO.....*John S. Stoddard*

B&H during the month of February 1984 include: Mammals - 0.0.9 White-toothed shrew, 0.0.2 Fruit bat, 0.0.5 Spiny mouse, 0.0.9 Degu, 0.2 Col-lared peccary, 0.0.2 Golden lion tamarin, 0.0.1 Silvered leaf monkey (1st Brookfield birth), 0.0.2 Callimico (Believed to be the first recorded birth of twins in captivity. One only survived for three days); Birds- 0.0.2 Red and white crane, 0.0.2 Robin chat (fledged) and 0.0.1 Inca tern.

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

January/February 1984 B&H include: 0.0.2 Vampire bat, 0.0.3 Tree shrew (DNS), 0.0.2 Japanese macaque, 0.0.1 Thomson gazelle and 0.0.1 Cordon bleu.





What's Your Zoo Doing About Continuing Keeper Education?

By
*Judie Steenberg, Coordinator
 AAZK Education Committee*

What's happening at your Zoo in the area of Continuing Keeper Education? Last year this column had several articles about what individuals and institutions were doing to accomplish this goal. We would like to publish more articles in AKF this year to share ideas and programs. What effort is being made at your zoo? Do you have workshops - speakers - training sessions - special training - paid leave or reimbursement for classes? You don't have to have

a formal training program to have information to share. Let me know what's happening at your Zoo. This column is for sharing ideas and information regarding Keeper training.

PHILADELPHIA CONFERENCE SURVEY RESULTS

A questionnaire was distributed at the Philadelphia Conference by the Education Committee; the same survey was printed in AKF at a later date. A total of 32 Keepers completed the survey; 20 zoos were represented. Following are the results of the survey.

1. "Have you read the 'Continuing Keeper Education' column in AKF this past year?" 24 YES 3 NO 5 no answer

The 24 "yes" replies all indicated that they found the column informative. Comments and suggestions for future articles were:

- have more complete updates on projects more often
- more involvement from smaller zoos
- want to know more about what other zoos are doing
- include complete addresses so one can aid programs that need assistance
- kept me up to date with what AAZK is doing and what programs other zoos have

2. "Does your Zoo have any of the following audio-visual equipment?"

	<u>Yes</u>		<u>Yes</u>
video recorder	- 19	video camera	- 20
movie projector	- 25	movie camera	- 10
slide projector	- 29	tape recorder	- 21
computer equipment	-11		

3. "Does your Zoo have a library?"

24 YES 3 NO 5 n/a

"Does it have literature on Keeper training and/or animal management?"

27 YES 5 NO

References listed:

- Crandall's - Wild Mammals in Captivity
Walker's - Mammals of the World
Hediger's - Wild Animals in Captivity
 - The Psychology and Behavior of Animals
 in Zoos and Circuses
 - Man and Animal in the Zoo
Fowler's - Restraint and Handling of Wild and
 Domestic Animals
Karsten's - Safety Manual for Zoo Keepers

Animal Keepers' Forum and Grzimek's Animal Life Encyclopedia were also listed as well as in-house manuals and guidelines, various materials from other zoos and handouts from staff classes.

4. "Which of the following basic Keeper training videotapes would you like to see produced?" (selections were numbered in order of preference from 1 - 10 and scored on a point system - total points for each topic are in parentheses.)

1. Keeper's role in zoo animal health (225)
2. Feeds and feeding (179)
3. Exhibit maintenance (147)
4. Parasitology (122)
5. Communications and records (121)
6. I.D. and marking (116)
7. Sanitation and pest control (101)
8. Additional safety tapes (78)
9. Tool use and storage (52)
10. Other categories suggested:
 - animal transportation
 - introductions
 - reproduction and incubation
 - dealing with the public
 - aquarium water quality and control
 - inbreeding
 - exhibit building
 - manual restraint

Thank you to all who took the time to fill in the questionnaire. Please send all information for the Continuing Keeper Education column to:

Judie Steenberg
9550 2nd Avenue N.W.
Seattle, WA 98117



AAZK AWARDS DEADLINE IS JUNE 1

Nominations are being sought for 1984 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 1984 AAZK Conference in Seattle.

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, 1984

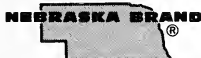
Send nominations to: Mike Crocker, AAZK Awards Committee, Dickerson Park Zoo, 3043 North Fort, Springfield, MO 65803.





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Keepers and Computers...Part Three

SORTING IT ALL OUT: OR, YOU'RE NEVER OUT OF SORTS WITH A COMPUTER BY YOUR SIDE

By

Jim Albert

*Colony Manager, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX*

Last time, I wrote about buying a cheap computer. Now, I'd like to start addressing uses for a computer. If you already own a computer, your appreciation of this article will be considerably enhanced; however, if you don't have one, you may find here some more justification for investing in one, or at least some increased tolerance for co-workers who mumble on about 'for-next loops' at break time.

A group of animals may be characterized in many different ways. Age and sex are obvious categories, but others include reproductive history (or lack of it), weight and other size measures, health status, lineage membership, and so on. When information about an animal, such as that mentioned above, is combined with identification data, such as a name, acquisition number, ISIS number, or whatever, and entered into a computer, it constitutes a 'case'. A group of cases is usually called a 'file', and is saved for future use on the storage medium available--frequently disks, but for the average zookeeper, the much cheaper cassette recorder is a slower but affordable medium.

To be sure, sorting can be done by hand, using information on index cards. However, imagine that you have a file that contains 150 cases; and you want to list all females (criterion #1: sex) above the age of three years (criterion #2: age) that haven't reproduced (criterion #3: reproductive history) in spite of being housed in an appropriate social group (criterion #4: housing). Once the computer has read the file, it takes only seconds to print out on the TV screen the desired list; and the search parameters can be easily changed, so that other, contrasting lists can be quickly generated. I think you'll agree that this would be a tedious, time-consuming job by hand.

I'd like to illustrate computerized sorting of cases by using a couple of primate examples. I used my Sinclair ZX-81, so the programs were written in ZX-BASIC. The information was stored on a cheap cassette recorder and output was to a small black-and-white television.

The primate behavior research lab where I work houses 70 monkeys of four species in one single-taxon and three multi-taxa groups. I use my computer to keep track of general inventory, note lost ID tags, and calculate optimum food distributions. Each case consists of the number in the file of the case, the animal's name, tag, and sex, its date of birth and mother's ID, its group and species identities. This is entered in response to the questioning of an entry program, and is stored such that each piece of information is in a specific column; date of birth is found in columns 22 through 28 of each case, for example. To search for animals born in April (our busiest month for births), I would have the computer look at columns 24 to 26 (month) to see if a 'apr' was there; if it was, it would print out the entire case history. In BASIC this goes something like this, where D\$ is the array of cases, I is a case number, and L is the total number of cases:

KEEPERS AND COMPUTERS...Part Three, Continued

```
100 FOR I = 1 TO L
110 IF D$(I,24 TO 26) = 'APR' THEN PRINT D$(I)
120 NEXT I
```

If you just wanted to count the number of births in April, you could change line 110 to:

```
110 IF D$(I,24 TO 26) = 'APR' THEN LET TOTAPR = TOTAPR + 1
```

and add a line before line 100 that says LET TOTAPR=0, and add one after line 120 that says, PRINT 'NUMBER OF BIRTHS IN APRIL = TOTAPR.

More than one search criteria can be incorporated into one line, thus:

```
110 IF D$(I,24 TO 26) = 'APR' and D$(I,31 to 32) = 'SV' THEN PRINT
D$(I). This would list the cases that have birth dates in April and live
in the South Vervet group.
```

Sound confusing? To simplify a little, we're dealing here with a string array -- a two-dimensional grouping of letters and numbers used as symbols -- whose name is D. The fact that it contains string data is reflected by the dollar sign after its name: D\$. The letter 'I' is a control variable, that as the computer goes through the 'for-next loop' assumes all the case number values from one to how many you have (which, for convenience, is stored as variable 'L'). PRINT D\$(35) would set you the thirty-fifth case record; you specify parts of it by putting column numbers after the case number, so that PRINT D\$(35,5 TO 16); D\$(35,24 TO 26) would print out on the screen the name of the animal in case number thirty-five, followed directly on the same line (the semi-colon tells the computer to do so) by the month of birth. Hopefully, this helps you understand what's going on some, but there's something to muddy the waters a bit: the notation used by ZX-BASIC isn't standard. Users of other machines probably need to translate to MID\$(D\$(35),24,26) from D\$(35,24 TO 26).

One of my favorite groups of primates are the colobine (leaf-eating) monkeys of Asia, a generally understudied group that is poorly represented in American zoos. The ISIS listings are useful, but too long for comfortable mental juggling of who's where. I copied the Asiatic colobine section of the ISIS Species Distribution Report into my computer, using abbreviations for both species and zoo to save space (and typing!). So, PRESBYTIS OBSCURA FLAVICAUDA becomes PREOBSFLA, and the zoo's name sets bent to fit 10 spaces, like JXN ZP MS for Jackson Zoological Park in Mississippi. Each individual animal once again constitutes a case, with age and sex information. Simple BASIC routines allow listing by species, zoo, age, or sex, or any combination of these. This can give an easily seen picture of the overall population.

My sort programs generally have three parts: first, I identify the file, then list array dimensions and 'initialize' certain counting variables (set them equal to '0'), plus put in 'comment' lines (called REM statements in BASIC) that do nothing in the program, but tell necessary things like what is in what column. The second part is an input routine that aids entering information into the file. The final part is an easily modified search and/or count routine. Actual listings of such programs isn't practical here for space reasons, but I am willing to share what I've done if people will write and ask. I can try to adapt them to your computer if it's different from mine, and if you have other troubles will try to help.

It goes without saying that there is an enormous amount of information involved in a zoo operation. The modern, small, inexpensive computer offers a practical way to make sense of lots of information. Sort programs based on two-dimensional (case by column) strong arrays and a column-consistent form of data storage are easy to write and use. They can be extremely useful in such keeper-related tasks as food distribution, such management functions as assessment of collection reproduction patterns, and in curiosity-satisfying ways as well. I hope that all of you who have computers put them to use in this way, and that those of you who don't might find this very useful ability further reason for considering obtaining a computer for yourself.

Finally, I would once again offer to field your questions. You can write to me at The Department of Anthropology, University of Texas at Austin, Austin, TX 78712. I'd like to thank the people who've written so far, and assure them that personal replies are in the making.

Next time, in contrast to this installment, where the only math was the adding of a 1 to a variable, I'll take up the subject of statistics. Stats, like computers, are much easier to learn than most people realize, and I think you'll be pleasantly surprised.



Primate Profiles

MONKEY MUNCHIES

By

Judy Sievert, Primate Keeper

and

*Diana Lyster, Assistant Primate Keeper
Woodland Park Zoological Gardens, Seattle, WA*

We developed a treat food for our primates at Woodland Park Zoological Gardens using the leftover "dust" in bags and barrels of Monkey Chow. After looking through natural food cookbooks, we found a bar cookie recipe which could be adapted. We substituted Monkey Chow "dust" for flour and left out salt, spices and sugar. All the food ingredients are regular food items and therefore are available from our commissary. We are pleased that our primates enjoy this new treat. For primate keepers who are interested, here is the recipe.

Monkey Chow Bars

1½ cups mashed bananas	1 Tablespoon baking powder
2 eggs	1 Teaspoon baking soda
¼ cup oil	½ cup chopped peanuts or other nuts
½ cup milk or water	½ cup raisins
2 cups Monkey Chow "dust"	

1. Blend bananas, eggs, oil, milk or water until smooth.
2. Stir together all remaining ingredients; make a deep well and pour in blended mixture. Combine mixtures.
3. Pour the batter into two 9" x 9" well-oiled pans. Bake at 350°F for 35 minutes.
4. Cut into bars while still warm.



ELEPHANT CRISIS DEEPENS

The huge wilderness area of southern Sudan and the adjacent grasslands of Zaire and the Central African Republic are now littered with the bones of tens of thousands of slain elephants, victims of Africa's most intensive ever poaching campaign. Since 1980 gangs of elephant killers, ranging far and wide across this thinly populated territory and armed with automatic weapons (Russian Ak-47s and West German G-3s) have been on the rampage. The herds are now decimated.

In the 4-year period 1979-82, the tusks of some 107,000 elephants left Sudan by one escape route or another. Although this figure represents about 80% of Sudan's elephants, much of the ivory bearing a Sudanese label almost certainly originates from across the border in Zaire or the Central African Republic, or, further afield, Tanzania. Two well-connected traders have no apparent difficulty in obtaining "legitimate" export documents from the Sudanese government.

Elsewhere in Africa the situation is not much better. Elephant expert Ian Douglas-Hamilton says that indiscriminate slaughter is on the increase nearly everywhere. From the trade statistics, IUCN (International Union for Conservation of Nature) estimates that at least 194,000 elephants--or close to 20% of Africa's total population--were killed during the three years 1980-82.

That the scale of the slaughter is fast leading to the extermination of the elephant is shown by the rapid fall in tusk weight as measured in Hong Kong and Tokyo, the two main centers of trade. In Hong Kong the average weight is down from 18.17 lbs in 1979 to 11.85 lbs in 1982; in Tokyo, where larger tusks are preferred for carving, the comparable drop has been from 34.83 to 21.34 lbs. It is clear from these figures that older elephants--those mature enough to breed--are becoming increasingly scarce.

With ivory ("white gold") commanding a price of around \$35 a pound--as against \$3 a pound in 1970--corruption at all levels is widespread. In many countries, including Sudan, the anti-poaching squads, however brave and dedicated, have small chance of finally defeating the highly organized and "highly protected" gangs of poachers.

"It's a disaster; the only thing left is to put the elephants in parks and sanctuaries," says Douglas-Hamilton. But will even this be enough to staunch the flow of precious life-blood from the species *Loxodonta africana*?

---The Animal Welfare Institute Quarterly
Vol. 32, No. 3, Fall 1983

Veterinarians and Keepers.....

Captive Reproduction Of Broucket Deer

By
Michael L. Hughes, D.V.M.
Gladys Porter Zoo
Brownsville TX

In recent years zoos have become more conscious of the need to have the animals in their care produce offspring. Captive reproduction will allow zoos to display animals that are difficult to obtain and possibly to restock wild habitats with surplus captive-born animals. For some species facing extensive habitat destruction, the captive environment may be their only chance for survival.

First efforts to improve captive reproduction involved relatively simple and common sense procedures such as providing more suitable environments, experimenting with new diets, experimenting with the numbers of animals kept together, changing photoperiods, and in some cases simply placing males with females.

As time passed, zoo managers sought other methods to improve reproduction of the more difficult species in their collections. Zoo workers began looking to domestic animal practices for possible answers to some of their reproductive problems. Procedures such as electroejaculation, artificial insemination, superovulation, induced ovulation, and embryo transfer, all commonly used in domestic species, have been experimented with in zoo animals with limited but increasing success.

At the Gladys Porter Zoo we have had a group of Brown Broucket Deer that has had limited reproductive success. About three years ago our only proven breeding male died, leaving us with one male of questionable fathering capabilities. This buck was put in with four females for 2½ years, and no fawns were produced. In order to solve this reproductive problem, we decided first to determine if both male and females were fertile. To check the buck's sperm production we needed to collect a semen sample. An electroejaculation machine purchased by Mrs. Ila Loetscher of Sea Turtles Inc., was used to accomplish this. The Zoo veterinarian has been working with Mrs. Loetscher and others attempting to induce breeding in captive Ridley Sea Turtles. When the machine was not being used on sea turtles, Mrs. Loetscher has generously allowed it to be kept and used by the Zoo. The male deer was anesthetized, and by using the machine a semen sample was obtained. The sperm count was high, motility was good, and morphology was normal.

Now that we knew our buck was fertile, we felt the low reproductive rate was due to one of two problems. Either the does had suddenly become infertile, and we felt this was unlikely, or the buck was not breeding the does. While we could not find any reason for this, we decided to attempt to artificially inseminate the does.

After checking with, and receiving help from other zoo staff around the country, we decided to breed two does in November 1981. Two more does were bred in December 1981 and another two in April 1982.

The most critical points for successful artificial insemination were to know when the does were in estrus (or heat), to be very clean during the entire procedure, and to protect the sperm from fatal thermal shock. The

CAPTIVE REPRODUCTION OF BROCKET DEER, Continued

first problem was solved by using a new drug used in cattle. This drug causes the animal to ovulate approximately three days after it is given. The second problem was approached by sterilizing all instruments to be used, and finally all semen handling equipment was kept at a constant temperature.

Since this was our first attempt, we were hopeful but skeptical about our chances for success. The two females bred in November passed their due date without producing fawns. The does bred in December each had a fawn on 18 June and 21 June respectively. This is a noteworthy accomplishment, and has given us the incentive to use this and other procedures on other species that are having problems perpetuating themselves in captivity. Both fawns were females.

This project was a combined effort of many people: General Curator/Mammalogist Jerry Stones, who along with his staff of Keepers, is responsible for the day to day care of the the deer and who originally suggested we should take a more manipulative course with these deer; myself and my clinic staff, who coordinated and performed the procedure; and the Los Angeles Zoo who sent three does to us on breeding loan.

By using procedures designed and developed for domestic livestock, captive reproduction of rare and endangered species can be increased, thus assuring these animal species' survival into the future.

(Editor's note: This article originally appeared in Gladys Porter Zoo News, Vol. 11, No. 2, June 1982 and is published here with the written permission of the author.)



THINK Safety!

*Submitted by Jill Grade
International Bird House
Chicago, IL*

Judie Steenberg from the Woodland Park Zoo in Seattle informs me that the keepers there Think Safety.

Wayne Buchanan, as you know, has produced a video tape on Keeper Safety which is now available through the Puget Sound Chapter in Seattle. Keeper training includes safety education through the use of seminars on various aspects of the subject, including demonstrations by the local fire department on fire hazards and placement and use of fire extinguishers.

Judie also suggests two slogans -- "Safe Keeping" and/or "Keeping Safe" for use on bumper stickers and/or buttons/patches in our zoos. Production of this material could be handled by an individual or as a Chapter project. Interested parties may contact me at International Bird House, 956 W. Huron St., Chicago, IL 60622, (312) 421-5458. Constant exposure to the idea of safe keeping would serve as an important reminder during our work days to Think Safety!

I am still awaiting input for this column--articles, short stories, cartoons and descriptions of keeper training programs which include safety education are all welcome. What is your zoo doing to promote safe work habits?



THOSE TERRIBLE TAX RETURNS

By
Jill Grade
International Bird House
Chicago, IL



(Editor's note: While this article did not arrive in time to publish before this April 1984 issue of AKF, it may give you some food for thought in keeping the proper receipts for deductions for next year's tax forms. If you have a question as to whether an item is deductible, we suggest you contact your local IRS office for clarification.)

It's that time of the year again--time to read your tax returns and weep. Or is it?

Are you aware of the numerous tax deductions available to members of the zookeeping profession? Percentages of costs incurred by keepers in pursuit of interests related to their jobs are refundable to those completing both long and short forms. The following is a list of deductions available to zookeepers. You may wish to discuss them with your tax consultant--the results might surprise you.

1. All professional memberships and charities (i.e. AAZK, AAZPA, zoo societies, Humane Society, World Wildlife Fund, etc.)
2. All professional publications related to animals in captivity and in the wild, and ecology (i.e. International Wildlife, National Geographic, Legislative News, catalogues, conference proceedings, etc.)
3. Professional libraries including all reference books on animals and ecology--purchases for the current year are deducted individually whereas established libraries may be depreciated.
4. All job-related meetings (i.e. national conferences, regionals, chapter meetings, zoo tours, seminars, society meetings--deductions include registration fees/gate costs, travel, accommodations and meals, including those provided for visiting professionals.)
5. Field studies (i.e. bird watching, wildlife travel tours, national park tours, zoo visits--travel, accommodations, meals, permits and special equipment including field glasses, camping needs and cameras.)
6. All clothes, accessories and equipment designed as such to eliminate use for other than zoo or zoo-related work.
7. Work-related education, not required by your employer, either individual classes or classes taken toward a degree in biology, zoology, etc.--deductions include registration fees, permits, parking, books and travel to and from class site.

Zoo keeping is a profession, and serious-minded zoo keepers pursuing various aspects of wildlife education in conjunction with their careers are entitled to tax deductions accordingly. The deductions listed herein are some I myself have used. If your accountant is not familiar with them (many are not up on the intricacies of our profession) find one who is. Those terrible tax returns are money in the bank. I look forward to filling out all of those forms each year--do you?





AAZK
National Conference
SEATTLE 1984

1984 AAZK NATIONAL CONFERENCE REGISTRATION FORM

Sept. 30-Oct. 4, 1984

Please type or print. One name per form.
Return form with your fee to:



Mary Bennett, Registration Coordinator
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103
Phone: (206) 625-5488

Make checks payable to Puget Sound Chapter AAZK.
Deadline for Pre-registration is August 15, 1984.

1984 Registration

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AREA OF INTEREST _____

VEGETARIAN YES _____ NO _____

WILL BE SUBMITTING PAPER YES _____ NO _____
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LATE FEE (After Aug. 15th)	\$15.00
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Are you interested in purchasing a conference T-shirt?

YES _____ NO _____ Size S _____ M _____ L _____ XL _____
(This will help us provide adequate inventory)

TEN WAYS TO HAVE FUN IN SEATTLE

Proposed Pre and Post Conference Activities-1984 AAZK Conference, Seattle

These tours will be scheduled if there is enough demand. Each tour or activity would have a staff member host. We want to show you our beautiful Northwest, have fun and get to know each other better. If you are interested please respond by June 1st to: Wendy Wienker or Eric Kowalczyk, Woodland Park Zoo, 5500 Phinney Ave. North, Seattle, WA 98103.

- 1) Breakfast at Snoqualmie Falls Lodge, followed by a mountain drive and scenic hike to Gold Mayer Hot Springs. Approx. cost \$15.00
- 2) Forty-five minute waterfront cruise to Blake Island. Indian-baked salmon dinner, Northwest Indian dances, artifacts and craft displays. Stroll on trails and walk on beach. Approx. cost \$22.00
- 3) Tour Washington's premier winery Chateau Ste. Michelle. Approx. cost \$5.00
- 4) Scenic or white water raft trips. View snow-capped mountains and native wildlife in its natural habitat. Approx. cost \$35.00-\$50.00
- 5) Cruise the beautiful San Juan Islands in search of the elusive Orca whale. This tour depends on how many people are interested, as we may need to arrange a charter. Approx. cost \$30.00 to \$40.00
- 6) Cruise the Princess Marguarite to Victoria, British Columbia, Canada through Puget Sound. Enjoy Old World shops, English pubs and antique stores. One day trip, round trip ticket approx. \$29.00
- 7) Visit spectacular Olympic National Park. Drive up to Hurricane Ridge and possibly view mountain goats. Can be done in one long day; share expenses.
- 8) Visit the National Nisqually Wildlife Refuge. See migrating waterfowl, raptors and other birds. One day trip; share expenses.
- 9) Drive to Paradise Lodge at Mt. Rainier. This majestic mountain offers hiking and spectacular views-weather permitting. One day trip; share expenses.
- 10) Drive to Mt. St. Helen's and, weather permitting, view the mountain and visit an interpretive center to study the volcano. One day trip; share expenses.

CALL FOR PAPERS

This year's topic for presentation papers, **WORKING IN ZOOS AND AQUARIUMS: TODAY AND TOMORROW**, was chosen to encourage all conference delegates to participate in writing about their professions. Working in zoos and aquariums today is complex, challenging, and exciting, requiring many skills such as public speaking, computer use, construction technique and nutritional analysis, in addition to caring for animals. The ability to share this knowledge and to educate others is a great asset. In the future, it will be even more important to exchange ideas and information.

Papers will be limited to 20 minutes with a 5-minute question/answer period. Please submit an outline or abstract by July 15, 1984. AAZK national committees that plan to have meetings at the conference should submit time and meeting space requirements by this date.

Send papers, information, or questions to:

Phil Pennock
AAZK Conference
Woodland Park Zoo
5500 Phinney Ave. North
Seattle, WA 98103-5897



Legislative News

Compiled by Kevin Conway
Legislative Coordinator

AT SKIN TRADE SHIFTS TO SMALLER SPECIES

The lucrative market for cat skins to fashion into fur coats has shifted from the larger species to smaller ones, according to a new TRAFFIC(U.S.A.) study of CITES annual reports. The largest consumer is Europe, which imports over two-thirds of the pelts in trade. In the U.S., fashion preference and strict regulations against the import of endangered cats limit the cat skin trade to species native to North America, the bobcat and the Canadian lynx. Unfortunately, it takes up to three times the number of pelts from the smaller cats as it does from the larger cats no longer found in trade.

The cat skin trade, like the reptile leather trade, illustrates a phenomenon common to trade in all wildlife: when one species is no longer available, the trade shifts to other similar species to supply continued consumer demands.

Trade in the skins of large cats, heaviest between the late 19th century and 1960, was a major threat to the survival of some species. By the early 1970s, the plight of the tiger, leopard, jaguar, cheetah, snow leopard, and others prompted efforts worldwide to control the trade. Many of the larger cat species were listed on CITES Appendix I in 1975, resulting in restricted commercial trade in their fur. All other Felidae species were listed on Appendix II.

After 1975, the cat fur market decreased dramatically in the United States. International and U.S. protective legislation, combined with voluntary efforts of the U.S. fur industry to halt trade in endangered species and a nationwide campaign to popularize fake fur, effectively curtailed the U.S. market for cat fur coats.

The European market, however, remained strong. As the larger species became rare, and finally prohibited from trade, the European fur industry simply started using pelts of smaller spotted cats. TRAFFIC(U.S.A.) estimates that in 1980, 685,000 cat pelts were traded internationally to supply European demands. Most of these originated in South America and Asia and were fashioned into garments in West Germany. Many were then exported for sale in other European countries. Approximately two-thirds of these pelts were of small to medium-sized spotted cats (see Table). According to CITES Secretariat, some of this trade was illegal and has since been controlled.

This shift from the larger to the smaller cats has not changed the appearance of garments currently marketed in Europe from those of the early 1970s. Fur coats made from cat pelts retain the "leopard look" but are now made from the smaller spotted species, primarily Geoffroy's cat (*Felis geoffroyi*), jungle cat (*F. chaus*), little spotted cat (*F. tigrina*) and wildcat (*F. silvestris*). There is an important distinction, however: 8 to 10 leopard pelts are needed to make one coat, but 20 to 30 pelts of these smaller spotted cats are required to manufacture a garment of the same size.

"Leopard look" fur coats have a limited market in the U.S., but there is some demand here for coats made from two North American species, the bobcat (*Lynx rufus*) and the Canadian lynx (*L. canadensis*). Bobcat and lynx coats are also exported to Europe and Japan where the demand for them is strong; approximately 205,000 skins of bobcat and Canadian lynx moved in international trade in 1980.

Approximate Numbers of Cat Pelts Reported In Commercial Trade*

Species	1979	1980
<i>Felis geoffroyi</i> (Geoffroy's cat)	115,000	145,000
<i>Lynx rufus</i> (bobcat)	126,000	140,000
<i>Felis chaus</i> (jungle cat)	90,000	79,000
<i>Felis tigrina</i> (little spotted cat)	46,000	70,000
<i>Lynx canadensis</i> (Canadian lynx)	42,000	64,000
<i>Felis silvestris</i> (wildcat)	7,000	60,000
<i>Felis pardalis</i> (ocelot)	22,000	45,000
<i>Felis wiedii</i> (margay)	20,000	30,000
<i>Felis colocolo</i> (pampas cat)	10,000	27,000
<i>Felis bengalensis</i> (leopard cat)	13,000	9,000
<i>Lynx caracal</i> (caracal)	1,000	6,000
<i>Lynx lynx</i> (European lynx)	9,000	5,000
Others	5,000	5,000
TOTAL	506,000	685,000

* Includes re-exports and exports from countries of origin where the animals are not native. Also includes a conversion of number of pelts per garment where the number of garments traded was reported.

SOURCE: McMahan, L., "The International Cat Trade," presented at the International Cat Symposium, October 4-8, 1982, in Kingsville, Texas. Proceedings are in press.

The U.S. and Canada annually conduct studies to determine the number of animals killed and to estimate population sizes, providing at least some information on the effect of trade on the lynx and the bobcat. Only limited information is available, however, on the effect of trade on Geoffroy's cat, the little spotted cat, and the other small spotted cats.

Despite international efforts, many of the larger cat species still have not recovered from the demand for their skins. Presumably, excessive trade could be similarly devastating to the smaller spotted cats.

---By Linda McMahan, Director TRAFFIC(U.S.A.)

TEXAS ALLIGATORS RECLASSIFIED

The status of the American alligator (*Alligator mississippiensis*) in Texas has been reclassified under the Endangered Species Act from Endangered and Threatened in different regions of the State to the less restrictive statewide category of Threatened due to Similarity of Appearance (F.R. 10/12/83). This action constitutes formal recognition by the USFWS of the biological recovery of the alligator in Texas. The State may now institute a comprehensive management plan for the alligator, which could include a regulated harvest season.

Due to poaching and overhunting for its hide, the American alligator was listed in 1967 by the Federal Government as Endangered throughout its entire range. In 1969, the State of Texas closed its alligator hunting seasons. Subsequently, in response to strict Federal and State protection, American alligator numbers rebounded in many parts of the species' range, and it has been gradually reclassified in areas where it is most secure. In 1977, alligators in most coastal Texas counties were reclass-

classified to Threatened, a category which authorized the control of nuisance animals. The October 12, 1983, reclassification of all American alligators in Texas to the category of Threatened due to Similarity of Appearance puts them in the same status as those in Louisiana, where a limited harvest of American alligators is allowed under State management and in accordance with specific State and Federal regulations.

Recent estimates of the American alligator population in Texas have been based on aerial surveys, line-transects, and survey questionnaires dating from 1975-81. Using a census technique developed for Louisiana's management program, the Texas Parks and Wildlife Department (TPWD) indicates that numbers of alligators on prime Texas habitat have doubled in the last five years. According to TPWD, alligator nest densities are near the maximum for the habitat, and population growth may have reached optimum levels. On the basis of this information, the USFWS proposed on September 13, 1982, to reclassify all American alligators in Texas.

Effects of Rule

The American alligator in Texas is reclassified statewide to Threatened due to Similarity of Appearance, the least restrictive category under the Endangered Species Act. Authority and responsibility for the management and protection of this animal now rests with the State of Texas under recently enacted State statutes. This gives Texas the options to expand its nuisance alligator control program and/or to allow the harvest of alligators in specified counties in accordance with State management procedures and Federal regulations [50 CFR 17.42(a)].

The degree of continued protection for the alligators under the new classification is authorized by Section 4(e) of the Act. It is necessary to regulate commercial activities in products derived from American alligators in Texas (as well as Louisiana) because these animals are similar in appearance to American alligators from less secure populations, as well as to other vulnerable crocodylian species that still need law enforcement protection. In accordance with the requirements of CITES, foreign commerce in American alligator parts from Texas will not be allowed until such time as the State develops a tagging and marking program for harvested alligators that is consistent with Service regulations and CITES criteria.

The reclassification rule removes American alligators in Texas from the habitat conservation measures under Section 7 of the Act. Fortunately, much of the prime habitat is under State or Federal management (including a number of national wildlife refuges), and water storage activities are increasing habitat availability. The status of the American alligator in other parts of its range is not affected by this rule.

---Endangered Species Technical Bulletin
Vol. VII, No. 11

LEGISLATIVE NEWS, *Continued*

REVIEW INITIATED FOR SPECIES LISTED IN 1978

In order to ensure that the U.S. List of Endangered and Threatened Wildlife and Plants reflects the true biological status of these species, the Endangered Species Act requires the Fish and Wildlife Service to conduct a review of all listed species at least once every five years. The USWFS published such a notice of intent to review on 8 December in the *Federal Register*. If the present species classification is not consistent with the current evidence, FWS may propose changes in the classification. The following is a list of species proposed for review.

Wild Species

Common Name	Scientific Name	Population Where Endangered/Threatened	(Status)
Mammals:			
Elephant, African	<u><i>Loxodonta africana</i></u>	Entire	(T)
Wolf, gray	<u><i>Canis lupus</i></u>	USA (48 cont. States except MN), Mexico	(E)
Wolf, gray	<u><i>Canis lupus</i></u>	USA (MN)	(T)
Birds:			
Eagle, bald	<u><i>Haliaeetus leucocephalus</i></u>	USA (48 cont. States except WA,OR,MN,WI,MI)	(E)
Eagle, bald	<u><i>Haliaeetus leucocephalus</i></u>	USA (WA, OR,MN, WI,MI)	(T)
Reptiles:			
Boa, Mona	<u><i>Epicrates monensis monensis</i></u>	Entire	(T)
Iguana, Mona ground	<u><i>Cyclura stejnegeri</i></u>	Entire	(T)
Rattlesnake, NM ridge-nosed	<u><i>Crotalus willardi obscurus</i></u>	Entire	(T)
Snake, eastern indigo	<u><i>Drymarchon corais couperi</i></u>	Entire	(T)
Turtle, green sea	<u><i>Chelonia mydas</i></u>	Where found except where listed as endangered below	(T)
Turtle, green sea	<u><i>Chelonia mydas</i></u>	Breeding colony pop. in FL, Mexico (Pacific Coast)	(E)
Turtle loggerhead sea	<u><i>Caretta caretta</i></u>	Entire	(T)
Turtle, Olive (Pacific)			
Ridley sea	<u><i>Lepidochelys olivacea</i></u>	Where found except where listed as endangered below	(T)
Turtle, Olive (Pacific)			
Ridley sea	<u><i>Lepidochelys olivacea</i></u>	Breeding colony pop. Mexico (Pacific Coast)	(E)
Fishes:			
Darter, leopard	<u><i>Percina pantherina</i></u>	Entire	(T)
Trout, greenback cutthroat	<u><i>Salmo clarki stomias</i></u>	Entire	(T)
Trout, Little Kern golden	<u><i>Salmo aguabonita whitei</i></u>	Entire	(T)

from AAZPA Newsletter, February 1984 and
Endangered Species Technical Bulletin, Jan. '84



Golden Lion Tamarin Reintroduction Program Update

On 7 November, 1983, the Smithsonian Institution's National Zoological Park sent 15 captive-bred golden lion tamarin monkeys to the Primate Center of Rio De Janeiro, Brazil, with the goal of reintroducing these endangered animals into their native environment.

The National Zoo, along with the Brazilian government authorities and the Primate Center of Rio de Janeiro, hopes to prevent the species' extinction in the wild, in part, by the annual reintroduction to the Poco d'Anta Biological Reserve near Rio de Janeiro of as many captive-born golden lion tamarins as possible. The monkeys flown to Brazil in November were captive-born residents at a number of American zoos, including the National Zoological Park in Washington, D.C., Chicago's Brookfield Zoo, the San Antonio Zoo, the Los Angeles Zoo, and the King's Island Zoo in Ohio.

These squirrel-sized, long-haired and brilliantly colored golden monekys are native to the Brazilian Atlantic coastal forests, but are nearly extinct in the wild. The number of golden lion tamarins surviving is estimated to be as low as 150 individuals. Due to the reduced size of the wild population and its diminished habitat, the species is considered to be threatened with extinction. In 1977 the Brazilian Federal Government established the 12,500-acre Poco d'Anta Biological Preserve in an attempt to preserve a portion of this Brazilian national animal's rapidly disappearing habitat. If successful, the reintroduction plan will bolster the number of endangered tamarins in the reserve so that the population may have a better chance of becoming self-sustaining.

For decades the beautiful and extremely active little monkeys have been popular in zoo exhibits. Until the 1970s, however, the species rarely reproduced in captivity and the few offspring born rarely survived. Aware of the animal's near-extinction in the wild, scientists at the National Zoo set out 10 years ago to solve the problem of golden lion tamarin reproduction in captivity. Dr. Devra G. Kleiman, Acting Assistant Director for Animal Programs at the National Zoo, has been in charge of this project since 1973. Important discoveries were made about the species' diet, housing requirements, medical care and the required group size and composition for effective breeding. Most important was the discovery of the monogamous relationship of male and female and the complex family interaction necessary for rearing offspring. Today, an excellent understanding of golden lion tamarin captive behavior and care exists. It was this understanding that allowed the National Zoo to produce successfully more than 200 of these highly endangered animals. Golden lion tamarins are now being bred in many zoos around the world using data compiled from the National Zoo and other zoo research programs.

Several factors have made it possible to attempt the reintroduction of the tamarins in the wild. The establishment of the Poco d'Anta Reserve and the hiring of guards to protect it, the collaborative efforts by zoologists at the Primate Center of Rio de Janeiro, funding from wildlife organizations, and the availability of captive-bred animals are among the most important factors. A National Zoo scientist, Dr. James Dietz, is now at the Reserve taking a census of the native animal population and assessing the availability and suitability of golden lion tamarin habitat for sustaining reintroduced animals. The National Zoo also has an educa-

GOLDEN LION TAMARIN REINTRODUCTION PROGRAM UPDATE, Continued

tional specialist, Lou Ann Dietz, working with the people living near the Reserve to encourage an understanding of the tamarin's plight and the importance of preserving the remaining 2 percent of the Brazilian Atlantic coastal rainforest.

For the past six months, the captive-born golden lion tamarins have been housed at the Primate Center while undergoing a program of readaptation to local foods and climate. The animals' survival skills are being systematically tested and evaluated by Dr. Ademar F. Coimbra-Filho, Director of the Primate Center in Rio de Janeiro, and Dr. Benjamin Beck, National Zoo Primatologist. Then, should there be suitable habitat available at Poco d'Anta, the animals will be released this month into specially built cages within the forest and the animals will be conditioned to their natural habitat. The captive-reared golden lion tamarins will then be released into the forest with the hope that they will strengthen the reduced natural population and thus enable the species to perpetuate itself indefinitely. If suitable habitat is unavailable, the animals will join the captive propagation program for this species at the Rio de Janeiro Primate Center.

Zoos have been widely acclaimed for years as centers of education that increase the public's understanding of wildlife. In the past decade many zoos have established research programs to utilize more completely the valuable scientific resources offered by their animal collections. The long-term maintenance in captivity of species endangered or extinct in the wild is becoming an increasingly important function of zoos. When habitat is destroyed before wildlife sanctuaries can be established, preservation in zoos has become the only hope for a number of species. Replacing lost wild populations with captive-bred animals is an important long-term objective of zoo captive propagation efforts. "The zoos that are providing collaborators in Brazil, and the organizations and individual donors providing financial support for this undertaking may be laying the foundation for what will become an increasingly important wildlife conservation practice," says Dr. Christen Wemmer, Acting Director, National Zoological Park.

Shown below is the project logo, designed by Bob Bischoff, along with other staff members in the Office of Graphics and Exhibits, NZP.



---Excerpted from NZP News Releases



Education Alternatives...



Wildlife Preservation Trust Professional Training Program

Purpose: To train individuals in the techniques of captive breeding of a variety of endangered animal species so that they can advance the cause of endangered species work and animal conservation in their respective countries.

Background: The Wildlife Preservation Trust is an international non-profit organization dedicated to the support of captive breeding of endangered species. It supports projects in captive breeding, field surveys, rescue missions, research and education. The zoological facility for the Trust's work is located on the island of Jersey, Channel Islands, British Isles. This facility is both a zoo and breeding/research facility for endangered species and has a collection of over 100 species of birds, mammals and reptiles. The International Training Center is an educational facility for training in captive breeding and endangered species work; it combines dormitory, classes and research facilities for students, staff and visiting scientists.

Program: The training program consists of sixteen, ten or six 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 June 1st for training to begin in the following year.

Dates: Starting date is by arrangement.

Location: Jersey, Channel Islands, British Isles.

Fees: Tuition is free. Full room and board costs approximately \$70 per week. Trainees are responsible for air fares to and from Jersey.

For application and further information write or call:

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

Deadline for application for 1985 positions is 1 June 1984.

EDUCATIONAL ALTERNATIVES, Continued

The Trust will also be offering a three-week summer course on breeding and conservation of Endangered Species from 11 August to 1 September 1984. Following the success of the 1983 summer school, this year's course again covers mammals, birds and reptiles. The program is intensive and includes lectures/discussions, practical instruction with zoo staff, and the research, preparation and presentation of individual project using Trust facilities for behavioral observation, veterinary investigation, record research and reference material. Course Directors are: Mr. J.E. Cooper, Senior Lecturer in Comparative Pathology, Royal College of Surgeons of England and Dr. S.K. Bearder, Lecturer in Physical Anthropology, Oxford Polytechnic, England.

Residential course fee is approximately \$675 inclusive. Deadline for applications is 30 April 1984. Contact for further information at the above address and phone number.



TAKE HEART!

*Submitted by Helen Huggett, Volunteer Guide
Metro Toronto Zoo/Taken from the Ontario Science Centre*

ANIMAL	WEIGHT (KG)	HEART RATE (beats/minute)
Beluga Whale	700-1000	15-16
Elephant	2,000-3,000	25-50
Horse	380-450	34-55
Ostrich	80	60-70
Human (adult)	70+	50-100 (average 72)
Human (5-9 years)	18-28	68-128 (average 96)
Goat	33	70-135
Seal	20-25	100
Turkey	8.7	93
Cat	2.5	110-240
Chicken	1.9	178-458
Rabbit	1.3	167-330
Squirrel	0.6	390
Mouse	0.02	480-738
Hummingbird	0.004	615
Shrew	0.004	588-1.320

The heart rate in warm-blooded animals (mammals and birds) depends on body size. The smaller the animal, the faster the heartbeat.

A small animal has a larger surface area relative to its weight, therefore it loses body heat more quickly, resulting in a faster heartbeat.



Chapter

TOPEKA ZOO AAZK CHAPTER

T. LOUIS AAZK CHAPTER

The St. Louis AAZK Chapter is pleased to announce the following newly elected officers for 1984:

resident..... Ann Day
vice President.....Gary A. Michael
Recording Sec.....Lucy Bailey
Treasurer.....Randy Adolph
Corresponding Sec...Steven McGehee
Host-at-Arms.....Joe Norton

Activities in the previous year included: tours of specific buildings on the zoo grounds, tours of St. Louis area animal observation projects, and guest speakers at meetings such as R. Arlin Perkins and Walter C. Crawford Jr. of the Raptor Rehabilitation and Propagation Project Inc. A lawn party was held to which all 200 zoo employees were invited and money was raised for the Chapter. More educational activities are planned for the coming year.

We are also happy to announce our Chapter's participation in the KAL program. Any zoo person who plans to visit St. Louis should get in touch with our KAL representative, Lucy Bailey, 1231 Highland Terrace, St. Louis, MO 63117. We have numerous keepers who can accommodate visitors. All we ask is that you say a few words about your work to our Chapter.

MEMPHIS ZOO & AQUARIUM CHAPTER

Newly elected officers for 1984 are:

President.....Robert Evans
Vice President.....David Hill
Sec/Treas.....Cathy Harrison

Following a month of weekly re-organizational meetings, the Topeka Chapter is well on its way to becoming an active, viable chapter again. Proposed activities for the coming year include: the manufacture and sale of items made from shed hair and moulted feathers (i.e. jewelry, greeting cards etc.) at the September Animal Fair; a display of AAZK and Keeper information on the zoo grounds; keeper lectures to the public; some type of special event for Zoo and Aquarium month in June. The Chapter is also proposing to host a Great Ape Workshop similar to the Tropical Habitat Workshop held in 1982. This event is still in the early planning stages.

News

Melissa Svoboda of the Kansas City Zoo AAZK Chapter visited at one of the Topeka Chapter's meetings. She shared ideas used by the KC Chapter and also noted the importance of communication between regional chapters. A regional Chapter meeting was held March 10 & 11 in Wichita with representatives attending from Tulsa, Oklahoma City, Kansas City, Topeka and Wichita.



Chapters are asked to send their news items to Coordinator of Chapter Affairs Lee Payne at the Detroit Zoo with a copy also sent to the AKF offices.



PEOPLE AND POLECATS

By
Jo David Pool, Director
Noah's Ark Zoo
Sulphur, LA

In America, the terms "polecat" and "skunk" are often used to refer to the same odorous animal. However, the truth is that these two animals are only far distantly related.

The polecat (*Mustela putorius*) is the ancestor of the domesticated ferret (*Mustela putorius furo*). Its weight of about two pounds and length of about 16 inches compares favorably with the ferret's weight of 1½ to 3 pounds and length of about 18 inches. The European polecat's whitish-yellow lower fur and dark brown surface fur are identical to the most common color variation of the ferret.

The spring breeding season and six weeks gestation period are the same as that of the domestic ferret. The polecat young are born with short white hair as are baby ferrets.

Some qualities of the polecat have been eliminated from the ferret by selective breeding. For instance, the ferret no longer possesses as strong an odor as the polecat, although ferret males can easily be smelled. The ferret has lost some of its ancestral aggressiveness; however, enough of it remained for a colony of feral ferrets to establish themselves on the islands of Sicily and Sardinia. The domesticated variety is also not as firmly nocturnal in their habits.

The European polecat is found near man in suburbs, parks and farms. It also lives in more remote fields, meadows and forests. The animal inhabits houses and barns where it often nests in the lofts and attics. Away from man, the polecat lives in holes in the ground that he tunnels or in those that have been dug by rabbits and the like.

The species usually sleeps during the day and is active at night. It is beneficial to farmers because it feeds on rats and mice. The polecat finds its prey at night relying on its hearing and sense of smell. It kills its prey with a neck bite or repeated bites on the snouts of larger animals. The polecat's enemies include owls, hawks, foxes, wolves, wildcats, dogs and man.

Other extremely close relatives of the European polecat and the domestic ferret include the Turkish or Siberian polecat (*Mustela eversmanni*) and the Black-footed ferret (*Mustela nigripes*). The Turkish species is smaller than the European polecat, whitish in color, and ranges from eastern Europe to China. The almost extinct Black-footed ferret of the western United States is almost identical to the Turkish species; in fact, it is thought that there is a common ancestry of all three species of polecats and ferrets.

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LIMITED EDITION

SPECIAL COMMEMORATIVE AKF TENTH ANNIVERSARY T-SHIRT

ANIMAL KEEPERS' FORUM



Dedicated to Professional Animal Care

TENTH ANNIVERSARY

1974 - 1984

AKF will be ten years old in October 1984. To commemorate ten years of continuous publication, a special T-shirt is being issued.

The Puget Sound AAZK Chapter has taken this on as a fund-raising project for the 1984 AAZK Conference. All profits will benefit the Conference and AKF.

The T-shirts will only be available from October 1983 through October 1984. A check must accompany your order. Please allow 3-4 weeks for delivery. The price of \$7.50 each includes postage and handling. The shirts are 100% cotton; if you wash or dry at high temperatures, order size larger.

AKF COMMEMORATIVE T-SHIRT ORDER FORM

NAME: _____

ADDRESS: _____

Color choice: ___ powder blue ___ beige

Size: ___ Small ___ Medium ___ Large ___ Extra Large

Make checks payable to: The Puget Sound AAZK Chapter Conference Account
Mail to: Woodland Park Zoological Gardens, 5500 Phinney Ave., N., Seattle,
WA 98103. ATTN: Judie Steenberg

TOTAL AMOUNT ENCLOSED \$ _____

The following "Positions Available" listings were received at the office of AKF. 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. The AAZPA listings were not received in time to include them in this month's issue. This is due to a difference in deadlines for the two publications. Those wishing to insure inclusion of their listing in AKF are asked to send the information directly to AKF.

AVES KEEPER/ASSISTANT MANAGER...responsible for care of large number of birds in Chicago quarantine and holding stations. Current driver's license, passport and previous experience with birds required. Basic knowledge of aves medicine, Spanish and carpentry helpful. Contact: Jill Grade, Station Manager, International Birdhouse, 956 West Huron St., Chicago, IL 60622 or call (312) 412-5458.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within the Conservancy Nature Center 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, is possible, back to their environment. Internship involves wildlife, as well as educational programs and special projects. Interns must be available for up to five months. Qualifications: a college student or recent graduate, studying wildlife or related field; some experience with people and animals; a sincere concern and interest in working with animals. \$55/week stipend, housing provided. Internships offered year-round. To apply, submit resume, statement of goals and three references to: Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy Nature Center, 1450 Merrihue Drive, Naples, FL 33942, (813) 262-2273.

ZOOKEEPER I...Due to major expansion of our zoological park, the Jackson Zoo is NOW accepting applications for the entrance level of Zoo Keepers. Salary range \$893-\$1,298 per month. Standard benefits. Duties include the general care and maintenance of a wide variety of mammals, birds and reptiles. Applicants must have a high school education and some practical experience is necessary. This is an excellent opportunity to be part of a progressive, expanding zoological park. Certified candidates will remain on an active list for six months. Send resume to: James L. Swigert, Director, Jackson Zoological Park, 2918 West Capitol Street, Jackson, MS 39209.

LARGE MAMMAL KEEPER...responsible for care and maintenance of large mammal collection. Requires one year zoo experience. Elephant handling experience preferred. Send resume and references by 30 April to: Michael Tucker Supervisor of Mammals, Caldwell Zoo, Box 428, Tyler, TX 75710.

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AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

_____ \$20.00 Professional
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with an animal care facility

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All members outside the
U.S. and Canada

_____ \$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 _____

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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Dedicated to Professional Animal Care

MAY 1984



Executive Editor: Alice Miser
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 NUMBER FIVE

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Vacancy	Canada

is month's cover art is by Cheryl Lunger. At the time the drawing was submitted, Cheryl was a Mammal Keeper at the Jacksonville Zoo in Florida. The AKF staff has since lost track of Cheryl but certainly hope that she has an opportunity to see her artwork on the AKF cover. Thanks, Cheryl!

Scoops and Scuttlebutt

NEW AAZK AWARDS COMMITTEE MEMBER NAMED

The AAZK Board of Directors has approved the appointment of Rachel Rogers to the Awards Committee. Rachel is a Keeper at Miami's Metrozoo. Welcome to the board, Rachel, we appreciate your desire to volunteer your time to the Awards Committee!

NOTICE TO MEMBERS ON RENEWAL MEMBERSHIP PROCEDURES

Over the years there seems to have been a considerable amount of confusion in the membership renewal process, especially in reference to how long a member is maintained on the AKF mailing list before being dropped. Hopefully the following outline will help explain the renewal process and if this format is followed by members, there should be no interruption of their AAZK/AKF mailings.

One month before a member's expiration date, a card notifying him/her of their need to renew their AAZK membership is sent. If a member sends in their renewal then, there is no interruption in mailings.

At the end of the month in which an individual's membership expires, he/she is sent a "Dear Former Member" reminder card. If an individual renews promptly at this time, there is no interruption in mailings.

A member is kept active on the mailing list for ONE MONTH following the expiration of his/her membership.

If a member does not renew his/her membership by the end of the month following their expiration date, he/she is dropped from the mailing list. If an individual then sends in his/her renewal, he/she will be reactivated on the mailing list. However, depending on what time during the month the renewal is received, that person may end up missing two or more copies of the Forum. We have a cutoff date with our computerized mailing service for inserting additional mailing labels and if the renewal comes in after this date, that name is not added to the list until the next month.

After a member is dropped from the mailing list for (1) failure to renew or (2) failure to notify National Headquarters of an address change, and subsequently renews, they are NOT sent back issues which they may have missed due to late renewal or failure to notify of an address change. These missed issues may be purchased for \$1.00 per copy but will not be sent free.

Members are also reminded that the Association pays a charge of 20¢ per listing each time an individual's name is either deleted or added to the computer's mailing list. This is in addition to the 25¢ postage due fee which is assessed when a member moves and does not notify us of his/her new address. As you can see, this can become quite costly to the Association and so your prompt reply to your renewal notice is important and greatly appreciated.

PROMPT RENEWAL SAVES AAZK TIME AND MONEY AND ASSURES YOU CURRENT MAILINGS.



Births & Hatchings

BRONX ZOO.....Margaret Price

B&H for February 1984 include: Mammals - 4.0 Egyptian fruit bat, 3.0 Pen-tailed bettong, 2.0 Wild cavy, 3.3 Blackbuck, 1.0 Nyala, 10.0 Mouflon, 3.0 Collared peccary, 2.0 Cotton-top marmoset, 1.0 Sugar glider, 1.0 Slender-horn gazelle, 1.0 Saddleback tamarin, 1.0 King-tailed lemur; Birds - 2 South American yellow winged honeycreeper, 4 Green wood hoopoe, 3 Crested tinamou, 1 Green junglefowl, 4 Inca tern, 4 Lilac-breasted roller, 1 Tawny frogmouth, 3 Congo peacock, 1 Black-rumped hemipode; Reptiles - 13 Uracoan rattlesnake.

JACKSONVILLE ZOO.....Anne E. Wiggins

February and March 1984 B&H include: 0.0.3 Ring-tail lemur, 0.2 Sitatunga (1 DNS), 0.1 Guanaco, 0.0.1 Nanday conure, 0.0.3 New Guinea snakeneck turtle and 0.0.1 Aldabra tortoise.

The birth of the Aldabra tortoise (*Geochelone gigantea*) occurred at the Jacksonville Zoo on 27 February 1984 after an incubation of 97 days. The hatchling was one of eight eggs which were deposited in a well-constructed nest on the evening of 22 November 1983; an additional 12 eggs were laid on 2 December 1983 following administration of 250 units of oxytocin. Clutches of 15 to 18 eggs were laid between 2 November and 2 December 1983 by two additional females in the breeding group.

The hatching represents the first reproduction of the Aldabra tortoise in the Northern Hemisphere. Previous captive hatchings have been reported only by the Sydney Zoo, Australia and from the Seychelles Islands, where the species was introduced during the last century. For more information contact: Dave Collins, Curator of Birds and Reptiles, Jacksonville Zoo.

CENTRAL FLORIDA ZOOLOGICAL PARK.....Diane Hagey

B&H for January through March 1984 include: Mammals - 0.1 Ocelot, 0.1.2 Cougar (0.1 DNS), 0.0.1 Dama Wallaby; Birds - 0.0.1 Lesser sulphur-crested cockatoo, 0.0.3 Indian ring-necked parakeet, 0.0.8 Fischer's lovebird, and 0.0.6 Wood duck.

TURTLE BACK ZOO.....Jay Jasan

Recorded B&H for January through March 1984 include: Mammals - 1.0 Llama, 2.0 Pygmy goat; Reptiles - 0.0.11 Snake-necked turtle, 0.0.5 Red-eared slider; Birds - 0.0.1 Cormorant.

TOLEDO ZOO.....Michelle Grigore

March 1984 B&H include: 0.0.5 Orangequits, 0.0.1 Basilisk, 0.0.3 Cuban boas and 0.0.1 Sooty mangabey.

TOPEKA ZOO.....Alice Miser

January through April 1984 B&H include: Mammals - 1.1 Cotton-headed tamarin (DNS), 1.0 Sitatunga, 1.0 Dama wallaby, 0.0.1 Giant Indian fruit bat; Birds - 0.0.1 Scarlet macaw.

BIRTHS AND HATCHINGS, Continued

PITTSBURGH AVIARY.....Curt Robbins

The following hatchings were noted from January to March 1984: 0.0.3 Palawan peacock pheasant (1 DNS), 0.0.2 Goldie's lorikeet, 2.0 Levaillant's barbet, 0.0.3 Double-barred finch, 0.0.1 Gouldian finch (DNS), 0.0.2 Rothchild's mynah.

Previously unpublished hatchings for 1983 included: 2.6.51 Elegant crested tinamou (0.0.8 DNS), 0.0.6 Green-backed heron (0.0.5 DNS), 0.0.2 Scarlet ibis (2 DNS), 0.0.6 Cape teal (5 DNS), 9.6.2 Tonkinese red junglefowl (0.0.2 DNS), 1.1.12 Lady Amherst's pheasant (0.0.4 DNS), 1.3.3 Palawan peacock pheasant, 2.3.2 Malay argus pheasant, 0.0.43 Common peafowl--blue, white and pied (0.0.3 DNS), 0.1 West African crowned crane, 1.2.4 Gray-headed gallinule (0.0.3 DNS), 0.0.1 Sun bittern (DNS), 0.1.1 Spur-winged plover (0.0.1 DNS), 3.0.1 Red lory (0.0.1 DNS), 4.2 Goldie's lorikeet, 0.0.4 Red-fronted Kakariki (0.0.3 DNS), 0.0.1 Greater roadrunner (DNS), 0.0.2+ Speckled mousebird (2 DNS), 3.2 African gray hornbill--first captive breeding was apparently here in 1982, 3.0 Levaillant's barbet, 0.0.3 Double-barred finch (3 DNS), 0.0.5 Gouldian finch (4 DNS), 1.0.4 Purple glossy starling, 0.0.2 Purple glossy starling x Blue-eared glossy starling hybrid - hen unknown 0 (1 DNS), 0.2.3 Rothchild's mynah (0.0.3 DNS), 1.0 White-collared mynah - Streptocitta albigollis - probable first captive breeding.

DALLAS ZOO.....Tami Jones

B&H for March 1984 include: Mammals - 0.1 Llama, 0.1 Suni (DNS), 1.0 Bactrian camel, 1.1.1 Patagonian cavy, 1.0 Chimpanzee, 1.0 Addax, 0.1 East African oryx; Birds - 0.0.1 Hawaiian goose, 0.0.3 Spur-winged lapwing, 0.0.1 Cape Barren goose, 0.0.2 Jandaya conure; Reptiles - 13 Mexican massasaugas (Sistrurus ravus).

ASSINIBOINE PARK ZOO.....Barb Haffner

Recent B&H from Winnipeg include: 2 Yak, 1 Lion-tailed macaque, 5 Gambian pouched rat, 2 Ring-tailed lemur and 1 Parma wallaby.

MIAMI METROZOO.....Lori Bruckheim

March 1984 B&H include: Mammals - 1.0 Reticulated giraffe, 1.0 Lowland gorilla, 0.1 Ring-tailed lemur, 1.0 Grant's zebra, 1.0 Dama gazelle, 0.1 Scimitar-horned oryx, 0.1 Maxwell's duiker, 2.0 Blackbuck antelope; Birds - 0.0.12 Ostrich, 0.0.2 Green junglefowl, 0.0.2 Hottentot teal and 0.1.2 Red-crested pochards.

TAMPA--BUSCH GARDENS.....Sandy Moher

B&H for March 1984 include: Mammals - 1.0 Scimitar-horned oryx, 0.1 Greater kudu, 0.1 Dromedary camel, 0.3 Thomson's gazelle, 1.0 Addax, 0.2 Roan antelope; Birds - 2 Jandaya conure, 1 Greater sulphur-crested cockatoo, 1 Stone Curlew, 3 Bare-eyed cockatoo, 4 Sun conure, 2 Black swan, 2 African gray parrot, 2 Pied cockatiel, 2 Scarlet macaw, 3 Hahn's macaw and 1 Green-winged macaw.

BIRTHS AND HATCHINGS, *Continued*

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

March 1984 B&H include: Mammals - 0.0.7 White-toothed shrew, 0.0.1 Callimico monkey, 0.0.2 Cotton-topped tamarin, 0.0.2 Golden lion tamarin, 0.0.1 Crab-eating macaque, 0.0.1 Guinea baboon, 0.0.1 Siamang, 0.0.1 Gibbon; Birds - 0.0.2 Red and white crane, 0.0.2 Blue-shouldered robin chat, 0.0.2 Inca tern, 0.0.1 Humboldt penguin; Herps - 0.0.1 Brown anole.

Unusual Acquisition--Also in March, Brookfield Zoo received 2.2 South American marsupial possums (*Drumiciops australis*) as a donation from the Field Museum of Natural History (Chicago). These animals were brought back by a returning field research team that had been studying them in their native Chile. These small (25-35 g.) marsupials have no common English name but are called "Monito del Monte" (little monkey of the mountains) by the locals. They have limited distribution, being found only in the higher altitude bamboo forests of south central Chile. They are common within that range, but probably due to their inaccessibility these are believed to be the only individuals in captivity.



Coming Events

10TH ANNUAL CONFERENCE OF THE
AMERICAN FEDERATION OF AVICULTURE

August 1-5, 1984

Redondo Beach, CA

For information, write, AFA, P.O. Box 1568, Redondo Beach, CA 90278 or call (213) 372-2988.

AAZPA ANNUAL CONFERENCE

September 9-13, 1984

Miami, FL

1984 NATIONAL AAZK CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK. See information on registration and accommodations in this issue of AKF.

FINAL CALL FOR AAZK AWARDS NOMINATIONS

Deadline - June 1, 1984

This is the last call for nominations for 1984 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.

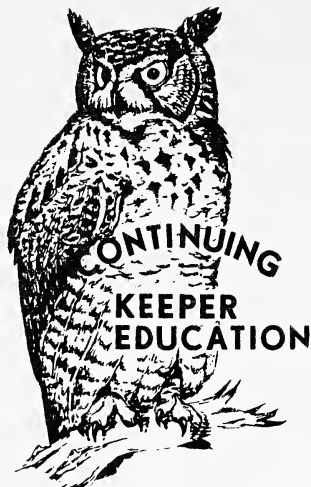
THE DEADLINE FOR ACCEPTANCE OF AWARD NOMINATIONS IS JUNE 1, 1984.

Send nominations to:

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



CORRECTION: In Robert Bergahier's article, "A Zookeeper's Reflections of Peru" (Vol. 11, No. 3, March 1984 AKF), the author inadvertently noted Eric Van Danikan's book as "Chariots of Fire". It should have been "Chariots of the Gods".



ANIMAL MANAGEMENT CORRESPONDENCE COURSE

Submitted By Judie Steenberg
Coordinator AAZK Education Committee

In the January AKF, page 6, information was given on testing for certification in the correspondence course, Animal Management, offered by the National Extension College, Cambridge, England. It has been suggested that the certification exam be given in conjunction with the annual AAZK Conference; the test would be given the day before the Conference begins.

The Education Committee is looking into this possibility and would like your help. If you are taking the course, or have taken it, and would be interested in being tested on it at the upcoming AAZK Conference in October, please write to Judie Steenberg, 9550 2nd Ave., N.W., Seattle, WA 98117. Although there might not be many students ready to take the certification exam this year, we want to make the opportunity available to any who are. Please pass the word to anyone you know who is taking the course.

* * * * *

Following is a list of references on captive mammal management that was received from Douglas Richardson, Howlett's Zoo Park, England. A note that accompanied the list stated:

"...when I started in Zoos, I had difficulty in finding pertinent material. In fact I still meet Keepers and Curators who are at a loss to find any books or periodicals which pertain to zoo animals. Many of these books are available from

Wildlife Publications Review
520 N. Dixie Hwy.
Hollywood, FL 33020."

Wild Animals in Captivity, Hediger

The Psychology & Behavior of Animals in Zoos and Circuses, Hediger
Man and Animal in the Zoo, Hediger (This is a must)

International Zoo Yearbook, Vol. 1-22, Zoological Society of London

International Zoo News, Zoo Centrum, London

The Dodo, Annual Report of the Jersey Wildlife Preservation Trust

The U.F.A.W. Handbook on the Care and Management of Laboratory Animals,
U.F.A.W.

Patterns of Mammalian Reproduction, Asdell (second edition)

Animal Management, Vol. I-III, National Extension College, Cambridge, GB

The Care and Capture of Wild Animals, Young

Management of Wild Mammals in Captivity, Crandall

Restraint and Handling of Wild and Domestic Animals, Fowler

Zoo and Wild Animal Medicine, Fowler

CONTINUING KEEPER EDUCATION COLUMN, Continued

Mammal Reference List, con't

Handbook of Zoo Medicine, Klos and Lang

Breeding Endangered Species in Captivity, Martin

Monotremes and Marsupials, Collins

International Symposium on Breeding Non-human Primates for Laboratory Use, Beveridge

Feeding and Nutrition of Non-human Primates, Harris

Zoonoses of Primates, Fiennes

Captivity and Behavior, Erwin, Maple, Mitchell

The Biology and Conservation of the Callitrichidae, Kleiman

The Squirrel Monkey, Rosenblum, Cooper

Gibbon and Siamang, Vol. I, Rumbaugh

Orang-utan Behavior, Maple

Gorilla Behavior, Maple, Hoff

Otters, Harris

The Giant Panda, Barzdo

The Giant Panda, Jing, Yangwen

International Pedigree Book of Snow Leopards, Vol. I-III, Blomquist
(Many other studbooks contain management articles)

The World's Cats, Vol. I-III, Eaton

Wild Elephants in Captivity, Adams

The Asiatic Wild Horse, Mohr

The Biology and Management of an Extinct Species: Pere David's Deer,
Beck, Wemmer

Reproductive Behavior in Ungulates, Fraser

The Behavior of Ungulates and Its Relation to Management, Geist, Walther

Does anyone out there have a similar list on birds, reptiles or other Zoo-related subjects that they are willing to share? If so, please send it to Judie Steenberg at the previously listed address.

* * * * *



More Register for Staff Exchange

*submitted by Elandra Aum
Staff Exchange Coordinator*

We have a few more zoos that have registered themselves for inclusion on our master list, as published in the March, 1984 issue of AKF.

Persons interested in working on exchanges should check the list for registered institutions. If your place of work is listed, then first try talking to the contact person whose name is included; that person has all the information, including the complete master list, published and disseminated to date. If you have any difficulty or further questions, write or call Elandra Aum at Woodland Park Zoo, 5500 Phinney Avenue North, Seattle, WA, 98103.

CONTINUING KEEPER EDUCATION COLUMN, *Continued*

Additions to the previously published Master List are:

Denver Zoological Park, Denver, CO --- Ed Schmitt

Kings Dominion Wild Animal Safari, Dowell, VA --- David Jeffers/Don Goff

Knoxville Zoological Park, Inc., Knoxville, TN --- Sam A. McCoig

Memphis Zoological Park, Memphis, TN --- Charles G. Wilson

Mesker Park Zoo, Evansville, IN --- Lynn Griese

Sacramento Zoo, Sacramento, CA --- Steve Taylor

In addition, the following changes or corrections should be noted on the original master lists:

For Northwest Trek, the correct spelling for the contact person's name is "Greg Starypan".

For the Philadelphia Zoo, the contact person's name should be "Rick Beyer".

For the Como Zoo, the contact person's name should be "John Fletcher".



INTERNATIONAL ASSOCIATION FOR BEAR RESEARCH AND MANAGEMENT (IBA)
ENCOURAGES KEEPER INVOLVEMENT/OFFERS MEMBERSHIP INFORMATION

submitted by Dan C. Heath, IBA-Zoo Coordinator

The International Association for Bear Research and Management (IBA) is an international organization made up of scientists, managers, and lay persons with an interest in bears. The purpose of this organization is to foster communication and cooperation in the management, research and protection of bears and their habitat. A newsletter is issued quarterly and an international conference is held every third year. Annual memberships is U.S. \$7.00 for regular and \$5.00 for students. Group memberships, e.g. AAZK Chapters, are available for \$7.00, and is payable to:

International Bear Biology Association
Brian L. Horejsi, Secretary/Treasurer
Box 3129, Station B
Calgary, Alberta
Canada T2M 4L7

Zoo personnel are encouraged to join this multi-dimensional bear group. Many have already actively participated in the formation of *ad hoc* committees, and in the presentation of poster sessions and papers on spectacled bears and sloth bears at previous conferences. If you are conducting research on bears in captivity, or are interested in problems of both captive and wild populations of bears, consider joining IBA. We welcome your input.





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- 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 responsibility for the restrictions listed above.

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Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103



Great Ape *Academonium*

SEPARATION DEPRESSION IN AN ADULT FEMALE ORANGUTAN

By
John Brannian
Animal Technician
Kansas City Zoo, Kansas City, MO

On 22 September 1983, an eleven-year-old female Bornean orangutan, Suai, came to the Kansas City Zoo on a trade from another zoo. This individual had been mother-raised with the male until about the age of five. Since that time she had been living in a mixed group of young adult orangs of various ages. She had never, according to her keepers, been isolated from other orangutans for any extended periods of time.

At the time the Kansas City Zoo maintained 1.1, 21-year-old wild-born Bornean orangutans, Timmy and Tammy, who were housed together on exhibit. These two orangs have been in residence at the Kansas City Zoo for nearly twenty years where they have produced three surviving offspring, all of which were hand-raised. Never had these two shared their quarters with other adult orangutans.

When Suai arrived she was placed in a transfer cage in which a screen-covered window had been installed to allow visual, auditory, and olfactory contact with the two resident orangutans. The plan was to provide free contact via the window between Suai and her future companions and concurrently give Suai periodic access to both the indoor and outdoor enclosures for 3-4 weeks before attempting an introduction. It was hoped that this would allow ample time for Suai to become acquainted with all aspects of her new environment and give the older pair of orangs a chance to adjust to Suai's presence.

Unfortunately, in transit, Suai had sustained severe abrasions to her knuckles and had lost two teeth in attempts to escape the shipping crate. She had lost some blood and her face was somewhat swollen. The first concern was her physical condition. Immobilization and examination by the staff veterinarian on the morning following her arrival revealed that although her injuries were severe they were localized and it was thought that her condition was not critical.

During her first day in her new surroundings Suai spent almost all of her time huddled in the rear corner of the enclosure. A variety of food items were offered but all except a few bites of banana were refused.

By the second morning the swelling in Suai's face was greatly reduced and her hands appeared improved. Her behavior had not changed, however. Keepers continued offering her a variety of food items in various forms including flavored milk which she accepted in small quantities. Her enclosure had been provided with a variety of play objects such as ropes, burlap bags, boxes, etc. but these were ignored. The only times she would move were to occasionally come to the front of the enclosure to take a drink of milk from a keeper or to look through the window at the two orangs on the other side.

SEPARATION DEPRESSION IN AN ADULT FEMALE ORANGUTAN, *Continued*

The third day brought no change. Her depressed behavior could not be attributed solely to her physical discomfort. Concern now shifted from her physical to her psychological condition. The zoo at which she had formerly resided was contacted in hopes of finding a special toy, favorite food item, or any other suggestion that might help lessen her depression.

All ideas were tried but nothing seemed to significantly improve her condition. This continued through the first week.

On 30 September, the eighth day of residence, Suai was released alone into the outdoor enclosure for the first time. Inclement weather earlier in the week had prevented an earlier release into this exhibit. It was hoped that the more spacious open-air enclosure might provide some stimulus which would begin to bring her out of her depressed state. To the disappointment of the zoo staff, Suai, upon entering the exhibit moved to the opposite corner, sat down in her characteristic huddle and did not move the rest of the day. When it came time for her to return to her indoor quarters for the evening she would not move. All attempts to coax her back inside were futile. Since the weather was mild more drastic measures to get her inside did not seem warranted. Keepers left her with free access to the indoor enclosure.

The next morning she was found in exactly the same spot she had been left in the previous evening. The food that had been left for her had not been touched.

It had been the consensus of the zoo staff throughout the week that one of the major sources of Suai's stress was that she had never before been separated from conspecifics. An early introduction with the older female, Tammy, had been discussed. Considering the risk involved in a premature introduction and the uncertainty of success in changing Suai's behavior, this action had been delayed.

With all other obvious alternatives exhausted it was decided to proceed with the introduction at once. Tammy was separated from the male and released into the outdoor enclosure with Suai. The moment Suai saw Tammy in the doorway she rose to a bipedal stance with eyes fixed on the larger orangutan. Tammy, seeing Suai at nearly the same instant, stopped in her tracks and stared at her new cagemate. Neither orang seemed alarmed. On the contrary, Suai's expression appeared to be less distressful than it had all week and Tammy's appeared to be one of mild curiosity. After mutual appraisal for about half a minute, the two orangs began moving towards each other. To the relief of the onlooking staff members, Suai approached Tammy with an outstretched arm and the two began investigating and grooming each other. Within minutes both were circumambulating the exhibit together. Suai followed Tammy up poles and ropes provided in the exhibit. This was by far the most activity seen from Suai since her arrival. Food was tossed into the exhibit in hopes that her appetite had improved as well. She immediately began eating apples, bananas, celery and primate biscuits, items that she had thusfar refused or only nibbled.

This remarkable reversal in Suai's behavior has continued. As of 1 March 1984, she and Tammy are still getting along very well. Suai had adapted well to her new environment. The injuries she sustained in shipment proved to be slow-healing. Both hands had to be casted for nearly three months. At present both hands are healed and an introduction with the male orang, Timmy, is scheduled to take place soon.

SEPARATION DEPRESSION IN AN ADULT FEMALE ORANGUTAN, Continued

Loss of appetite in captive primates is usually attributed to depression, illness, or environmental changes (Erwin and Deni, 1977). In this case any or all of these factors may have been involved.

Depression associated with separation has been widely studied in captive primates, particularly in regard to mother-infant separations and juvenile-age peer separations (see Erwin, Maple, and Mitchell, 1979, for review).

Typically responses to separation in these cases follow the pattern described by Bowlby (1961): (1) an initial period of protest followed by (2) depression or withdrawal and (3) a period of detachment upon reunion. Erwin *et al.* (1971) observed this pattern in mother-infant and juvenile-age peer separations in rhesus macaques except that no detachment period was seen during mother-infant reunions. The Bowlby pattern including detachment was observed in an orangutan mother-infant separation and reunion (Nadler and Codner, 1983). Separation of socialized rhesus juveniles of slightly older age than those observed in the previously cited study resulted in hyperactivity with no evidence of depression or withdrawal (McKinney *et al.*, 1972). These authors suggested age differences in responses to separation.

Chronic depression as a result of temporary separation in a mother/peer-raised, well-socialized adult great ape may be an unusual situation. In the case described here, Suai exhibited protest, which resulted in her injuries, and prolonged depression. In addition to separation from familiar peers, stress from physical injury and subjection to a totally foreign environment were factors which probably contributed to her depression. What is particularly interesting from this observation is that her behavioral reversal was so immediate and complete in response to an introduction with an unfamiliar peer in an unfamiliar environment.

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- McKinney, W.T., Suomi, S.J., and Harlow, H.F., 1972. Repetitive peer separations of juvenile-age rhesus monkeys. Arch. Gen. Psychiat. 27: 200-203.
- Nadler, R.D. and Codner, M.A., 1983. Maternal separation and reunion of an infant orangutan. Primates 24(1): 67-76.



Zookeeper Husbandry Fundamentals Manual Update

The Committee that is working on the manual is currently attempting to 1) organize itself into several working groups and 2) formulate a format for material submission. Anyone interested in participating in this project by providing descriptive articles on all types of techniques and other husbandry procedures should contact either Pat Sammarco or Jim Ellis by filling out the form below.

NAME _____

ADDRESS _____

DESCRIPTION OF INTEREST AREA AND MATERIAL TO BE PRESENTED _____

Send completed interest survey to either: Pat Sammarco, Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614 or Jim Ellis, Teaching Zoo, Santa Fe Community College, P.O. Box 1530, 3000 NW 83 St., Gainesville, FL 32602.





WHY, OH WHY DID I COME TO THE AAZK CONFERENCE IN
SEATTLE??

...BECAUSE YOU CAN'T AFFORD TO MISS THE CONFERENCE IN SEATTLE!!

September 30 - October 4, 1984

Actually it rains less in Seattle than in Miami Beach, Florida. Sunshine has also been ordered for that week and is currently being stored in the zoo commissary. Tacoma also promises sunshine for their midday barbecue on Wednesday at the Point Defiance Zoo and Aquarium, to be followed by a nice, warm evening under the stars at Northwest Trek. All this plus the wine and cheese party to be held at the Seattle Aquarium Monday night will give you a unique opportunity to visit four major zoological facilities in the Pacific Northwest. PLUS, with Portland's Washington Park Zoo and Canada's Vancouver Aquarium only 3½ hours away, you can easily see five to six major institutions for the price you'd usually pay for one. This is a conference package you just can't afford to miss!

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You'll have time on Monday to explore the city, take a trolley ride along Seattle's Waterfront, have salmon dinner (or anything you like) at an outdoor cafe with a view of Puget Sound, then meet at the Aquarium for tours and wine and cheese.

Besides the Hotel lunch and the barbecue by Point Defiance, the Woodland Park Zoo Docents will serve lunch during your day at the Zoo, and dinner the same day will be provided by our Zoological Society.

Our banquet will be at the World Famous Space Needle. Dinner will be buffet style to please all the big appetites.

When you think of the unique opportunity to participate in workshops, paper sessions, tours and just exchanging ideas with keepers from four Northwest zoos and aquariums, plus other keepers from all over the world, how can you pass it up?! It's a professional opportunity that can't be beat; the National Conference is where it's at.

Added Note: For all those registered with the Madison Hotel by August 15th, we will have a drawing for three free nights (to be deducted from your hotel bill). If we fill 60 rooms, we'll be able to draw for four more nights, and with 70 rooms, another five nights! Remember that two to a room is ideal and four is the hotel maximum, which is, frankly, a bit tight. (Additional \$10.00 per person per night over two). The more help we get from you to fill these rooms, the more we can help you. And besides that, the hotel is beautiful!

SEE YOU AT THE 1984 AAZK CONFERENCE SEPTEMBER 30 - OCTOBER 4!

PLEASE START THINKING ABOUT WHAT YOU'LL BRING FOR THE AUCTION.

1984 AAZK NATIONAL CONFERENCE REGISTRATION FORM

Sept. 30-Oct. 4, 1984

Please type or print. One name per form.
Return form with your fee to:



Mary Bennett, Registration Coordinator
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103
Phone: (206) 625-5488

Make checks payable to Puget Sound Chapter AAZK.
Deadline for Pre-registration is August 15, 1984.

1984 Registration

Name _____

ADDRESS _____

CITY _____ STATE/COUNTRY _____

ZIP/POSTAL CODE _____

ZOO AFFILIATION IF APPLICABLE _____

AREA OF INTEREST _____

VEGETARIAN YES _____ NO _____

WILL BE SUBMITTING PAPER YES _____ NO _____
(\$20.00 will be refunded on acceptance of paper)

AAZK MEMBERSHIP STATUS AND FEES:

MEMBER OR SPOUSE	\$50.00 each
NON-MEMBER	\$70.00 each
LATE FEE (After Aug. 15th)	\$15.00
TOTAL FEES ENCLOSED	\$ _____

ONE DAY RATES FOR INDIVIDUAL CONFERENCE EVENTS ARE AVAILABLE. PLEASE
CONTACT MARY BENNETT FOR INFORMATION.

Are you interested in purchasing a conference T-shirt?

YES _____ NO _____ Size S _____ M _____ L _____ XL _____
(This will help us provide adequate inventory)



800-426-1172 Out of State

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Our conference headquarters is the Madison Hotel, a quality hotel within Seattle's business and financial district. Shopping, entertainment and many of Seattle's scenic and historic attractions are within a easy walk.

Each of the Madison's 575 guest rooms has its own seating area with sofa and chairs, from which you can enjoy a sweeping view of Puget Sound and the Cascade and Olympic Mountains.

Special room rates for the conference delegates are: \$55.00 single
\$60.00 double

Use the toll free number (800 number) to make your reservations, and identify yourself as being with the American Association of Zookeepers.

If you wish to be matched with a roommate, let the hotel know when you call, and they will attempt to do so.

We feel the Madison offers a unique mixture of "new hotel", while retaining a sense of warmth in its smaller size. With the busy schedule we have planned, it would be advantageous to stay with us at the hotel. It is one of Seattle's finest hotels and we think you will enjoy it, especially at our reduced conference rates.

NOTE: The hotel also has a swimming pool and health club so you will want to bring your swimsuit! There is nightly entertainment at Visions, a video disco. Their rooftop restaurant, Pregos, serves a fine Italian cuisine. Be sure to bring evening attire for these.

Transportation from Sea-Tac Airport to the Madison is easy! Just take the Airporter bus directly from the airport to the hotel. The Madison is the first stop! It leaves every half hour from United Airlines Baggage Terminal, and the ride takes 20 minutes--Cost \$4.75.

CALL FOR PAPERS

This year's topic for presentation papers, WORKING IN ZOOS AND AQUARIUMS: TODAY AND TOMORROW, was chosen to encourage all conference delegates to participate in writing about their professions. Working in zoos and aquariums today is complex, challenging, and exciting, requiring many skills such as public speaking, computer use, construction technique and nutritional analysis, in addition to caring for animals. The ability to share this knowledge and to educate others is a great asset. In the future, it will be even more important to exchange ideas and information.

Papers will be limited to 20 minutes with a 5-minute question/answer period. Please submit an outline or abstract by July 15, 1984. AAZK national committees that plan to have meetings at the conference should submit time and meeting space requirements by this date.

Send papers, information, or questions to:

Phil Pennock
AAZK Conference
Woodland Park Zoo
5500 Phinney Ave. North
Seattle, WA 98103-5897



VACATION SUGGESTIONS FOR
1984 AAZK NATIONAL CONFERENCE DELEGATES

By
B. Wayne Buchanan
*Woodland Park Zoological Gardens
Seattle, WA*

If you're planning on attending the National Conference this fall in Seattle, you'll be in the northwest during a period offering great wild-life watching opportunities. The fall migration season will be in progress creating numerous areas of wildlife concentration in Oregon, California, and Washington. Here are some of my favorite areas to visit at that time of the year. When combined with a drive along the Oregon picturesque coastline they form a large, convenient, loop auto trip.

Klamath Basin National Wildlife Refuge - located in part of extreme northern California, and in part of extreme southern Oregon, this refuge is perhaps the premiere waterfowl area in North America. They can number in the millions. A visit here after the Conference would give slightly better odds of seeing a heavier concentration. This is also a major wintering area for Bald Eagles. Some of these birds should also be present. For more information contact:

Klamath National Wildlife Refuge
Route 1, Box 74
Tule Lake, CA 96134
(916) 667-2231

Hart Mountain National Antelope Refuge - located in southeastern Oregon, this refuge is only an hour or two from Klamath NWR. This area offers a good variety of typical prairie bird life with many possible migrants. The primary attraction here is the swift and keen-eyed pronghorn antelope. Once on the brink of extinction, this unique North American antelope is common here. However, they can be easily overlooked. Mule deer and, with a little luck (or a lot of hard work), California bighorn sheep can also be seen. For more information contact:

Hart Mountain National Antelope Refuge
P.O. Box 111
Lakeview, OR 97630
(503) 947-3315

Malheur Wildlife Refuge - located 42 miles from Hart Mountain NWR, Malheur offers one of the greatest variety of wildlife watching in the U.S. In the fall one of the major attractions is the gathering of sand-hill cranes in preparation for migration --7,000-plus are possible. Swans and other waterfowl are here in large numbers, also white pelican, shore and wading birds, and raptors. Golden Eagles are fairly common. Mule deer and coyote are common. Pronghorn antelope, porcupine, beaver and weasle are possible. This is one of my favorite areas. For more information contact:

Malheur National Wildlife Refuge
P.O. Box 113
Burns, OR 97720
(503) 493-2323

VACATION SUGGESTIONS FOR 1984 AAZK NATIONAL CONFERENCE DELEGATES, Con't

This has been only a brief listing of the highlights of these areas. There are many other animals possible as well as some very notable geographical points of interest. I will be traveling to these areas the week prior to the Conference. Though I cannot offer transportation to anyone, I will be glad to help with questions, information, or other assistance. I would also welcome the company of other AAZK members.

Whether you visit these or other areas of interest, I strongly encourage you to take advantage of being in this region by adding some enjoyable vacation time to your conference trip.



Information Please

We would appreciate any information on actual recorded birth weights (and other relevant data such as sex, gestation, etc. of the animals) of Reticulated giraffes. Send information to the Rocky Mountain Chapter Information Committee, c/o Denver Zoo, City Park, Denver, CO 80205.

We have been releasing black bears born at our facility into the wild as yearlings, but we need more information. If you have knowledge of captive black bears released into the wild, contact Doug Carmichael, Curator, Municipal Black Bear Habitat, 1001 Parkway, Gatlinburg, TN 37738 or call (615) 436-5423, Ext. 128.

I would like to hear from anyone having information on training macaws, parrots and cockatoos to do tricks for an exhibition. Send to: The Endangered Species, Inc., Rt. 3, Box 410, Trenton, FL 32693.



Primate Profiles

SIAMANG BIRTH AT THE SAN FRANCISCO ZOO

By
Lisa Hamburger, Ape Keeper
San Francisco Zoo, San Francisco, CA

The San Francisco Zoo and Ape Keepers John Alcaraz and Lisa Hamburger are proud to announce the birth of twin Siamangs (*Symphalangus syndactylus*)--we believe the first recorded in captivity. The female Siamang gave birth unassisted during the night of 9 March. The twins were spotted in the early morning, Saturday, 10 March 1984, and the next day were identified as two males.

One had swelling and edema in both legs, we believe, from the birth process. The swelling did not abate until Monday morning, 12 March. Neither twin was removed during this period from the mother, and the edema abated naturally. The male Siamang was in the cage during and after the birth. On Sunday, 11 March, the female was separated into the nightquarters to ascertain that both infants were healthy and nursing. Upon verification, the mother was released with her tightly clinging duo and reunited with her mate. She was given access to the entire cage (cage description: 25x25x50' cyclone fence oblong, hanging branches, access through flap door to heated concrete and wood nightquarters).

In addition to their normal diet of cooked sweet potatoes, apples, bananas, bread and monkey chow, we have added mirror leaf (*Coprasma*), cooked horse-meat, and 8 ounces of milk supplemented with one dropper (1 ml) of liquid vitamins, to the nursing female's diet.

The female Siamang is a six-and-one-half-year-old primiparous mother, born 9-13-77, on breeding loan from the Jackson Zoo, MS. The male is wild-caught, est. birth 1972, also from the Jackson Zoo. He has sired two previous offspring at the San Francisco Zoo; one DNS, the other, a female, was sent back to the Jackson Zoo for an unrelated female--the present mother.

Housed approximately 50 yards away in a similar structure is our Siamang pair who have produced the most offspring in captivity--to date 10 offspring. These progeny are on breeding loans throughout the United States, with first and second generations in Seattle and Tacoma, Washington. The breeding pair are in their 20's, arriving at the zoo in 1962. Their two most recent offspring, two females aged 1½ and 3½ years, live with them. A 5½ year old son was shipped out in December 1983 to the Gibbons and Galinaceous Birds Center. It brings to four the number of individuals in each Siamang family group (1.3 and 3.1).

Each day the two groups participate in several ear-splitting territorial calls, loud hooting back and forth, together and independently. Each individual participates in the group effort and when separated responds from whatever part of the zoo he or she is in.

It was amazing to see the twins which looked almost like one baby with four arms and legs tucked so close to mama's belly and chest, held up by her knees. But there they are, two healthy twin male Siamang babies! Doing fine so far.



THE SPECIES SURVIVAL PLAN:
A SUITABLE CASE FOR TREATMENT

By
Mike Clark, *Former Keeper*
Jersey Zoological Park, Channel Is.
and
Doug Richardson, *Keeper*
Howletts Zoo Park, Kent, England

Most people who read this journal regularly will be familiar with the Species Survival Plan (SSP) as outlined by the AAZPA and which was the subject of an "open house" discussion at the AAZK Conference in Philadelphia.

In crude terms, the object of each species-specific SSP is to formulate long-term plans of management for endangered species thus assimilating all pertinent data - e.g. the number of animals involved, their sex ratio, the hold capacity of the institutions concerned, projected capacity of those institutions, etc. - in an effort to monitor the healthy development of the captive population (1.). The eventual aim is to have each relevant species achieve a genetically balanced "population pyramid" with younger, more vital animals providing the base and working up through the bulk of the breeding population to the older animals at the apex. Surplus animals go to form bachelor groups or are euthanized.

At the present time, the SSP proposals are a response to management difficulties encountered in U.S. zoos, but there can be little doubt that such schemes will evolve sympatrically in Europe and elsewhere as major collections grapple with similar problems. The SSP then, has an international significance even at this early stage.

While a great deal of the initial reaction to the SSP has been emotional (with particular reference to euthanasia), the urgent need for improved long-term management of endangered species is obvious--as are the conflicting values inherent in the proposals.

In the sense that each SSP will provide closer scrutiny of the captive population and greater accountability of member institutions, these proposals are long overdue. If we accept this to be true, then it is necessary to examine the fine print of the SSP.

Among other criteria proposed, it is said that feasibility in captivity is concomitant with placing a given species on an SSP program. This includes availability of adequate facilities and mastery of husbandry for the species. (2.). As any keeper will testify, it is the absence of adequate facilities which is the irritating norm and is a failing commonplace in the zoo-world. Much harder to prove and dangerous to propose is the absence of required animal husbandry skills. Perhaps more difficult to ignore are the propagation figures for Snow Leopards in 1981 when the world's zoos recorded a net gain of 8.1% for this species. If conservation were a multi-national corporation then the board would be asking questions! However, we do not suggest that Snow Leopards should not be accorded the benefits of an SSP. We only urge that management competence should not be presupposed too readily for any species.

Another related question is the vitality of the captive population. A species such as the Amur Leopard may well be eligible for SSP, but this becomes complicated when the history of the species is examined. Nearly

THE SPECIES SURVIVAL PLAN: A SUITABLE CASE FOR TREATMENT, *Continued*

all the captive stocks derive themselves from two pairs--the original wild-born ancestors being deceased. In fact most individuals of all three races of Studbook Registered Leopard races derive their ancestry from only 8 to 10 individuals. The point we are trying to make here is that we should take care to recognize that our breeding programs and SSP initiatives do not help to conceal the very flaws which they are (hopefully) designed to correct.

We would like to propose that this journal become a focus for discussion of the SSP concept and all the argument surrounding it.

Perhaps we could invite comment on the following: An SSP could be seen in a disadvantageous light if, in the actual process of moving animals around and checking records, will the rate of propagation in some species be effectively slowed down? Also, if animals are to be moved around on a regular basis in order to implement SSP objectives, does this not expose greater numbers of important specimens to disease and accident? Will it be a straightforward procedure to pull replacement specimens from the surplus stock pool which will be differently structured socially from the main breeding populations?

There will, of course, be many more questions than answers with regard to the long-term management of zoo animals. However, we hope this in itself does not discourage open discussion.

References

1. The role of zoos and aquariums in captive propagation of rare and endangered species - AAZPA Newsletter, August 1981 - Nancy Muckenhirn.
2. AAZPA Report - May 1981 - Tom Foose
3. The 1981 annual report of the captive Snow Leopard population - International pedigree book of Snow Leopards III - L. Blomquist.
4. International Zoo Yearbook No. 19 - A.H. Shoemaker



ENVIRONMENTAL EDUCATION GRANTS ANNOUNCED

The National Audubon Society Expedition Institute has announced a grant and scholarship program for high school, college and graduate students. The 1984 awards are designed to defray an individual's expenses while attending school or completing a project, internship or summer program of the person's choice.

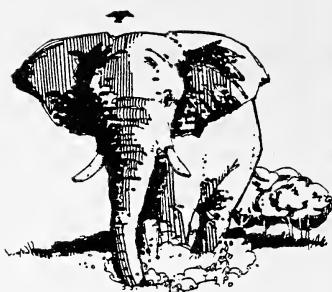
Application forms and instructions for grants up to \$500 are available until July 1984 by sending a self-addressed, stamped #10 envelope to: Scholarship Committee, RFD#1, Box 149-B, Lubex, ME 04652. Applications must be received prior to 15 July 1984.



THE STRUGGLE FOR SURVIVAL

A CRUEL DILEMMA

By
Peter Jackson
IUCN Press Service



Zimbabwe is planning to reduce its elephant herds by 30 per cent over the next few years because of the recent severe drought and pressure on land from the growing human population. Vegetation has suffered so badly from the drought, and its potential for early regeneration is so reduced that the government's wildlife specialists have decided that an initial cull of 6,000 elephants must be taken this year out of the total population of some 50,000. The long-term aim is to reduce the population to around 35,000, a figure considered to be within the carrying capacity of the land likely to be available for elephants in the foreseeable future.

The prolonged drought has been one of the worst suffered by southern Africa. Recently it was broken by heavy rains, but a senior Zimbabwe government scientist has declared: "The situation in most of the wildlife reserves remains critical. The level of rainfall, and therefore plant growth, is still well below that required to sustain game populations through the next dry season."

Zimbabwe's plans are bound to cause a shock at a time when there is an international outcry about ivory poaching and a decline in the number of elephants in many parts of Africa. It is indeed tragic, especially since Zimbabwe has the healthiest elephant population in Africa.

At the turn of the century hunting for ivory had almost wiped out elephants in most of southern Africa and only around 4,000 are believed to have roamed the wide open spaces of what is now Zimbabwe--then called Rhodesia. But by the beginning of this century laws were introduced to protect them and reserves were being established. In Rhodesia careful management has led to a 12-fold increase in the country's elephant population in the past 80 years.

But while elephants were increasing so were people, and present day Zimbabwe has a population of seven and a half million--15 times the 1900 population--which is growing at a rate of 3-4% a year. There is great pressure on land and elephants and other wild animals will be lucky to retain their present 12% of Zimbabwe's area at the end of this century--only 16 years away.

Faced with this situation, Zimbabwe's wildlife managers have decided that the elephant population has to be kept in check. Furthermore, experience has shown that elephant herds confined to reserves and no longer at liberty to wander widely may destroy their habitat and food sources, resulting in starvation and a population crash.

The extensive Hwange (Wankie) National Park is a good example of the overall situation. Bordering the Kalahari desert, it is a dry dusty land, and in the past the waterholes filled during the rainy season and dried up in subsequent months. Elephant had to migrate. Management of Hwange involved making many of the waterholes perennial by installing pumps to bring up subsoil water. Elephants stayed throughout the year and bred in the favorable conditions so that there are now over 20,000 compared with 1,000 when the reserve was first established in the 1920s. Not only

A CRUEL DILEMMA, Continued

elephant flourished. Buffalo, impala, sable, roan, black rhino and re-introduced white rhino have all benefitted and combine to make Hwange a spectacular place to view wild Africa.

However, it is soon apparent to a visitor that Hwange is endangered by the abundant elephant herds. Stark tree skeletons litter the landscape, especially around the waterholes. Some areas look like deserted battlefields. Elsewhere bark hangs from the trunks of trees, still green with leaf but doomed to die. It may be exciting to watch elephants tearing down branches with their trunks, or bulldozing trees to the ground for the sake of some fruits or twigs. But in large numbers they may cause such destruction that the time could come when there is no food for them. In the past herds could move to new pastures, but now expanding human populations have surrounded and encroached on the remaining wilderness and there is virtually no space left for elephants outside their present habitats.

Twenty years ago a similar situation was developing in Kenya's Tsavo East National Park, where growing numbers of elephants were destroying the trees. There was a long and bitter debate between advocates of culling and those who argued that it was a natural phenomenon and nature should be allowed to take its course. In the event the argument became academic as drought and a massive wave of poaching took the lives of thousands of elephants--over 16,000 according to some estimates--as well as rhino and other species. Since then poaching has continued to reduce elephant numbers in Tsavo and many other areas of Africa.

Elephant poaching has not been such a serious problem in Zimbabwe, and elephants flourished even during the bush war preceding independence in 1980. But now the drought has dramatized the potential threat of overpopulation and Zimbabwe's wildlife managers see no alternative to sacrificing individual elephants for the future benefit of the species. This year 4,000 elephants will be culled in Hwange, and some of the pumps providing perennial water are being switched off so that elephants are no longer attracted and the surrounding vegetation will have a chance to recover.

In the southern reserve of Gona-re-Zhou bordering South Africa, the elephant population was reduced by culling last year to nearly one-third--from 7,000 to 5,000--because of the severity of the drought and the damage the herds were doing to their habitat. Great Baobab trees, some which have survived for 2-3,000 years--a sobering thought--were being decimated. Now five hundred more elephants will be culled there. In the north of the country, along the southern shores of the Zambezi, up to 1,000 elephants will be culled in the Matusadona and Chizarira/Chirisa reserves, and 900 in the Zambezi valley between Kariba and Mupata Gorge.

Zimbabwe's wildlife scientists feel that culling is fully justified in the interest of both woodlands and elephants, not to speak of other species. They argue that damage to woodlands may well be irreversible by the time it is obvious--in some devastated areas of Tsavo there is still no regeneration after 20 years. And if regeneration does take place it can take much longer to produce a mature tree than an elephant.

Culling may be considered justified, but it is not a pleasant task. In the words of a spokesman of the Department of National Parks and Wild Life Management, "Controlled culling by skilled teams involves shooting large chunks of the populations, which is not pretty. Entire family groups are eliminated by skilled marksmen in the numbers and areas in

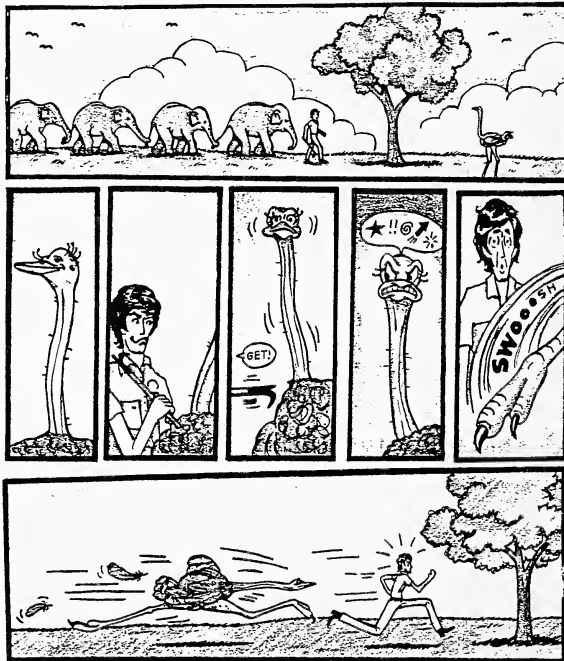
A CRUEL DILEMMA, *Continued*

which reduction is necessary. It is unpleasant, but so are the alternatives--a return to *ad hoc* human predation and loss of control, or a *laissez-faire* approach with the risks of habitat destruction and massive numbers of elephants dying."

The culling produces ivory and hides, which are sold to benefit the national exchequer. Twenty-five per cent of the meat goes to local people near culling operations, and the rest goes to more distant markets. But all of this is considered to be "windfall" or spin-off of elephant population control and not a justification. However, it does serve to soften the often hostile attitude of local people to wildlife reserves, which may have been their former hunting grounds, or even their homes from which they have been moved. Wildlife managers say that poaching has noticeably diminished, and virtually ceased in some areas where food and other products from wildlife have been provided from culling.



THINK Safety!



THINK SAFETY -
USE THE PROPER EQUIPMENT FOR HANDLING
YOUR ANIMALS!

Chapter

News

Gerald Payne
Coordinator for Chapter Affairs

The following zoos have expressed an interest in forming Chapters at their institutions: California Living Museum, Bakersfield, CA; Central Texas Zoo, Waco, TX; North Carolina Zoological Park, Asheboro, NC; Boise City Zoo, Boise, ID; John Ball Zoo, Grand Rapids, MI; Turtle Back Zoo and Van Saun Park Zoo for possible Jersey regional chapter; and the Alexandria Zoological Garden in Alexandria, LA.

The following Chapters are in the process of reactivating: Topeka Chapter, Topeka, KS; Kansas City Zoo, Kansas City, MO; and Audubon Park Zoo, New Orleans, LA.

The North Jersey Zookeepers held their first meeting during a blizzard but remained undaunted and came up with an outline of their purpose for a chapter and discussed future meetings.

The Roger Williams Park Zoo reports that all is going well. They held a profitable holiday turkey raffle and are also selling zoo posters to raise money. They are also interested in information on possible guest speakers. Maybe some of the other Chapters can supply them with this information. If so, write and let them know.

The South Florida Chapter continues to put out their monthly newsletter. They hold a barbacue one hour before their regularly scheduled meetings so that members can eat there instead of going home and coming back. In March they had a Book/Bake sale at the South Miami Street Fair. They are now gearing up for the 1985 National AAZK Conference.

The Detroit Chapter held a membership drive and recruited 22 professional and seven affiliate members. The Zoo's Director, Steve Graham, paid half the dues for all the new members and also the Chapter's charter fee. The Chapter made \$200 selling uniform T-shirts to the employees and \$80 on bake sales.

The Oklahoma City Zoo Chapter is working on designing a Chapter logo and are interested in what other Chapters have used. There seems to be no record at National Headquarters on Chapter logos and the staff is only aware of a few. Chapters who already have their own logos or patches are asked to send a photocopy of same to both the Coordinator of Chapter Affairs and the National Headquarters. This way, when the question arises, we can help avoid duplication of logos between Chapters.

Chapters should keep me posted on what they are doing. I want to put out an update on what all the Chapters are doing!



Keepers and Computers...Part Four

FIGURING IT ALL OUT: OR, COMPUTER STATISTICS ARE NOT SADISTICS

By
Jim Albert
Colony Manager, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX

This month, I'm going to discuss statistical tests and how they can be performed using an inexpensive microcomputer. But, instead of describing the arid details of the statistics themselves and then (if you were still with me) dealing with some practical examples, I'm going to start with a simple, practical research problem and work through it, illustrating the math and the programming as I go. I hope that the general principles show through the specific nature of the example.

Let's say that we have four reasonably large, 'chain-link box' outdoor primate exhibits, with concrete floors and heatable houses at the back. In these cages we have, in appropriate social groups based on the species and the space available, Japanese macaques, Celebes macaques, Mandrills, and Gelada baboons. We also have a curious keeper, who has been feeding these animals for enough years to have begun to ask himself, "What is the relationship between the temperature and the amount of food these guys eat?"

This is a practical question in that it might prevent wastage of food, which would be good for both the budget and pest control efforts.

What does the keeper need to know to do this study? The important information would seem to be the high and low temperature in his area (calling the weather bureau would not cut it) and the amount of food each group consumes. The former could be obtained from a thermometer mounted behind the area; it would be dandy if it was the sort that recorded the high and low temperature itself. The latter could be determined by weighing the food before feeding, and sweeping up and weighing the leftovers. A simple data sheet could be printed up that could make recording this information easy.

Although it could be done in other ways, the information is stored in the computer in the form of string arrays, much like I discussed last month for sort programs. Each string is 24 characters long; the first six are the date (example: 240284), the next one is cloud cover (0-4, 0 being clear and 4 being totally clouded over), the next three are for high temp (it could go over 99, ex: 87), the next two for low temp (ex: 45), and then there would be four groups of three characters each for the amount of food eaten by each of the four groups (decimal points for tenths of pounds or kilos would be omitted). An example of a complete string would be:

240484308745125134092170

Let's say that data for a hundred or so days has been entered into the computer in the above format. What are we going to ask the machine to tell us?

First of all, it would be interesting to look at the statistical description

of each variable ('variable' referring, of course, to cloud cover, high and low temp, and the amount of food eaten by the four groups). These are univariate statistics, since they are performed on one variable at a time, and include the mean (what is usually called 'the average') and the standard deviation. The mean is a measure of central tendency--around what value do the values cluster?--and the standard deviation (or s.d.) is a measure of variability or dispersion--how far away from that central value are values found? Both are easy to compute; in addition, the following short program will give us minimum and maximum values, and the range of values.

(example for high temperature)

```

LET SUM = 0
LET SUMSQ = 0
LET MIN = 1000
LET MAX = 0
FOR I = 1 TO N
  LET V = VAL D$(I,8 TO 10)
  LET SUM = SUM + V
  LET SUMSQ = SUMSQ + (V*V)
  IF V < MIN THEN LET MIN = V
  IF V > MAX THEN LET MAX = V
NEXT I
LET MEAN = SUM/N
LET VAR = SUMSQ/N
LET S.D. = SQR VAR
LET RANGE = MAX - MIN
PRINT 'MEAN: ';MEAN, 'S.D. ';SD
PRINT 'MAX: ';MAX, 'MIN: ';MIN
PRINT 'RANGE ';RANGE

```

Note: '*' means multiply, 'SQR' means square root; N, keep in mind, is simply the total number of cases; 'var' is short for variance, a useful value in other analyses but here used to find the S.D. Also note that the above BASIC example is in BASIC and would require each line to be numbered in some fashion for it to run.]

We know that the high temperature will vary widely over a period of many days, so we should expect to see a rather large standard deviation. However, if we find a MINimum value of 85, then somewhere a mistake was made in entering data for writing the program!! But what about food consumer? Could the S.D.'s be large or small? It would be interesting, if weights were available on all of the individual animals, to sum the weights of the inhabitants of each case and divide the mean of the weight of the food consumed by that value so as to obtain numbers that are more directly comparable between groups.

Univariate stats will more nearly answer the question we are asking: Is there a relationship between temperature and the amount of food consumed? Univariate means two variables are used; in this case, we want to see if high temp, low temp, and (importantly) the difference between these two values are correlated with the food intake of each of the four groups. Two such tests need to be made, one for each of the four groups, for each of the three temp variables (3*4=12). The test illustrated in the following program is called the 'product-moment correlation' or 'Pearson's r statistic'. It's intended application is to what is called 'normally distributed data', but a discussion of normalcy is beyond the purposes of this article; fortunately, when a statistical test's assumption of

normalcy can be violated without dire consequences it is said to be 'robust', and Pearson's 'r' is quite robust (so don't worry about it).

```

LET SUMX = 0
LET SUMY = 0
LET SUMXSQ = 0
LET SUMYSQ = 0
LET SUMXY = 0
FOR I = 1 TO N
LET X=VAL D$( I, 11 TO 12)
LET Y=VAL D$( I, 13 TO 15)
LET SUMX = SUMX+X
LET SUMY = SUMY+Y
LET SUMXSQ=SUMXSQ+(X*X)
LET SUMYSQ=SUMYSQ+(Y*Y)
LET SUMXY=SUMXY+(X*Y)
NEXT N
LET SQSUMX=SUMX*SUMX
LET SQSUMY=SUMY*SUMY
LET R= (N*SUMXY) - (SUMX*SUMY)/SQR(SUMXSQ-SQSUMX)*(SUMYSQ-SQSUMY)
LET DF=N-2
PRINT 'PEARSON'S R = ';R
PRINT 'DEGREES OF FREEDON= ';DF

```

(the above calculates a correlation between the low temp and the amount of food eaten by the first group, according to our data storage format devised earlier.)

In the example above, 'degrees of freedom' are printed out. This value allows you to resort to a standard statistical table for correlation coefficients and find the significance for the correlation that is computed. As for the 'r' itself, if it's almost 1, then the correlation is strongly positive; that is, if the low temp goes up, then so does food consumption. If it is nearly a minus 1, then the opposite is true. If it is 0 or close to it, no or a weak correlation exists. Regardless, you should set a number between -1 and 1; if you don't, something's wrong!

Of course, the univariate and bivariate routines in this article could be combined into one program, that would automatically step through the variables or variable pairs as needed. There isn't space here to go into this nonmathematical process of for-next loops.

I'd encourage you to try it yourself, but if you really want to do this sort of statistics and can't seem to set it to work, I might be able to help in a couple of ways. I can try to answer your questions. I am also working on a program that will input data, sort it, do univariate stats on it, do three correlation routines, and plot the data on the screen as well. I would be willing to share this program with anyone who could put it to some use. If you have an Apple II or a Timex/Sinclair, then a copy could be sent on cassette tape; otherwise, a program listing could be provided, and you'd have to type it in yourself.

The example discussed in this article of temperature and food consumption is intended to be just that--an example. I'm not going to defend it as worthwhile thing to do (though it might be); I just used it as a foundation for presenting the statistical stuff. With a little imagination, you will probably find even more practical applications for elementary statistical analysis. [Oh, by the way, why do you think I picked the species that I did for this study? Why did I have 'cloud cover' recorded, and what could be done with it?]

w, that wasn't TOO painful...was it?

Next time, I'm going to tell you about how you can use your own computer as a learning tool, and for other miscellaneous purposes. As usual, your questions and comments are welcome. Address to: Jim Albert, Dept. of Anthropology, UT-Austin, Austin, TX 78712.



Legislative News

*Compiled by Kevin Conway
Legislative Coordinator*

CENT FWS ACTIONS UNDER ENDANGERED SPECIES ACT

Department of Interior's Fish and Wildlife Service has proposed Endangered status and to designate its Critical Habitat under authority contained in Endangered Species Act of 1973, as amended, as follows:

Wyoming toad (*Bufo hemiophrys baxteri*), formerly abundant in the Laramie Basin, is now known to occur only in one 40-acre area of privately-owned land in Albany County, WY.

Florida Torreya (*Torreya taxifolia*), is endemic to the Apalachicola River area in Florida and Georgia, and is endangered by a fungal disease, which kills trees before they reach seed-bearing size.

US also has designated 10 foreign mammals Endangered, but cannot designate Critical Habitat as all are found totally out of U.S. jurisdiction. The ten are: Singapore roundleaf horseshoe bat (*Hipposideros ridleyi*), drigues Island flying fox fruit bat (*Pteropus rodricensis*), Bulmer's flying fox fruit bat (*Aproteles burmeri*), Bumblebee bat (*Craseonycteris longlongyai*), Buff-headed marmoset (*Callithrix flaviceps*), Preuss's red colobus monkey (*Colobus badius preusii*), Vancouver Island marmot (*Marmota vancouverensis*), African wild dog (*Lycason pictus*), Pakistan leopard cat (*Felis margarita scheffeli*) and the Giant panda (*Ailuropoda melanoleuca*).

US has removed from the U.S. List of Endangered and Threatened Wildlife Simpson's pearly mussel [(=*Dysnomia sampsoni*), once found in portions of Wabash River in Illinois and Indiana and the Ohio River near Cincinnati, and has labeled it extinct since no specimens have been collected in over 70 years despite repeated samplings within its range.

US amended its regulations under the Eagle Protection Act, as approved by Congress, to permit taking (i.e., collection, molestation, disturbance, or destruction) of golden eagle nests during resource development or recovery operations when the nests are inactive if the taking is compatible with the preservation of the area nesting population of golden eagles.

US proposed to amend Part 17 of Title 50 of the Code of Federal Regulations in order to comply with changes made in the Endangered Species Act of 1973 by the Endangered Species Act Amendments of 1982. Part 17 would be amended to establish procedures for: (1) the establishment and/or designation of certain populations of species otherwise listed as Endangered or Threatened as experimental populations; (2) the determination of such populations as "essential" or "nonessential"; and (3) the promulgation of appropriate protective measures for such populations.

In findings on pending petitions, FWS has determined:

Designation of critical habitat for the Higgins' eye pearly mussel is not a petition requiring published findings under the Act.

Listing of the bobcat (Lynx rufus) and the river otter (Lutra canadensis) is "not warranted" at this time.

Petition for listing of 58 foreign bird species requested by Dr. Warren B. King, Chairman, United States Section, International Council for Bird Preservation in 1980, was found to be "warranted but precluded."

FWS may find petitions "warranted but precluded" under Section 4(b)(3)(B)(iii) of the Act when FWS is making expeditious progress in revising the lists. In the 12-month period following the effective date of the Amendments (Oct. 13, 1982), the Service rendered final listing actions on 28 species, proposed listing actions on 83 species, and emergency listings on 8 species. As of Oct. 13, 1983, FWS's Washington Office of Endangered Species was also reviewing documents that would propose or make final listing actions on 95 species.

The FWS has also proposed the following:

- (1) Endangered Status for the Guadalupe fur seal (Arctocophalus townsendi)
- (2) Endangered Status and Critical Habitat for the Key Largo woodrat (Neotoma floridana smalli) and the Key Largo cotton mouse (Peromyscus gossypinus allapaticola).
- (3) Endangered Status and Critical Habitat for the Modoc sucker (Catostomus microps).
- (4) Threatened Status for the Ozark Cavefish (Amblyopsis rosae).

FWS also has proposed reclassifying from Endangered to Threatened the snail darter (Percina tanasi) and rescinding Critical Habitat Designation.

Comment period on proposed Endangered Status and Critical Habitat for the Fresno kangaroo rat (Dipodomys nitratooides exilis) was reopened.

FWS also announced final findings by a Scientific Authority and a Management Authority under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) on export of several species taken in 1983-84 and subsequent seasons. These species included: Alaskan Gray Wolf (Canis lupus), Alaskan Brown or Grizzly Bear (Ursus arctos), Bobcat (Lynx rufus), Lynx (Lynx canadensis) and River Otter (Lutra canadensis).

---from ECOLOGY USA
February 13, 1984 and March 12, 1984



In Encouraging Word.....

HORSE TRADING AND BEHAVIORAL RESEARCH PAYS OFF WITH IMPORTANT FIRSTS AT SAN DIEGO WILD ANIMAL PARK

By
Debbie Hewitt, Hospital Keeper
Vice President San Diego Chapter
San Diego Wild Animal Park

A very significant endangered species birth occurred on 28 February 1984 at the San Diego Wild Animal Park with the arrival of Vasilii, a male Przewalski's wild horse. Vasilii represents an invaluable horse trade that will help preserve the genetic variability of Przewalski's wild horses for decades to come. The birth also provided support to an important new theory on wild stallion behavior.

Vasilii was born early in the morning after a normal gestation of 327 days, according to Rich Massena, field service manager at the Wild Animal Park. Massena said the colt and mother, 5-year-old Vata, are "looking extremely well and the veterinarians and keepers couldn't be more pleased with how everything's going."

Massena has an avid interest in the health and welfare of Vasilii and has been anxious about the pending birth. It was exactly eleven months before the birth date (on 28 March 1983) that Massena was attacked and bitten by Vasilii's father, 20-year-old Basil, as he was trying to rescue another newborn colt, Vargo, from repeated aggressions from the stallion. Massena was hospitalized for several days with a crushed forearm and was off work for two months due to the accident. During several hours of surgery, Dr. Gary L. Douglas reconstructed both bones in Massena's left forearm using a bone graft from Massena's hip, two metal plates and 11 screws. Massena has regained most of the use and strength of his arm, but still has to undergo surgery in June or July of this year to remove the hardware.

In spite of Massena's heroic efforts to save that newborn colt, Vargo died the next day from internal injuries.

Vargo and Vasilii had the same mother, Vata, who arrived in the U.S. in July 1982 from the Ukrainian preserve at Askaniya Nova. Vargo was sired by a stallion in Moscow prior to Vata's departure for the U.S.

After Vargo's death, Wild Animal Park officials began to analyze a previous Przewalski colt death (Dec. 1982) that had, for lack of any contrary evidence, been listed as a stillborn. Suspicions grew that Basil may have caused that death, too. That colt, like Vargo, had not been sired by Basil.

Vasilii's behavioral history prior to coming to the Wild Animal Park in October 1982 was very favorable. At his previous home at the Marwell Zoological Park in England, he sired and was present for the birth of 48 foals. He had shown no aggressive tendencies toward any of these babies.

Inflamed by Basil's seemingly inconsistent behavior, Zoological Society of San Diego researchers discussed the symptoms with equine specialists from around the world, and, in doing so, discovered other recent studies which recorded similar actions for feral horses in the U.S. and Europe. Due to increasing amounts of data, equine behavioral specialists have now pieced together a theory that when a wild stallion displaces another stallion as leader of a band of mares, the new stallion often kills any newborn offspring he did not sire.

HORSE TRADING AND BEHAVIORAL RESEARCH PAYS OFF WITH IMPORTANT FIRSTS
AT SAN DIEGO WILD ANIMAL PARK, *Continued*

The fact that Basil may have killed both unrelated colts at the Wild Animal Park, yet is very calm around Vasilii, supports this theory of infanticide in wild horses.

This breakthrough in behavioral research for wild horses enables zoos and wildlife preserves to better manage changing herds of horses. Previous management of Przewalski's wild horses had followed guidelines set for domestic horses. This type of infanticide has never been reported in domestic horses.


Dr. Oliver A. Ryder, geneticist for the Zoological Society of San Diego, was elated at the news of Vasilii's birth and the resolution of problems with Basil. Oliver claims, "Vasilii is a very desirable mixture of bloodlines and has a great future in store for preserving the genetic variability of Przewalski's wild horses."

Ryder is also the species coordinator for the Przewalski's wild horse Species Survival Plan (SSP) of the American Association of Zoological Parks and Aquariums. As such, Ryder keeps computerized records of all 500 Przewalski's wild horses alive today at 74 zoos and private collection around the world.

Ryder and others on the SSP committee have worked across political boundaries in an effort to save this wild horse from extinction. The Przewalski horse is extinct in the wild and the future of the species is entirely dependent on human management.

Ryder was instrumental in the organization of the 1982 exchange of Przewalski horses between the U.S. and the Soviet Union that resulted in Vata's arrival at the Wild Animal Park and a mare and a stallion going to the New York Zoological Society's Bronx Zoo. The stallion at the Bronx Zoo, Vulkan, has sired a filly, born last fall, but the mare, Varna, has yet to foal.

The Russian bloodlines are a direct descendent of the last horse taken from the wild in 1947. Vasilii's birth represents the introduction of two valuable bloodlines into the U.S. --Vata's and Basil's. According to Ryder, "We must control the breeding of these horses to prevent repeated brother-sister, father-daughter matings which could produce harmful effects in the offspring. The addition of the two new bloodlines into the gene pool help insure the genetic variability and stability of the Przewalski species for years to come. This healthy baby, our behavioral research findings and the encouraging progress against extinction are what our organizations (San Diego Zoo and San Diego Wild Animal Park) are all about."



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AKF will be ten years old in October, 1984. To commemorate ten years of continuous publication, a special T-Shirt has been issued.

All profits from the T-Shirt sales will benefit the 1984 AAZK Annual Conference and ANIMAL KEEPERS' FORUM.

The shirts will only be available for a few more months; through the AAZK Conference. A check must accompany your order; \$7.50 each includes postage and handling. The shirts are 100% cotton, if you wash or dry at high temperatures order a size larger than you normally wear.

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1974 - 1984

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Total Amount enclosed \$ _____

The following "Positions Available" listings were received at the office of AKF. 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.

SUPERVISOR OF BIRDS...responsible for care/maintenance of Bird Collection. Requires a minimum of two years zoological park experience with birds. B.S. in Zoology or related field preferred. Send resume and references by 31 May, 1984 to: Hayes Caldwell, Executive Director, Caldwell Zoo, P.O. Box 428, Tyler, TX 75710.

ELEPHANT HANDLER...to assist trainer and participate in African elephant husbandry program/exotic hoofstock management. Salary \$924-\$1,224 per month plus benefits. Send resume by 1 June 1984 to: Mike Blakely, Curator/Mammals, Kansas City Zoo, Swope Park, Kansas City, MO 64132.

KEEPER - ELEPHANT/GENERAL...performs responsible animal husbandry duties in the care of a variety of exotic animals at the Washington Park Zoo, Portland, OR. Prefer applicants with extensive elephant management experience. Pay \$8.41 per hour plus benefits. Contact Personnel Office, Metropolitan Service District, 527 S.W. Hall St., Portland, OR 97201, phone (503) 221-1646 for job description and application procedure. Position closes 6 June 1984.

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 the program involves wildlife, as well as educational programs and special projects. Interns must be available for up to five months. Qualifications: college student or recent graduate, studying wildlife or related field; some experience with people and animals; a sincere concern and interest in working with animals. Housing and stipend: \$55/week, housing provided. Internships offered year round. To apply, send resume, statement of goals and three references to: Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy Nature Center, 1450 Merrihue Dr., Naples, FL 33942 (813) 262-2273.

AVES KEEPER/ASSISTANT MANAGER...responsible for care of large number of birds in Chicago quarantine and holding stations. Current driver's license, passport and previous experience with birds required. Basic knowledge of aves medicine, Spanish and carpentry helpful. Contact: Jill Grade, Station Manager, International Birdhouse, 956 West Huron St., Chicago, IL 60622 or call (312) 412-5458.

ZOOKEEPERS...responsible for daily feeding/maintenance/health/behavioral observations. Positions in Children's Zoo and primate sections. Contact Sam Winslow, Curator of Mammals, Audubon Zoological Garden, P.O. Box 4327, New Orleans, LA 70178 (504) 861-2537.

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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.

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

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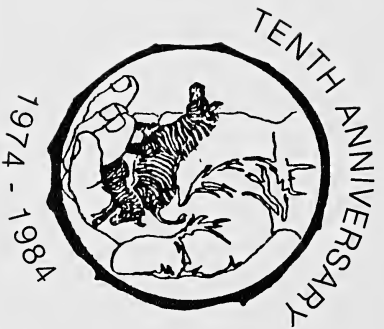
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JUNE 1984



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This month's Keeper/Artist is Jill Hickey of Tucson, AZ. Jill works in the field of animal care at the Desert Pet Center in Tucson. Her artwork features one of the many hummingbirds Jill says visit her feeder and flowers. Thanks, Jill!

Scoops and Scuttlebutt

CELEBRATE YOUR ZOO DURING JUNE 1984

The month of June is officially National Zoo and Aquarium Month. Over 125 million people visit our nation's some 200-plus zoological parks and aquariums each year to take advantage of both the recreational and educational benefits. June is an excellent time to interact with your zoo's visitors, help them learn more about the purposes of zoos and aquariums and to hopefully increase their awareness of and appreciation for animals. Many Chapters plan special activities at their institutions during June. If you are not actively participating in National Zoo and Aquarium Month in 1984--begin making plans now to promote your institution next June.



KEEPER ACCOMODATION LIST UPDATE/SURVEY

---submitted by Oliver Claffey, Metro Toronto Zoo

I am revising the Keeper Accomodation List for 1984. In your Membership Directories please add KAL alongside the following zoos:

- ...Utica Zoo, New York
- ...Columbus Zoological Gardens, Ohio
- ...Riverbanks Zoological Park, Columbia, SC
- ...Turtle Back Zoo, West Orange, NJ

If your zoo or aquarium chapter is a KAL participant, would you please help? Just fill in the form below and mail to: *Oliver M. Claffey, AAZK, Metro Toronto Zoo, Box 280, Westhill, Ontario, M1E 4R5, Canada.*

ZOO _____

CONTACT PERSON _____

HAVE YOU BEEN HOSTS TO TRAVELING AAZK MEMBERS IN THE LAST 12 MONTHS?

YES _____ NO _____

IF SO, HOW MANY TIMES? _____

DO YOU HAVE ANY SUGGESTIONS FOR IMPROVING THIS SERVICE? _____



Births & Hatchings

TOPEKA ZOO.....Alice Miser

Late April, early May 1984 B&H include: Mammals - 0.0.3 Giant Indian fruit bat, 2.1.0 North American porcupine; Birds - 0.0.2 Red-crested touraco (first time at Topeka) and 0.0.2 American golden eagles. These two eagle chicks represent the 30th and 31st successful hatching of this species at the Topeka Zoo since 1971.

TAMPA/BUSCH GARDENS.....Sandy Moher

B&H for April 1984 include: Mammals - 1.0 Greater kudu, 1 Senegal bushbaby, 6.7 Thomson's gazelle, 0.1 Sable antelope, 1 Black-capped capuchin monkey, 0.1 Scimitar-horned oryx, 2.7 Nyala, 0.1 Muntjac, 0.1 Kafue (Red) lechwe, 0.1 Addax, 1.1 Soemmering's gazelle; Birds - 6 Gold-capped conure, 11 Ringed teal, 29 Mandarin duck, 15 Red-crested pochard, 8 Indian ring-necked parakeet, 10 Jandaya conure, 4 Crested tinamou, 8 Sun conure, 2 Moustache parakeet, 2 Cockatiel, 2 Fischer's lovebird, 1 Red-crested touraco, 1 Indian peafowl (Blue Phase), 1 Chilean pintail, 1 Green-winged macaw, 2 Chattering lory, 4 Black-masked lovebird, 1 Timneh parrot, 2 Golden (Queen of Bavaria) conure, 5 Orinoco goose, 2 Goldie's lorikeet, 2 Black-necked swan, 3 Black swan and 2 Red-necked ostrich.

LINCOLN PARK ZOO.....Susan Moy

The following are the April 1984 B&H: Mammals - 0.0.1 Chimpanzee, 0.0.2 Geoffroy's tamarin, 0.0.2 Black lemur, 0.0.2 Black and white ruffed lemur, 1.0.2 Owl monkey, 0.0.2 Emperor tamarin, 1.0.2 Geoffroy's marmoset, 0.0.2 Senegal galago, 0.0.3 Moustached tamarin; Birds - 0.0.1 Sunbittern (DNS), 0.0.2 Nicobar pigeon, 0.0.4 Shama thrush, 0.0.3 White-crested laughing thrush, 0.0.2 Fairy bluebird; Reptiles - 0.0.11 Rainbow boas.

HONOLULU ZOO.....Steve Robinson

B&H for January through April 1984 include: Mammals - 0.1 White-handed gibbon, 0.0.5 Golden lion tamarin (3 DNS), 1.0 Black lemur, 1.0 Giant anteater (DNS), 2.2 Hawaiian sheep, 0.1 American bison, 1.1 Aoudad, 0.0.4 Hawaiian pig; Birds - 6.4 Nene, 0.0.12 Hawaiian gallinule, 0.0.1 Kea (DNS), 0.0.6 Galah, 0.0.3 Amboinia king parrot, 0.0.4 Green-winged king parrot, 1.1 Grand yellow macaw (DNS), 0.0.2 White ibis; Reptiles - 0.0.2 Helmeted turtle and 0.0.8 Day gecko.

DALLAS ZOO.....Tami Jones

April 1984 B&H include: Mammals - 0.2 Dama gazelle, 0.1 Addax, 0.0.1 Mexican fruit bat, 0.1 Speke's gazelle, 3.0 Barbados sheep, 0.1 Bison, 0.1 Grey x Pygmy goat, 1.0.2 Patagonian cavy, 1.0 Nile lechwe, 1.0 Eland, 0.0.1 East African porcupine, 1.0 Kirk's dik dik; Birds - 0.0.1 Bar-tailed cuckoo dove, 0.0.1 Nicobar pigeon, 0.0.1 Edwards pheasant, 0.0.1 Hawaiian goose, 0.0.3 Black-necked swan; Reptiles - 0.0.20 Macquarie turtle (*Emydira macquarii*).

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

B&H for March and April 1984 include: Mammals - 0.0.1 Red kangaroo, 0.0.1 Vampire bat, 0.0.2 Tree shrew (DNS), 0.0.3 Ruffed lemur, 0.0.1 Bolivian titi, 0.0.1 Diana monkey, 0.0.1 Caribou (DNS); Birds - 0.0.2 Humboldt penguin, 0.0.2 East African crowned crane (DNS) and 0.0.1 Barn owl.

BIRTHS AND HATCHINGS, Continued

KANSAS CITY ZOO.....Dee Wolfe

B&H for January through March 1984 include: Mammals - 0.0.1 Red kangaroo, 0.0.2 Meerkat (1 DNS), 0.1 Masai giraffe, 0.0.1 Potoroo, 1.0 Ring-tailed lemur, 0.1 Dairy calf, 0.2 African pygmy goat, 0.1 Sicilian donkey, 2.0 Barbados sheep, 0.0.2 Patas monkey; Birds - 0.0.1 Emu, 0.0.1 African Speckled pigeon, 0.0.2 Ostrich (DNS).

BRONX ZOO.....Margaret Price

March 1984 B&H include: Mammals - 0.1 Yak, 1.0 Slender-horn gazelle, 1.0 Pen-tailed bettong, 2.0 Mouflon, 1.0 Nyala, 0.1 Red brocket deer, 0.1 Grevy zebra, 2.0 Patagonian cavy; Birds - 3 Green wood hoopoe, 2 Tawny frogmouth, 1 American barn owl, 1 Malay peacock pheasant and 7 Ring teal.

MIAMI METROZOO.....Lori Bruckheim

April 1984 B&H at Miami Metrozoo include: Mammals - 1.1 Ringtail lemur, (0.1 DNS), 0.1 Dromedary camel, 1.0 Baird's tapir, 0.2 Scimitar-horned oryx; Birds - 0.0.1 Red-crested pochard (DNS), 0.0.12 Ostrich (0.0.1 DNS), 0.0.2 Demoiselle crane, 0.0.16 Mandarin duck, 0.0.2 Yellowbill stork (0.0.2 DNS), 0.0.6 Java tree duck (0.0.5 DNS), 0.0.9 Wood duck, and 0.0.1 Crested wood partridge.



Coming Events

The 8th ANNUAL INTERNATIONAL HERPETOLOGICAL SYMPOSIUM ON CAPTIVE PROPAGATION AND HUSBANDRY

July 17-21, 1984

Columbus, OH

For more information contact: Herpetological Symposium, 13019 Catoctin Furnace Road, Thurmont, MD 21788.

AAZPA ANNUAL CONFERENCE

September 9-13, 1984

Miami, FL

AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at the Madison Hotel. For information contact Mary Bennett, Registrar, 5500 Phinney Ave., North, Seattle, WA 98103.

ECOLOGY RESTORATION SYMPOSIUM

October 11-12, 1984

Madison, WI

To be held at the University of Wisconsin, the two-day symposium focuses on the scientific value of attempts to restore ecological communities and ecosystems. For information contact: Nancy Dopkins, 1207 Seminole Highway, Madison, WI 53711 or call (608) 262-2746.



Letters To The Editor

Dear Editor,

There are a number of comments that could be made concerning the article "Elephants Crisis Deepens" in the April issue of Animal Keeper's Forum. The article raises more questions than it answers. It is not argued that economic pressures have caused a rise in the incidence of poaching. That is evident even here in our own national park system. What is questioned, however, are the facts presented really an indication of a crisis?

The figures given were based on the ivory trade. The tusk from an elephant does not tell us whether the animal died of natural causes, from an accident, was culled, or was poached as the article would have us believe. If the number 194,000 represents approximately 20% of the population then that would give us a total population of 1 million individuals. Current estimates have the population numbering between 1.2 and 1.5 million animals. The figure is also for a three-year period giving an annual death rate of 60,000 or roughly 6%. Nowhere is the birth rate given for comparison.

Studies done by Laws and Parker at Tsavo showed that elephant herds on the periphery of the park, which were the heaviest poached, were the herds with the highest reproductive rate. When an anti-poaching campaign purged the area of poachers, the elephant population rose to the point where they were destroying the habitat. (Ed. note: See "A Cruel Dilemma", May 1984 AKF) Culling was viewed as the only viable management tool. Keeping the habitat from being devastated would not only benefit the elephant, but also those other species inhabiting the area.

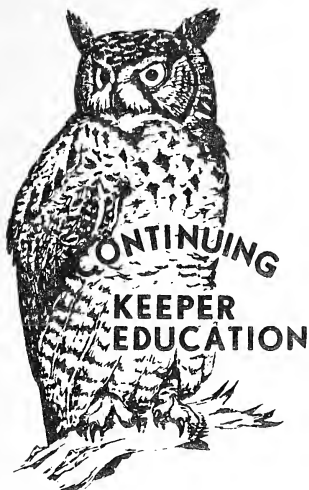
From the figures concerning the tusk weight it is not clear that "older elephants--those mature enough to breed--are becoming increasingly scarce." Tusk size is a genetic variable. Some are short and stubby and others long and slender with males having larger tusks than females. The question remains as to whether there is selective pressure for elephants with smaller tusks or a disproportionate number of female tusks have entered the ivory market during that time period. This could be so if culling operations had occurred whereby the whole herd is destroyed. This, by the way, is the method suggested by Douglas-Hamilton as opposed to killing random individuals. That way the remainder aren't psychologically distraught or disoriented at losing their matriarchs. What is the relationship of tusk size to age and how does that relate to maturity? Laws and Parker have found that elephants may first give birth as young as 13 or as late as 20 years of age with puberty being dependent on ecological factors.

Putting all the elephants in parks and sanctuaries as the article suggests has its disadvantages. Few parks encompass all of the elephant's migration routes. Isolation in these reserves may inhibit genetic flow and variability. As already mentioned elephants have a good reproductive capacity which in too small a reserve could lead to overpopulation and habitat destruction.

If we truly wish to see an elephant crisis which has deepened we should look at the plight of the Asian elephant. Olivier estimates a population numbering between 40 and 50 thousand elephants. Of those, several thousand are in work camps and cannot be considered part of the breeding population. Mahouts traditionally have discouraged breeding. A cow with a calf is not going to be worked and a non-working elephant means a loss of wages for the mahout. Also most work bulls are unwilling to try to mate since everytime in the past when they made an unstructured move they were disciplined. So if we are going to focus on an elephant crisis, let us focus on the real elephant crisis concerning Elephas maximus!

Charlie Rutkowski
Washington Park Zoo, Portland, OR





AAZK Education Committee: Project Updates

Submitted by

Judie Steenberg, Coordinator
AAZK Education Committee

A major change will occur in the Education Committee later this year. Pat Sammarco, former AAZK PResident, and currently a member of the Board of Directors and the Education Committee, has agreed to be the new Education Committee Coordinator. Pat will gradually phase into this position and assume all duties just prior to the AAZK

Conference in Seattle. With new energy and ideas, the Committee will continue to identify and become involved in projects that promote Continuing Keeper Education.

As a step toward phasing in as Education Coordinator, Pat will begin investigating Zoo/University relationships. There has been considerable discussion on this topic during the past year. Pat is also Co-editor of the ZOOKEEPER HUSBANDRY FUNDAMENTALS project. You will be learning more about both of these projects in the near future.

The resignation of Dwight Knapik, Calgary Zoo, was accepted with regret. He felt it was best to tender his resignation due to other commitments. Dwight had been very supportive of the Committee while he was a member and has offered to continue to answer any questions about Calgary Zoo and their training program. Hopefully, he will be rejoining the Committee at a future date.

AAZK/AAZPA Liaison

AAZK President Kevin Conway is working on this aspect of the Committee's involvement. Efforts are also being made to arrange for a time slot to conduct a special session, or panel discussion on Keeper Education at the AAZPA Conference in Miami.

Animal Management Correspondence Course

If there are members ready to test for certification in this course by the Conference in Seattle, every effort will be made to arrange for testing at that time. Please refer to previous issues of AKF for additional information. Anyone interested in testing is urged to contact me as soon as possible.

Exhibit Design Form

Diane Forsyth reported this project is nearing completion and should be ready for presentation and implementation by the Conference. The final format has been submitted to the Board of Directors for their review and approval. A proposed release form, bids on reproduction costs, a budget and recommendations from the project committee were also submitted.

CONTINUING KEEPER EDUCATION COLUMN, Continued

Keeper Training Videotapes

Wayne Buchanan reports that to date, eight orders have been received for the AAZK videotape on Keeper Safety (refer to the January 1984 AKF for details). The Metro Toronto Chapter has expressed interest in producing a training tape on the subject of Feeds and Feeding. The "Keeper's Role in Zoo Animal Health" (Tape #1 on the subject of "Keeper Know Thyself") is also being developed. Both tapes should be ready for membership review and approval by the Conference.

Manual Review

Beth Poff has submitted a project outline with recommendations for additional use of materials collected to date. Information on the subject of safety has been referred to the ZOOKEEPER HUSBANDRY FUNDAMENTALS project.

Staff Exchange

Elandra Aum has completed and distributed the master list and first addendum on this project. To date 50 Zoos and Aquariums have registered and have designated a contact person to coordinate staff exchanges with other institutions. If you are interested in an exchange, refer to the March and May issues of AKF to see if your institution has registered, and note the contact person listed. If your zoo or aquarium has NOT registered contact your Director and discuss the possibility of becoming a registered institution. In some instances local regulations or other problems have prevented registering. It is also possible that your Zoo/Aquarium was missed.

If you are having difficulties with arranging an exchange, please contact Elandra Aum to seek help finding a solution, or for information on alternative approaches. During the remainder of this year the Staff Exchange Project will continue to develop and addenda to the Master List will be issued as deemed necessary.

Zookeeper Husbandry Fundamentals

Jim Ellis and Pat Sammarco will be Co-editing this project which is expected to take about two years to complete. The organizational stage has been completed with project members receiving outlines, memoranda and survey forms for consideration. A survey form was printed in the May issue of AKF requesting volunteers to contribute to the project. All correspondence on the project should be directed to the Co-editors. Project members are: Frank Kohn, Bruce Clark, Kevin Conway, Adrienne Wright, Mike Coker, Douglas Richardson, Ken Reininger, Wayne Buchanan, Judie Steenberg and Marilyn Cole.

Zoonoses Reference Guide

Project coordinator Bruce Clark is still in need of typing assistance with the ZOONOSES NOTEBOOK. The final draft is expected to be ready for typing by early July. With typing assistance, the Notebook could be ready for the conference...anybody out there willing to help? If so, contact Bruce Clark, 1116 Radcliffe, Toledo, OH 43609.

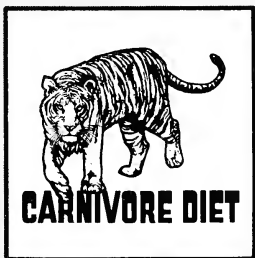
1984 AAZK NATIONAL CONFERENCE

Are you planning to submit a paper for the AAZK Conference??? Have you prepared your outline or abstract? By the time you read this it will only be about a month until the deadline. Continuing Keeper Education is the sharing of experiences, techniques and unusual occurrences in the management of captive animals. Presenting a paper at a National Conference is an excellent way to share information with your colleagues.



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PREDATION ON A NICOBAR PIGEON
BY A MATSCHIE'S TREE KANGAROO

By
Judie Steenberg and Chuck Harke
Keepers, Woodland Park Zoological Gardens
Seattle, WA

A group of 1.3 Matschie's tree kangaroo (*Dendrolagus matschiei*) has been exhibited in a naturalistic exhibit at the Woodland Park Zoological Gardens since December, 1982. The exhibit measures 20'W x 40'L x 25"H. The exhibit also contains three New Guinea water dragons (*Physignathus cocincinus*) and free-flying Edward's lorries (*Trichoglossus haematodus capistratus*). There are currently 2.0 lorries in the exhibit but there have been as many as four in the past. From February through June 1982, 3.0 potoroo (*Potorous apicalis*) also shared the exhibit. During the past fifteen months no aggression has been observed from the tree kangaroos toward any of the other animals.

Tree kangaroos are classified as herbivores, so we did not anticipate predation on a nicobar pigeon (*Caloenas nicobarica*) by a tree kangaroo. After windows are coated with "Glass-wax", and the electric hot-wire around the plant areas was restrung to allow for the pigeons to pass under it, 1.2 nicobar pigeons were introduced into the exhibit. Our main concerns when introducing the birds were their reactions to an exhibit having a very large free-flight area faced in glass along one side and part of one end wall, their coming into contact with the hot-wire, and possible harassment by the Edward's lorries.

Forty minutes after the pigeons were released into the exhibit, with a keeper observing from the public area, the adult female tree kangaroo descended from a tree near the perimeter of the exhibit where the pigeon was pecking at the ground. The bird was in a planter behind the hot-wire. The tree kangaroo reached the ground and immediately jumped through the wire into the planter and grabbed for the pigeon. The pigeon escaped, but the kangaroo pursued it as it fled across the open sandy area to a point about 35 feet away from the original attack. The tree kangaroo again crossed over the wire into the planted area and captured the pigeon in the vegetation. Keepers entered the exhibit no more than 1½ minutes after the predation began, but the pigeon had already been decapitated and was being eaten by the tree kangaroo.

When the keeper grabbed the tree kangaroo by the tail, she dropped the pigeon, but was intent upon returning to it (now on the ground behind the keeper) and actually challenged the keeper. Two keepers clapping their hands and talking loudly for several minutes convinced her to climb a tree. Interestingly, the male tree kangaroo also descended from the tree, possibly to come to the aid of the female, or was just caught up in the excitement of the event. However, normally he is the most shy of the four tree kangaroos and retreats to the tree tops whenever there is more than routine activity in the exhibit.

There is no doubt from either keeper involved that the attack and killing of the pigeon by the tree kangaroo was deliberate and very efficient. She had been watching the pigeons for quite some time, but showed no special interest when they were in the open sand area. The site of the initial attack was only a few feet from the tree she was in.

None of the literature on tree kangaroos indicates that they are predators of other animals. Several times over the past 15 months, our tree kangaroos have been sitting on tree limbs right next to the lorries and water dragons. They have also been observed grazing next to potoroo during the time potoroo were in the exhibit. If anyone knows of another incident of tree kangaroo preying upon other animals, please write: Judie Steenberg and Chuck Harke, Woodland Park Zoological Gardens, 5500 Phinney Ave. North, Seattle, WA 98103.

"Glass Wax" is a product of Gold Seal Co., Bismarck, ND



Reptile Care: Relating To
The Inquiring Novice - Part I

Reptile
Amphibian
potpourri

Introduction

Nomenclature, Taxonomy, Anatomy, and Physiology

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

As zoo keepers, we are expected to interact with the public, offering information about the zoo in which we work and the animals housed within. We may perform this duty as a guided tour, formal lecture, through journals, or by answering telephone inquiries. Whether we are disseminating information formally or informally, our assistance is essential in promoting animal welfare. The following series of articles should be helpful for those reptile keepers who enjoy assisting the inquiring public.

When discussing animal information with a novice, it is often necessary to first identify the animal in question. To avoid confusion the keeper should attempt to assist the inquiring novice with scientific terminology. For example, a caller may confront a keeper with local names such as Highland Moccasin, Chunkhead, Poplar Leaf, Rattlesnake Pilot or just Copperhead. Of course we know the Northern Copperhead as Agkistrodon contortrix mokasen. Scientific names are helpful since they often describe an animal's physical characteristic, coloration, pattern, habitat, or locality. Basic knowledge of reptile nomenclature, taxonomy, anatomy and physiology may promote a better understanding of an animal's habits and natural environment, aiding reptile enthusiasts in providing the best possible care for their charges.

Of the nearly 6,000 species of reptiles, all are ectothermic, air-breathing vertebrates covered by scales or plates. Reptiles have internal fertilization and produce their offspring oviparously or viviparously.

The order *Chelonia* comprises 219 species of turtles and tortoises. Sexual dimorphism is well pronounced in many species. These animals possess well developed copulatory organs and all are oviparous. Chelonians are toothless, and have a sharp-edged beak called the tomium. Like snakes, chelonians have no external ears. Typically, turtles may be terrestrial or semi-aquatic; tortoises are terrestrial reptiles, occasionally entering water. Water requirements vary according to species, as well as individuals. Their eating habits vary widely. Most turtles are omnivorous, however they may tend to be primarily carnivorous or primarily herbivorous; tortoises are primarily herbivorous.

Twenty-one species comprise the order *Crocodylia* which includes alligators and caiman, crocodiles, and gavials. These are semi-aquatic animals possessing a scaled epidermis with osteroderms. All possess well-developed copulatory organs, are oviparous, and display strong parental instincts. All crocodylians are carnivorous, and have sharp conical teeth without roots. Alligators and caimans differ from crocodiles in that their fourth lower tooth fits into a socket of the upper jaw and is not visible when the mouth is closed. The fourth lower tooth of crocodiles fits into a groove in the upper jaw and is visible when the mouth is closed. Gavials (Gharials) are the only species that exists today in the crocodylian family *Gavialidae*. This reptile has a long, slender snout adapted for catching fish.

With approximately 5,000 species, snakes and lizards comprise the order *Squamata*. They are extremely diverse in structure, habit, dietary requirements, and behavior. All have paired copulatory organs and they produce their offspring oviparously or viviparously. Squamates have a well-developed Jacobson's organ: a chemoreceptor which enables them to smell. All lizards have internal pelvic girdles, but not all have legs. Some groups have vestigial limbs, while others lack external rudiments altogether. With the exception of some geckos, lizards have moveable eyelids and the majority have external ears. Like chelonians, lizards, collectively, have a wide dietary requirement. With the exception of one genus, *Heloderma*, all lizards are non-venomous. Of the more than 2,000 species of snakes, all are legless; some boids have a trace of vestigial limbs. Snakes lack moveable eyelids and external ears, and all are carnivorous. Some species such as some boids, and rattlesnakes, have evolved thermoreceptor pits; however, most rely on smell, sight and vibrations to hunt their prey. Approximately one-third of the world's population of snakes are venomous.

Part II of this series will be concerned with assisting the novice herpetologist in purchasing a reptile for a pet.

Information Please

Information is requested on the management and breeding of Tawny Frogmouths (*Podargus strigoides*) in captivity. Diets, exhibit descriptions and breeding data all would be appreciated. Our zoo has hatched out one young this year and would like to enhance our knowledge of these birds to accompany the videotapes we've made so far. Please send information to: Oliver Claffey, Metro Toronto Zoo, Box 280, West Hill Ontario, Canada M1E 4R5.

RESEARCH ASSISTANCE NEEDED: Request for ectoparasites, endoparasites, and fecal material from all zoo animals except birds, rodents, and ruminants. Parasites and fecal material should be preserved in 10% formalin or 70% alcohol. If collecting vials and preservatives are needed, please contact Sue Barnard, Senior Keeper, Dept. of Herpetology, Atlanta Zoological Park, 800 Cherokee Ave., S.E., Atlanta, GA 30315.

The Guernsey Zoo seeks information on the use of plants within a sloth exhibit, and would be interested in any species (scientific names please) that can be safely be in contact with the sloths. Please send information to: Peter Merrett, Guernsey Zoo, Guernsey, Channel Islands.

Anyone having information concerning toe problems in Scarlet Macaw (*Ara macao*) hatchlings, please contact: Alice Miser, Animal Keeper, Topeka Zoological Park, 635 Gage Blvd., Topeka, KS 66606. I'm also interested in diets fed the parent Scarlet macaws, nesting material offered and the general breeding set-up for the macaws.

Would anyone with any information on Celebes Apes (*Cynopithecus niger*) please get in touch with me. In particular--the rejection and hand-rearing of infants. The reason(s) for rejection and anything done to alter this situation and also any formulas and timetables used in rearing the offspring would be appreciated. If any attempts at reintroduction to the group (even if unsuccessful) were attempted, I would like this information as well. I am compiling information for a paper that I am writing on this species. Send information to: Lynda M. Collrin, Cherry Brook Zoo, RR# 1, Saint John, New Brunswick, Canada E2L 3W2.



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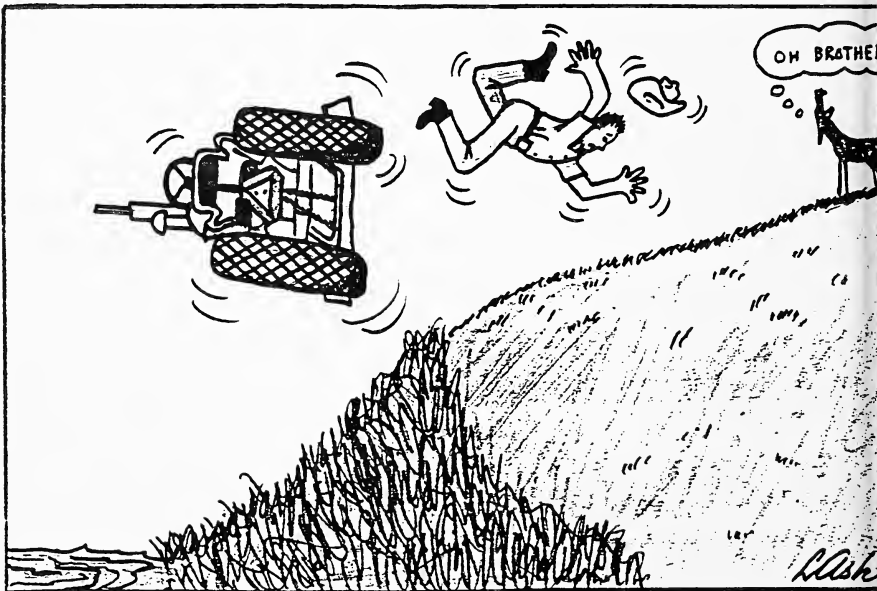
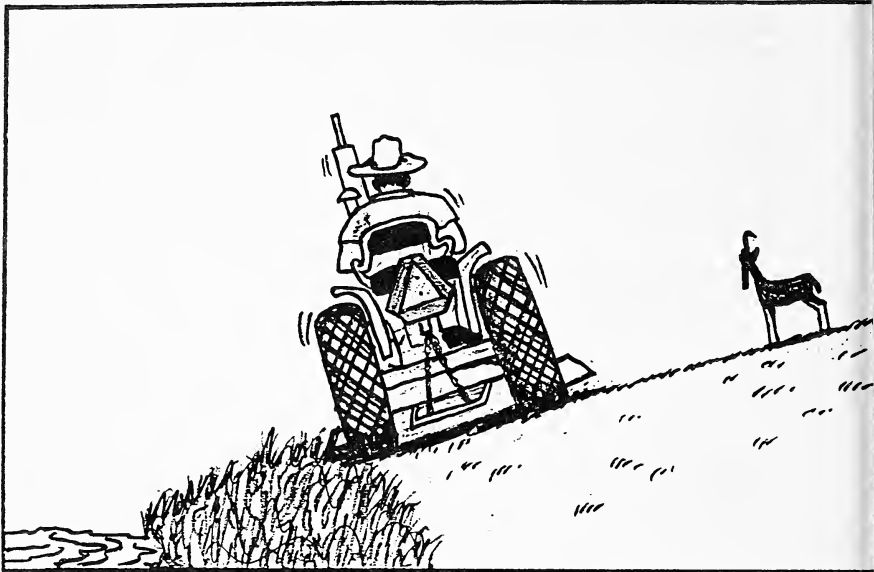
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THINK Safety!



THINK SAFETY - DAYDREAMING CAN BE DANGEROUS!

WILD ANIMAL PARK ASIAN ELEPHANTS

SOON TO GET NEW DREAM HOUSE

By

*Debbie Hewitt, Hospital Keeper
San Diego Wild Animal Park*

The construction of a new 10,000-square-foot Asian Elephant Breeding Facility at the San Diego Wild Animal Park began May 1, with tentative completion set for 1 October, 1984. This \$336,000 project, which has been on the drawing boards for several years, involves three major areas of construction: a female elephant (cow) barn, a nursery yard and a forage warehouse.

The 3,745 square foot cow barn will contain three stalls for adults plus a maternity stall. It will accommodate 10 adult cows plus allow additional space for segregating expectant mothers and aunties prior to pending births. All of the stalls are constructed of six-inch-diameter steel pipe, interconnected by steel rolling gates. Much of the construction expense comes from the oversized steel reinforcements, bars and safety gates that are customized to contain elephants weighing up to 12,000 pounds.

Adjacent to the maternity stall is a keeper's "apartment" unit where keepers and veterinarians can conduct 24-hour-a-day surveillance of expectant and new mothers and have quick and easy access for specialized care. A nursery yard of approximately 6,000 square feet is connected to the cow barn via heavy-duty swinging gates. Mothers, babies and aunties can be safely transferred to the yard for fresh air and exercise. Fabric-covered shade structures in the yard will provide shelter from the sun for the newborn elephant's delicate skin.

The third part of the Asian Elephant Breeding Facility is a storage area for forage and equipment. The warehouse will hold 220 bales of hay, which is the amount required for food and bedding for 15 days. It will also store grain and supplies and equipment for maintaining the elephant herd and the facility.

The Wild Animal Park's elephant breeding program is a long-term project. The first phase of the project involved the construction of isolation yards and barns for the African and Asian bulls. That bull project was entirely funded by donations and was completed in 1981. Another phase of the breeding project was accomplished in 1982 with the construction of outside nursery yards for three African elephant calves born earlier that year.

To date, \$225,000 has been raised through donations for the Asian Elephant Breeding Facility. Over 2,500 members of the Zoological Society of San Diego have contributed to the project and those who donated \$250 or more will be recognized with a bronze plaque on the barn.

The Asian Elephant Breeding Facility will be located north of the existing cow enclosure and the Elephant Show Amphitheater. The nursery yard and adjacent bull yard will be visible to passengers on the Wgasa Bush Line Monorail.

The Wild Animal Park presently has eight Asian cows, six of which share cramped nighttime quarters with seven African cows in the African's barn. The remaining two Asian cows are tethered outside at night in the Asian enclosure. No elephants are pregnant now. Breeding introductions will be scheduled upon completion of the barn next fall.



Chapter

After the fine job Wayne Buchanan of the Seattle Chapter did with the Safety Video-tape, our Chapter has accepted the baton (so to speak) and is busily working on a video program dealing with Feeds and Feeding in Zoos (not necessarily the title of the tape). Response from Chapter members, nonmembers, management and the community e.g. local TV stations has been tremendous. We're all biting our nails and hoping that the tape will be available for screening during the Seattle Conference.

submitted by Oliver Claffey

METRO TORONTO AAZK CHAPTER

Newly elected and re-elected officers of the Toronto Chapter are:

President....Oliver Claffey
1st Vice Pres....Marilyn Cole
2nd Vice Pres....Harry Hofauer
Treasurer....Neville Pike
Secretary....Karen Mottram

On 18 October 1983, the animal keepers of the Honolulu Zoo reactivated their Chapter of the American Association of Zoo Keepers (AAZK), electing the following officers:

President....Dan Vitiello
Vice-President....Peter McLane
Secretary/Treasurer....Steve Robinson
Sergeant-at-arms....Larry Zolton

The Honolulu Zoo AAZK Chapter's first activity was an In-Front-Of-The-Scenes presentation in support of the Zoo Hui's Halloween Day held at the Zoo on 30 October. While the elephant handlers (Larry Zolton, Steve Robinson, Gwen Yoshimura, and Peter McLane), dressed in Asian Indian outfits, put the elephants through their routine and brought "Empress" out to meet the public, other keepers gave the public a close-up look at other handleable zoo animals. Dan Vitiello, in Tarzan attire, showed off the Zoo's young white-handed gibbon. While a pirate's parrot parroted the pirate (John Halemano), a witch (Margo Lengen) explained the advantages of having a vulture around (no leftovers), and the troll (Gail Wine) hung on tightly to Hawaiian Goat Gruff. A good time was had by all with a little more education provided for the public. In appreciation of the Honolulu AAZK Chapter's support of the Zoo's Hui on Halloween Day, the Zoo presented the Chapter with a ticket for two to the outer islands. The ticket was raffled off as a fund-raiser for the Honolulu AAZK Chapter.

---submitted by Steve Robinson

New officers for the Washington Park Zoo AAZK Chapter are:

President....Stanley Held
Vice President....Mike Marchall
Elayne Barclay
Secretary....Janet McCoy
Treasurer....Mike Keele

News

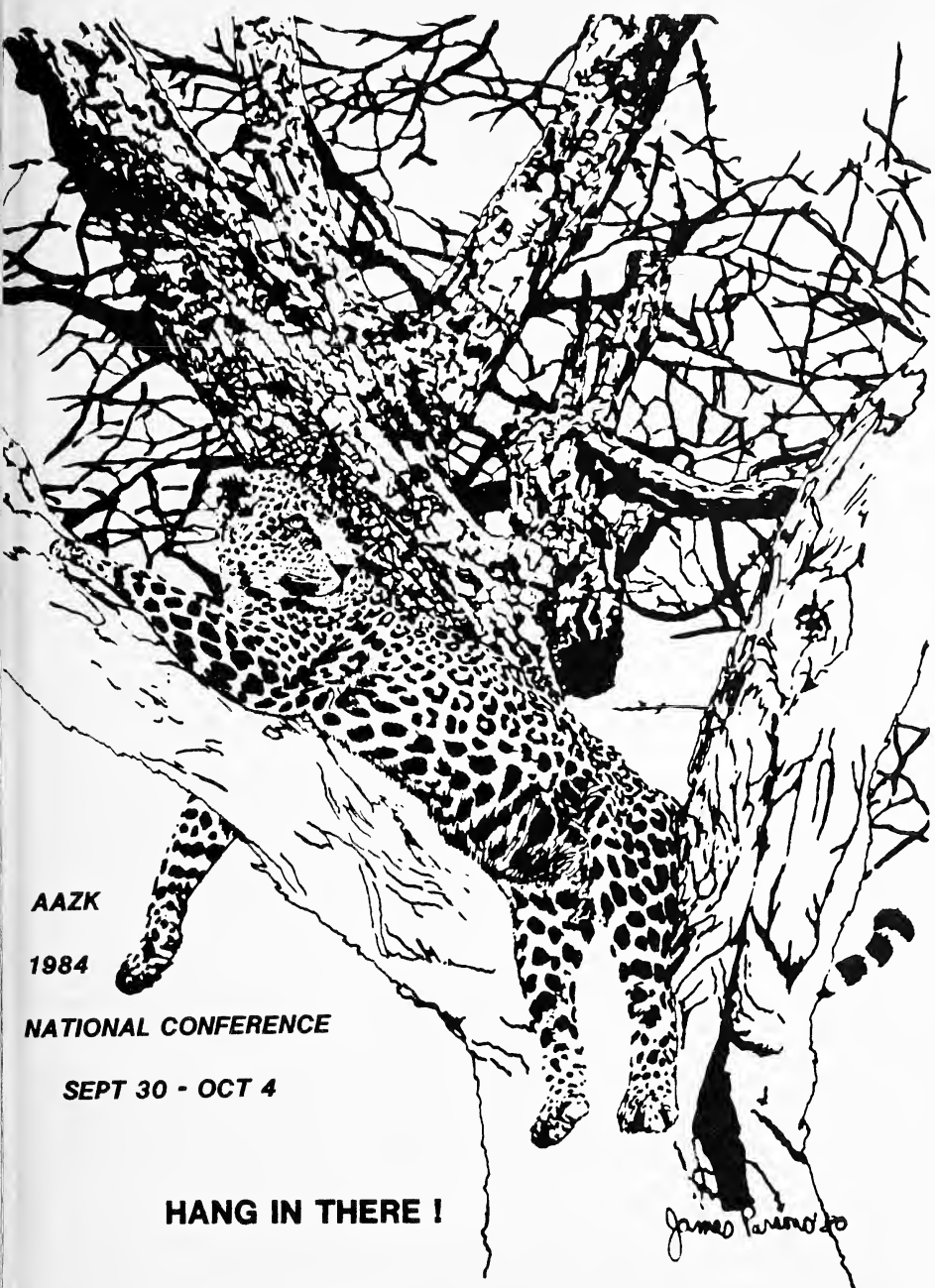
New officers for the Bronx Zoo AAZK Chapter are:

President.... Angelo Arena
Vice-president....Dan Maloney
Treasurer....Bob Eddington
Corres. Secretary....Margaret Price
Record. Secretary....Marty Zybura

*Please send Chapter News to
Lee Payne at the Detroit Zoo.
Also send a copy to the AKF
editorial offices, 635 Gage
Blvd., Topeka, KS 66606.*

The Honolulu Chapter will be meeting on the first Wednesday of each month to discuss and plan activities.





AAZK

1984

NATIONAL CONFERENCE

SEPT 30 - OCT 4

HANG IN THERE !

James Parmenter

ONLY 3 MONTHS TO GO.....

FROM US TO YOU

The two years since we decided to accept the impossible mission of putting on a conference have gone by at warp speed (the laws of physics don't seem to apply in the Pacific Northwest). The deadline for submitting papers is almost here, and the deadline for registrations is right behind it. When planning an event like this, there will always be problems and unexpected setbacks. But, through it all, there is always a shining light at the end of the tunnel (and, no, it's not from the oncoming freight train). It's a learning process for everyone involved. If your chapter is considering hosting a conference, GOT FOR IT. You'll need everyone's help to pull it off, and it will be a lot of hard work. But it will all be worth it. We're convinced of that, and ours hasn't even happened yet.

If you've never been to an AAZK conference before, make Seattle your first. You'll have a unique opportunity to visit a variety of zoological facilities, meet and exchange ideas with interesting people from across the country, and have a good time while you do it.

Harmony Drazick-Taylor
Harmony Drazick-Taylor

Phil Pennock
Phil Pennock

Debbera Stecher
Debbera Stecher

Co-chairpersons

FINAL CALL FOR PAPERS

DEADLINE: JULY 15, 1984

WORKING IN ZOOS AND AQUARIUMS: TODAY AND TOMORROW

There is still time to submit your paper for presentation at the 1984 conference. We encourage all delegates to share the unique and special knowledge they have about their professions. Don't think that everyone knows what you know. Your experience could hold the answer to some other keeper's problem.

Submit your paper as soon as possible because presentation time is limited. If your paper is accepted, you will receive a \$20 refund from your registration. And don't forget--all papers will appear in the special conference issue of Animal Keepers' Forum at the end of the year.

Papers will be limited to 20 minutes, with a 5-minute question/answer period. Please submit an outline or abstract by July 15, 1984. AAZK national committees that plan to have meetings at the conference should submit time and meeting requirements by this date.

Send papers, information and questions to:

Phil Pennock
AAZK Conference
Woodland Park Zoo
5500 Phinney Avenue N.
Seattle, WA 98103



1984 AAZK NATIONAL CONFERENCE REGISTRATION FORM

Sept. 30-Oct. 4, 1984

Please type or print. One name per form.
Return form with your fee to:



Mary Bennett, Registration Coordinator
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103
Phone: (206) 625-5488

Make checks payable to Puget Sound Chapter AAZK.
Deadline for Pre-registration is August 15, 1984.

1984 Registration

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ADDRESS _____

CITY _____ STATE/COUNTRY _____

ZIP/POSTAL CODE _____

ZOO AFFILIATION IF APPLICABLE _____

AREA OF INTEREST _____

VEGETARIAN YES _____ NO _____

WILL BE SUBMITTING PAPER YES _____ NO _____
(\$20.00 will be refunded on acceptance of paper)

AAZK MEMBERSHIP STATUS AND FEES:

MEMBER OR SPOUSE	\$50.00 each
NON-MEMBER	\$70.00 each
LATE FEE (After Aug. 15th)	\$15.00
TOTAL FEES ENCLOSED	\$ _____

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Keepers and Computers... Part Five

TEACHING YOUR COMPUTER TO TEACH YOU IS A BIT LIKE WATERING YOUR GARDEN

By
Jim Albert
Colony Manager, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX

In addition to a multitude of other failings, I have a rather horrible memory. I have tried a fair number of techniques and tricks to help me learn a variety of materials, including "flash cards" (back when I was a kid and despairing of ever learning the multiplication tables, and several times since). Well, it happens that one of the things that the micro-computer lends itself to quite well is the creation of a set of electronic flash cards.

The particular situation that got me thinking about using my computer in this way was the need to memorize 95 three-letter codes for behaviors that comprises the ethogram that we use in our behavior laboratory. Generally, the codes are based on the first three letters of words involved, but there are many exceptions, such as VEC--ventral cling; PRG--present for groom; and TAH--tail hang. Even where the first three letter rule holds, you have to remember that FIG is fight, GEC is gecker, and IGN is ignore. And there are 95 of them!

Since it is no problem at all to get a computer to remember 95 items, I entered them into computer memory such that each code was assigned a number. One of the interesting and valuable characteristics of almost all computers is the ability to generate "random numbers" (not true random, but pseudorandom, since they depend on a "seed" number); so I had the computer select a number from 1 to 95, look up the ethogram code associated with that number and print it out on the TV screen. If I didn't know what it meant, I looked it up, and told the computer to print another code. I could have done a more elaborate job of programming, where I would have had to type in the right answer.

Since the commands to get your computer to generate random numbers may be quite different than those used by the Sinclair machine that I own, be wary of this example.

```
1000 LET A = INT ( RND * 95 )
1010 IF A 1 OR A 95 THEN GOTO 1000
```

The variable "A" will equal a number between 1 and 95 inclusive. INT and RND are Sinclair "keywords" that represent "integer" (remove the fractional component; note that this is not the same as rounding!) and "random" (produce a number between 0 and 1 using the random number generator). Multiplying the number produced by RND by 95 creates the range of values we're interested in, INT makes it into a whole number, and line 1010 insures that they do fit the required range by starting the process over if they don't.

What could you use this for? Perhaps for the same thing that I used it for--memorizing lists. Maybe you get asked all the time how old the animals in your area are, and can never remember their birth dates. The

basic idea could be extended into a game of sorts where the user is called upon to provide a variety of information about an animal, with the computer "keeping score".

So how is teaching your computer a bit like watering your garden? You have to know just a little bit to do both effectively, but the rewards can be quite great.

Many lectures and presentations are accompanied these days with slides. In addition to regular photographs, slides of graphs, charts, and lists are popular. The traditional way to construct such "graphics" slides is to draw what you want on a piece of paper, carefully composing it, and then photographing it.

I didn't have time to go through the process of producing a bunch of drawings and figures for a presentation I was giving, so I wrote a "screen manipulator" program for my computer. Once I entered what I wanted for each line, the program allowed me to move things around, add and delete, and change the spacing. I photographed my small black-and-white TV's screen with a 35mm camera mounting a 200mm telephoto lens, using a high-contrast developer on the black-and-white film thus exposed. Since the Sinclair prints black letters on a white screen, the negative came out white on black, and were very readable when mounted in slide mounts and projected.

There's another reason beyond convenience for using a computer to do your graphics slides: limiting the information per slide. I have been at conferences when slides packed with tiny numbers that would have taken 10 minutes to digest flashed by in 15 seconds. The computer's ability to pack that much onto its screen (the Sinclair allows 22 lines of 32 characters each) really helps to make more reasonable slides, a fact that your audience is certain to appreciate.

I'm not going to deal with word processing, since that requires a good quality printer, and those are still quite expensive. I wrote a limited but useful word-processing program once, and used it to "rough-draft" a couple of articles, setting my typewriter up in front of the TV and typing off of it to make a final copy. This was a rather awkward arrangement, and I gave it up. The price of good printers may soon be low enough for the likes of us to afford them, and at that time, I might write a sequel to this series dealing with word processing, but not until then!

Finally, an item of news: Timex, who has been marketing the Sinclair line of computers in the United States, is going out of that line of business. Sinclair machines will still be available, directly through their representatives, and supposedly some new computers will join the product line. Since Sinclair has a tradition of unorthodox but quality electronics at a low price, their ads may be worth watching if you're considering buying a computer.

In the next installment, I'll offer some thoughts to wrap all of this up. I hope that these articles have stimulated some of you to consider the possibilities that the computer holds for assistance to the professional zookeeper. If on the other hand, I've merely generated raving frustration I'd like to try to help out. My address is, once again, Department of Anthropology, UT-Austin, Austin, TX 78712.

ELEPHANT SET

ELEPHANTS IN JAPAN MID-1982 TO EARLY 1984

Part I

By
Yoshi. Yonetani
ZooDEL/Zoo Design & Education Lab



(Editor's note: The following is Part 1 of a two-part series on the history and current status of elephants kept in captivity in Japan. Only minor editorial changes have been made from the original text to provide continuity as it was our wish not to negate the original intent & flavor of Yoshi.'s manuscript.)

1. Introduction

I have taken an interest in the historical keeping of the elephants for some time past. Therefore, I began to gather the related informative matters bit by bit.

Before now, I had added to the stock of information about many raising situations for elephants of overseas as well as internal facilities. Under the latest full-scaled Zoo-travel around Europe-area from August to November 1983, I visited at some spots famous for the breeding success of elephants. These were the Munich Zoo which succeeded the first propagations of Asian and African elephants in Europe; the Hannover Zoo, where I observed Asian elephants breeding; the Amsterdam Zoo, Holland; and the Copenhagen Zoo in Denmark. Besides, I also looked at several African Forest elephants. Their places were the Whipsnade Park, England; the Paris Zoo, France; the Duisburg, West Germany except the West Berlin Zoo here the individual had already died in 1982. In addition to them, I recognized a pygmy-sized male Forest elephant which was exhibited as a calf of an African elephant in the Barcelona Zoo in Spain. I also called at the homes of Asian elephants--Sri Lanka and Thailand. Thus, these knowledges and informative matters were indirectly very useful for the purpose of this survey.

During the summer of 1982, I conducted a survey of elephants in Japanese Zoos in earnest. A questionnaire drawn up by the author was mailed to some zoos and zoo-related institutions that were listed in the newest annual report of the Japanese Association of Zoological Gardens and Aquariums. Among the rest, I directly contacted with the persons concerned as animal care keepers or veterinarians in each facility. At the same time, I was given many significant informations including not only the census of the zoo's elephants, but also various captive aspects of the pachyderms by sympathetic associate members.

In the case of several circus shows, I tried to visit at the performance location and then checked up on the matter. But I couldn't get the perfect reply against definite subjects enough.

This research generally brought difficulties. To tell the truth, the reaction of almost all was thick-skinned at the beginning. Because accurate animal-inventories or annual reports haven't been written out regularly in most Japanese Zoos, there was not much information available about the study of elephants up to now. So, those questioned didn't give especially complete answers of "Captive Care", "Training Sessions" and "Chemical Immobilizations" except for a few institutions. By force of circumstances, I was compelled to omit some items from the expected

ELEPHANTS IN JAPAN, Continued

data. Finally, the target was strained to know the number of animals in captivity lately.

After this survey, I found out several corrections on that data and grasped some new facts about the movement of elephant-population in my country by the re-examination from the end of 1983 to the early 1984. Accordingly, I intend to state the additional matters of investigation against the data of 1982 on a previous notice in that case. Principal findings of the survey will be discussed below.

A Brief History of the Elephant's Advent to Japan

The first elephant was imported to Japan (present Fukui prefecture) from South Asia in 1408. Between that time and 1863, elephants were imported seven times.

The first ones to come to a Zoo arrived in June, 1888 as a gift from the Emperor of Siam (present Thailand). They (15-year-old male and 8-year-old female) were kept at the Ueno Zoo which celebrated its 100th birthday on 20 March, 1982 as the oldest Zoo in Japan. Afterwards, the female died in 1893 and the male was sold to the Hanayashiki of Asakusa, Tokyo, which was a famous amusement park in late 1923. In the Ueno Zoo, the keeping of elephants reached 89 years within a century.

In 1941, there were about 20 elephants in Japanese Zoos. As the war became worse, these were killed off one by one. At the end of the war only two were left living. They were females in the Higashiyama Zoo, Nagoya. They had arrived in December 1937. One died in September 1963 at the age of 61, and the other died in October at the age of 58.

The first elephant to arrive after the war was a 2.5-year-old female from Thailand, which came to Ueno on 4 September, 1949. She was later sent to the Inokashira Park Zoo in Tokyo on 5 March, 1954 where she lives today.

The Ueno Zoo had had 11 elephants since its opening (4.7 total: 2.4 Thai; 1.3 Indian; 1.0 Ceylonese). Five of these were gifts from heads of state of foreign countries. It was only one time that Ueno Zoo bought a pair of elephants in 1954. The others were all presents to the Zoo.

All the elephants so far mentioned have been Asians.

The first African elephant was a young male brought to Japan in March of 1953 by a circus. The second male African elephant arrived at the Kanazawa Zoo from Kenya on 25 July, 1965. He was 1.5-year-old and was the first of this species at an established zoological facility.

...data at that time: weight about 700kg, height at the shoulder
1.4m

After 10 years, he died on 6 May, 1975.

Continuously, the first female African elephant reached the Oji Zoo in Kobe on 29 November, 1965. She was approximately 1-year-old and ended in a short life.

Sources of Elephants (from survey findings)

Animal dealers were the most common source of Zoo-elephants, followed by countries of origin including the part of province, such as Southeast Asia (India, Thailand, Cambodia, Malaysia, Sri Lanka), Kenya and South

ELEPHANTS IN JAPAN, Continued

frica. Other sources includes other Zoos and the International Animal exchange, U.S.A.. It appears that it is extremely difficult to determine the geographical race of Zoo-elephants. In spite of this, I tried to pursue the respective origins as much as possible. As a result, I had some elephants whose subspecies were specifically cleared up. Of those, an African Forest elephant belonging to a certain animal training production and a Ceylonese elephant at a small animal-dealer were found in 1982.

Structure of Zoo's Elephant Population

A total of 164 elephants were maintained in 46 Zoos (public & private) and other facilities in Japan in mid-1982. In this data for investigation, the public zoo contained 31 municipal, 1 prefectural management and 2 juridical foundations (Ritsurin Park Zoo and Okinawa-Kodomonokuni Zoo & Aquarium) for a total of 34 facilities. There were 12 private Zoos (only city-typed ones indicated). The total number of elephants consisted of 86 Asians (10.75.1) and 78 Africans (18.60).

At the present, mid-February 1984, a total of 172 elephants were maintained in 46 Zoos and other facilities. The public zoos numbered 35 municipal, 1 prefectural management and 2 juridical foundations for a total of 38. There were 11 private zoos (only city-typed ones indicated). The total number of elephants consisted of 89 Asians (12.74.3) and 83 Africans (19.64). SEE TABLE I.

Of 61 institutions, 26 had one elephant each. Of these 26 individuals, 24 were Asian (1.23) and 2 were African females in mid-1982. After that, one private Zoo (=the Yatsu) put an end to their history by the end of the same year. In the beginning of 1984, of 64 institutions, 27 had one elephant each. These 64 individuals were 24 Asians (3.20.1 [the one of unknown sex is probably a Ceylonese male]; 2 African females and 1 male African Forest elephant.

In 1982, nine institutions exhibited both Asian and African elephants. In March of 1983 that number dropped to eight after the Elza Wonderland no longer exhibited both species.

The largest number of elephants kept by one institution was 12 (Fuji Safari Park and Nanki Shirahama Adventure World in early 1983, but now is only Fuji Safari Park.

Seven institutions had 5 or more elephants in 1982. This includes 6 Safari parks and 1 public zoo (Tama Zoo, Tokyo). By now, this data has increased to 7 safari parks (with the addition of the newest Safari: Himeji Central Park which opened in March 1984) and 2 public zoos (the Tama and Nagoya-Higashiyama).

In this connection, commercialized zoos, including safari parks and 7 private animal facilities (except zoos definitely) owned 82 elephants in the census at the present time. Among them, circuses were left out.

It is my feeling that there cannot be an accurate source for a head count of elephants held in captivity in Japan. In small local facilities or dealer compounds, I couldn't grasp how elephants exist exactly. However, I hope that their survey serves as a "yardstick" to review the status of captive elephants in my country in the future.

Table I
Elephants in Japan: Mid-1982-Early 1984

From September of 1982 to February 1984, contents at each item are made into one in the event of unchanged figures of elephants. The data of mid-1982 shows on the upper row, and the data for early 1984 shows on the lower row for those facilities which experienced elephant population shifts

ZOO	Asian Male	Female	African Male	Female	TOTAL
Sapporo-Maryuama Zoo*	0	2	0	0	2
Asahikawa-Ashiyama Zoo*	0	1	0	1	2
Obihiro Zoo*	0	2	0	0	2
Kushiro Zoo*	0	0	1	1	2
Yagiyama Zoological Park-Sendai*	0	2	1	1	4
Hitachi City-Kamine Zoo*	0	1	0	0	1
Utsunomiya Zoo	0	1	0	0	1
Kiryugaoka Park Zoo*	0	1	0	0	1
Gunma Safari World	0	1	2	5	8
	0	1	1	4	6
Tobu Zoological Park, Saitama*	0	0	1	1	2
Ueno Zoological Gardens, Tokyo*	1	2	0	0	3
	1	1	0	0	2
Tama Zoological Park, Tokyo*	1	2	1	2	6
Inokashira Park Zoo, Tokyo*	0	1	0	0	1
Tatsu Zoological & Botanical Gardens, Chiba	0	1	0	0	1
	0	0	0	0	0
Nogeyama Zoological Gardens of Yokohama*	0	2	0	0	2
Odwara Zoo*	0	1	0	0	1
Mishuma City Park, Rakujuen*	0	1	0	0	1
Kofu Yuki Park Zoo*	0	2	0	0	2
Komoro Zoo*	0	1	0	0	1
Nagano-Chausuyama Zoo*	0	0	0	0	0
	0	1	0	0	1
Kanazawa Zoo	0	1	0	0	1

TABLE I, *Continued*

ZOO	Asian Male	Female	African Male	Female	TOTAL
Fuji Safari Park	0	0	2	10	12
Izu National History Park	0	1	0	0	1
Shizuoka municipal Nihondaira Zoo*	0	2	0	0	2
Hamamatsu municipal Zoo*	0	1	0	0	1
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	2	0	0	2
Toyohashi municipal Zoo*	1	1	0	0	2
Nagoya-Higashiyama Zoo & Botanical Gardens*	0	2	0	2	4
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	2	1	2	5
Korankei Snake Center, Aichi	1	0	0	0	1
Elza Wonderland, Aichi	1	1	1	0	3
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	1	0	0	0	1
Kyoto municipal Zoo*	0	2	0	0	2
Nanki Shirahama Adventure World	0	4	1	7	12
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	4	0	6	10
Ayameike Zoo, Nara	0	1	0	0	1
Misaki Park Zoo & Aquarium, Osaka	0	2	0	0	2
Osaka municipal Tennoji Zoo*	0	3	0	0	3
Koshien Hanshin Park, Hyogo	0	2	0	0	2
Takarazuka Zoological & Botanical Gardens	1	2	0	0	3
Kobe-Oji Zoo*	1	1	0	0	2
Himeji municipal Zoo*	0	1	0	0	1
Himeji Central Park	0	0	0	0	0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	0	2	7	9
Ikeda Zoo, Okayama	0	1	0	0	1
Ritsurin Park Zoo, Kagawa*	0	1	0	0	1
Tokushima Zoo*	0	1	0	0	1
Ehime prefectural Dogo Zoo*	0	2	0	0	2
Asa Zoological Park, Hiroshima*	0	0	1	2	3

TABLE I, *Continued*

ZOO	Asian Male	Female	African Male	Female	TOTAL
Tokuyama Zoo*	0	0	0	1	1
Akiyoshidai Safari Park, Yamaguchi	0	0	1	6	7
Itozu Zoological Park, Fukuoka	0	2	0	0	2
Fukuoka municipal Zoological & Botanical Gardens*	0	2	0	0	2
Omutu Zoo*	0	0	0	1	1
Sasebo Subtropical Zoological- Botanical Garden*	0	1	0	0	1
Cable Rakutenchi, Oita	0	1	0	0	1
Africa Safari, Oita	0	1	2	8	11
Kannawa (Yama-jigoku) Zoo	0	1	0	0	1
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	1	0	0	0	1
Kumamoto Zoological Park*	0	1	0	0	1
Miyazaki Safari Park	0	0	2	6	8
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	0	2	5	7
Phoenix Natural Zoo, Miyazaki	0	1	0	0	1
Hirakawa Zoological Park, Kagoshima*	1	1	0	0	2
Okinawa-Kodomomokuni Zoo & Aquarium	0	1	0	0	1
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	0	0	1	0	1

(*) mark...these are public institutions

The above mentioned institutions are official members of the Japanese Association of Zoological Gardens and Aquariums except for Korankei Snake Center, Elza Wonderland, Himeji Central Park and Kannawa Zoo. Membership application for the Nagano-Chausuyama Zoo is pending at the present time.

Touhoko Safari Park, Fukushima	0	0	0	3	3
Iwaki World Safari	0	0	1	3	4
Nasu Safari Park	1	0	1	0	2
Nagasaki Bio-park	0	0	0	0	0
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	1	(2)	0	0	3

"unknown sex:probably females"

TABLE I, Continued

ZOO	Asian Male	Female	African Male	Female	TOTAL
Fureai Children Zoo	1	1	0	0	2
Toshin Planning	(1)	0	0	0	1
	"unknown sex: male?"				
Shonan Animal Planning	0	0	0	0	0
	0	1	0	0	1
CIRCUS	Asian Male	Female	African Male	Female	TOTAL
Kinoshita Circus Performing Ltd.	0	2	0	0	2
Kigure Circus	1	2	0	0	3
	0	2	0	0	2
Kakima Circus	0	1	0	0	1
Holiday-Inn Circus	0	0	0	0	0
	0	2	0	0	2
The Sum Total					
Mid-1982/	11+(1)	74	18	60	164
Early-1984/	12+(1)	74+(2)	19	64	172

.....

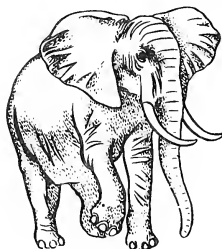
(a) About the aforesaid list, the following matters of those subspecies are ascertained by the author.

Ueno Zoo...Indian (0.1), Thai (1.1)
Tama Zoo...Ceylonese (1.0), Cambodian (0.1)
Inokashira Zoo...Thai (0.1)
Nogeyama Zoo...Thai (0.1)
Kanazawa Zoo...Thai (0.1)
Nihondaira Zoo...Indian (0.1)
Korankei Snake Center...Thai (1.0)
Kyoto Zoo...Malayan (0.1)
Nanki Shirahama Adventure World...Thai (2.0)
Tennoji Zoo...Indian (0.1), Thai (0.2)
Hanshin Park...Thai (0.1)
Takarazuka Zoo...Thai (0.1)
Himeji Zoo...Thai (0.1)
Itozu Zoo...Ceylonese (0.2)
Hirakawa Zoo...Thai (1.0)
Kodomonokuni by the route of the closed Yatsu, and Eliza Wonderland...
African Forest elephant (1.0) = Loxodonta africana cyclotis

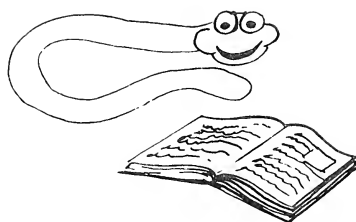
(b) Worthy Matters of Special Mention

1. Yatsu Zoological & Botanical Gardens in a big amusement park had closed by the end of 1982 in connection with the opening of Tokyo Disneyland (TDL) in March of 1983. The Zoo was managed by the co-related company as a nucleus of the enterprise of TDL.
2. Kannawa Zoo belongs to a tourist hotel with a hot spring.
3. A new city Zoo in Nagano opened in summer of 1983. They got a female elephant from Elza Wonderland. About that time, Elza Wonderland sent away the Forest elephant to Aritake Birds & Animal Co., Ltd. in March 1983. The animal dealer deposited it with Okinawa-Kodomonokuni.
4. The African female who arrived in Yagiyama Zoo in July of 1969 at approximately two years of age, died suddenly after the first compiling of this survey. In place of it, a new female came from Miyazaki Safari Park in 1983.
5. In Nagoya-Higashiyama Zoo, a big male African died in September of 1981 and a new male came from Nanki Shirahama Adventure World in 1983 at an interval of about two years.
6. From 1980 to 1981, a male Asian elephant from the Yano Circus died following medical treatment for a fractured foot bone. It was the Yano Circus only elephant. Besides, the only male Asian in the Japanese Circus world was sent to Nagasaki Bio-park in November of 1982 by the Kigure Circus. The male had become too difficult to control.
7. The following Safari Parks - Thouhoku Safari Park, Iwaki Safari World, Nasu Safari Park are operated by the same person and these are entirely profit-making concerns.
8. The newest Safari combines a large, American-style amusement park and sports area and is called Kimeji Central Park. It is similar to Great Adventures of U.S.A. (New Jersey). This park imported 10 young African elephants (3-5 years old) from South Africa in January, 1984. One animal died due to the stress of the long voyage.

(Editor's note: Part 2 will deal with Captive Records, Longevity, Male Elephants in Captivity, Breeding, etc. Due to the length of the Table 1 Charts, references cited and acknowledgements will be included in Part 2.)



Book Review



The Return of the Brown Pelican
Photography by Dan Guravitch
Text By Joseph E. Brown
L.S. U. Press, Baton Rouge, 1983
Price: \$24.95 Hardback
51 pages/101 photographs

Review by Joe David Pool
Noah's Ark Zoo
Sulphur, LA

These experienced professionals, Guravitch and Brown, who have given us numerous books and magazine articles on the ocean and nature, have teamed together to create a work that is, in the author's words, "...not only a celebration of the brown pelican, but in some measure as a guide to the steps we must take...to avoid the fate of its long-vanished cousins, the passenger pigeon and the Carolina parakeet."

This beautiful book reports on the most endangered of the eight species of the family Pelecanidae--*Pelicanus occidentalis*. In a most artful and interesting way, the authors deal with the life history of this bird and explores all of the subjects that might bring that history to a close. Hazards such as oil spills, fishing lines, red tides, fish hooks, human habitation, and chemical pollution are explored in the 51 pages of text and 101 photographs.

The authors, I think, did not mean this book to be a work for academic research, but rather one of merciful appeal to the public. The photography is excellent, especially in the seventeen 8x10 full color photographs.

The shape and size of 8 3/4 X 11 inches intends the work to be a display book rather than a reference source. Should the reader purchase the book with that quality in mind, he would not be in any way disappointed.



BIOLOGICAL VALUES FOR SELECTED MAMMALS

Limited Copies Left

A limited number of copies of the booklet "Biological Values For Selected Mammals" are still available from the AAZK National Hdqts. The price of the booklet is \$1.25 for Professional Members and \$2.50 for all other categories. To order send check or money order payable to "Biological Values/AKF" along with desired number of copies and your complete mailing address to:

Biological Values/AKF
635 Gage Blvd.
Topeka, KS 66606



Legislative News

Compiled by Kevin Conway
AAZK Legislative Coordinator

FINAL RULEMAKINGS ON ENDANGERED/THREATENED SPECIES ANNOUNCED BY USFWS

The following is a synopsis of recent final rulemaking by the U.S. Fish and Wildlife Service to the list of endangered and threatened species.

The U.S. population of the American wood stork (Mycteria americana), has been determined to be an Endangered species. The present population is thought to number about 10,000 adults, a 75% decline since 1930. Since 1975, this species has experienced a 5% decline annually and would, at that rate, be extinct in North America by the turn of the century. Population declines are attributed to disturbances, both natural and man-made of their rookeries and feeding areas.

The population of Woodland caribou (Rangifer tarandus caribou), known also as the Southern Selkirk Mountain herd of Woodland caribou, has been added to the list of Endangered species. This population is found in extreme northeastern Washington, northern Idaho, and southern British Columbia, and is the only herd regularly occurring within the conterminous United States. The herd is now limited to approximately 30 individuals because of habitat destruction, poaching, and probable inbreeding due to its extreme isolation from other populations to the north in Canada.

The Hierro giant lizard (Gallotia simonyi simonyi) has been added to the list of Endangered species, and the Ibiza wall lizard (Podarcis pityusensis) has been added to the list of Threatened species. The Hierro giant lizard, a native to the Canary Islands, was thought to be extinct until recently. The Ibiza wall lizard is found on the Balearic Islands and Mallorca Island in the Mediterranean Sea. Both species suffer from greatly reduced habitat competition and predation by introduced animals, and over-collection by researchers and the pet trade. Several subspecies of the Ibiza wall lizard indigenous to small Mediterranean Islands have already been extirpated.

The Arctic peregrine falcon (Falco peregrinus tundrius), first listed as an Endangered species in 1970, has been reclassified to Threatened. The species is no longer in danger of extinction throughout a significant portion of its range, which extends from Alaska to Greenland in summer and south to South America in winter. The species is estimated to have a current population of at least 3,000 pairs found in the Arctic and sub-Arctic areas of North America. Under "similarity of appearance" provision of the Act, the rule also extends legal protections granted to any type of peregrine falcon in the continental U.S.

---from AAZPA Newsletter, May 1984
Endangered Species Technical Bulletins
and DOI News Releases

INTERIOR DEPT. WITHDRAWS PROPOSAL TO REMOVE KANGAROOS FROM ESL

The Interior Dept.'s FWS has withdrawn a proposal to remove three kangaroo species from the U.S. Endangered and Threatened Species List. The proposal was based on a petition from the Australian Government in 1982; its withdrawal was made after more recent data from Australia indicated a substantial drop in kangaroo populations due to widespread drought last year. This ruling maintains as Federally listed Threatened species: the eastern gray (Macropus giganteus), the western gray (Macropus fuliginosus) and the red kangaroo (Macropus rufus).

Large parts of Australia experienced the worst recorded drought in that country's history in 1982-83. The drought resulted in a decline of 17 percent of red kangaroos and 20 percent of gray kangaroos in New South Wales and South Australia between 1981-83; smaller declines are thought to have occurred in Queensland and Western Australia. The nationwide kangaroo population is now estimated at between 10 and 12 million animals, down from a pre-drought estimate of 19 million.

REGULATIONS PROPOSED FOR EXPERIMENTAL POPULATIONS

A proposed rule to establish procedures for the designation of certain populations of listed species as "experimental populations" has been published by the USFWS. This proposal would amend Section 10(j) of the Endangered Species Act, as amended in 1982.

An experimental population is defined as a reintroduced population (including offspring) of a listed species that is geographically isolated from the non-experimental populations of the same species during specific periods of time. Experimental populations can be classified in two categories, "essential" and "nonessential". An essential experimental population is one whose loss would appreciably reduce the likelihood of the survival of the species in the wild. All other experimental populations would be classified as nonessential.

Prior to the 1982 Amendments, the USFWS was authorized to reintroduce listed species into unoccupied portions of their historic range in order to aid in their recovery. However, legal prohibitions associated with listed species often resulted in local opposition to reintroductions. In an effort to encourage greater cooperation and therefore enhance the recovery capability of listed species, the concept of experimental populations was developed during the reauthorization of the Act in 1982. It is hoped that this designation would encourage greater State and local participation in recovery efforts by reducing Section 7 (consultation) and Section 9 restrictions identified in the Act.

Section 9 strictly prohibits the taking of Endangered species. Under the experimental population designation, Endangered species would be treated as Threatened. This less restrictive designation can allow for more exceptions to the taking prohibitions by developing special regulations (50CFR 17:84-86) for the management of each individual population. The special rule would also include the specific geographical location of the experimental population and any special procedures to be used in its management.

Section 7(a)(2) prohibits Federal agencies from authorizing, funding, or carrying out any activity that would be likely to jeopardize the continued existence of an Endangered or Threatened species. This provision would continue to apply for essential experimental populations and all other experimental populations (both essential and nonessential) located on National Wildlife Refuges or National Parks. It would no longer apply to other nonessential experimental populations. However, Federal agencies would still be asked to confer (a non-binding process) with the Service and to treat nonessential experimental populations as if they were proposed species under Section 7(a)(4). Incidentally, it should be pointed out that before individuals intended to comprise the experimental population are removed from the "donor" population, it must be determined that their removal does not violate Section 7(a)(2) of the Act.



1984 MARKED BY SETBACKS, SUCCESSES
FOR ENDANGERED CALIFORNIA CONDOR

By
Alan Levitt
Department of the Interior



The discovery in late March of a dead California condor is viewed as an unfortunate setback in what researchers is the U.S. Fish and Wildlife Service had otherwise characterized as the most successful year to date in the effort to improve the chances for survival of this severely endangered species.

Radio signals led scientists to a remote section in the southern Sierra Nevada Mountains in California on 22 March, where they discovered a dead male condor, thought to be between 5-6 years old. Preliminary results following necropsy at the San Diego Zoo by the zoo's veterinarian and a scientist from USFWS have not established the cause of death. The bird had not been shot. A small (8mm by 1 mm) piece of metal, of unknown content and origin, was found in the gizzard and is being analyzed. Tissue analysis is also being conducted to pinpoint the cause of death.

The immature condor had been tagged with two miniature radio transmitters in October 1982 in an effort to track its movements in its range throughout the rugged coastal hill country north of Los Angeles. Scientists became concerned when radio signals indicated the bird's movements had stopped.

"We have no clues yet about the cause of death of this condor," said Robert A. Jantzen, director of FWS which sponsors the condor recovery project along with the California Dept. of Fish and Game, National Audubon Society, U.S. Forest Service, and Bureau of Land Management. "The only positive aspect we can take from this situation is that it demonstrates the critical value of radio telemetry in allowing us to investigate condor deaths that we know are occurring in the wild, but that have previously been nearly impossible for us to document."

There are only an estimated 16 California condors known to exist in the wild, with another nine birds in captivity in zoos.

The latest death follows what scientists hail as the most successful season yet in the ongoing attempt to remove condor eggs from breeding pairs in the wild and hatch them in captivity. Six condor eggs have been removed from four wild pairs this season and placed in incubators at the San Diego Zoo. Four eggs and two nestlings were removed from the wild last breeding season. Researchers are also heartened by the discovery of a fifth breeding condor pair, thought to be nesting in the most unusual location yet spotted--halfway up a 200-foot giant sequoia tree in Sequoia National Forest. Prospects for discovery of additional condor eggs in the future are good, scientists say.

removal of condor eggs to the carefully maintained environment of artificial incubators stimulates production of replacement eggs by breeding pairs, a phenomenon known as "double-clutching." The removal can also significantly lessen the chances that eggs or chicks might fall victim to predators or nesting squabbles between adult condors.

Egg production has been excellent this year and we anticipate good chick survival, "Jantzen said. "The encouragement we take from this news is tempered by our concern over the deaths of two wild condors. We are still in need of a more complete understanding of the reasons for condor mortality."

A young female California condor was also found dead in Kern County, California last November.



FILM OFFERS VISUAL DELIGHT, FOOD FOR THOUGHT

*Submitted by Bob Berghaier
Philadelphia Zoo, Philadelphia, PA*

I have recently viewed for the second time what I consider one of the most beautiful and informative wildlife films I have ever seen--"Korup". It is a film about the forest of the same name located in the West African nation of Cameroon. The area is one of the most diverse in life forms of any African forest and has recently been declared a national park. "Korup" was filmed over a three-year period by an Englishman, Phil Agland. It has the rarest film footage of forest primates you will ever see: Red Colobus, Angabey, Guenons, and Drills. Nocturnal shots show Potto and Angwantibo. Along with the primates, birds are also represented. A long sequence takes place at the nest of a forest-dwelling African Crested Eagle. The smaller inhabitants of the forest are also covered by the film. Those familiar with tropical forest ecology know how fascinating invertebrates can be and this film gives excellent coverage of this topic.

Combined with the film's outstanding photography is an informative narration. Watching this movie, your visual senses are overwhelmed by the sights of the forest and your mind is broadened by the dissertation of Korup's ecology. Those of you who have seen the movie "Greystoke" will perhaps think that some of the scenery in Korup looks familiar. That is because the "on location" work was shot at the forest.

I feel that "Korup" should be viewed by all zoo professionals. The film gives one an idea of what can be lost if a forest like Korup is allowed to be destroyed. The film is now being used by an organization called Earth Life (started by the filmmaker) which is attempting to raise money to help the Cameroon government preserve Korup. Obtaining this film for zoo employees or zoo members would make a worthwhile AAZK Chapter project. If you are interested in getting a copy of Korup or want more information on Earth Life, contact Al Imhoff, Suite 700, 1990 M. Street, N.W., Washington, D.C. 20036 (202) 223-4300.



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AAZK KEEPER TRAINING VIDEO TAPE NOW AVAILABLE

Entitled Zoo Keeper Safety, An Attitude Adjustment, this first tape attempts to create a safety attitude and presents a systematic safety approach to the job of zoo keeping. All proceeds generated from the sale of training tapes will be used to finance production of future training tapes.

AAZK KEEPER TRAINING VIDEO TAPE PURCHASE AGREEMENT
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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



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.

EXECUTIVE DIRECTOR...for Zoological Society of Florida, Miami. Salary open DOQ. Reports to Society Board of Directors. Responsible for staff selection and supervision. Functions include development, fund raising, education, membership development and support, volunteer program management and marketing. All efforts support Miami's world class Metrozoo. Requires substantial related experience including management experience, preferably in a zoological environment. Budget \$600k. Society has 13,500 members. Send confidential resume to: Robert E. Slavin, Korn/Ferry International, 1900 Avenue of the Stars, Suite 1900, Los Angeles, CA 90067 by 11 June, 1984.

ZOOKEEPER...responsible for animal care and public interaction in children's zoo. Salary \$600/biweekly. Contact John Donaho, Curator, Children Zoo, Houston Zoological Gardens, 1513 Outerbelt Dr., Houston, TX 77030, (713) 520-3250.

BIRD KEEPER...responsible for care/maintenance. Requires one year experience in aviculture. Send resume to: Guy Farnell, Curator/Birds, Audubon Zoological Garden, P.O. Box 4327, New Orleans, LA 70178.

POSTDOCTORAL POSITIONS...contact The Population Council, 1230 York Ave., New York, NY 10021 (212) 360-1000.

Available July - to study steroid regulation of gene expression. Requires PhD, MD or equivalent, background in recombinant DNA technology; experience in protein chemistry helpful. Send curriculum vitae and three references to Dr. Olli Janne.

Available August - to study sperm structure and motility/ in vitro fertilization in exotic mammals. PhD, DVM or equivalent required. Send curriculum vitae and three references to Dr. David Phillips.

SUPERVISOR/KEEPER...responsible for care/maintenance of hoofed stock/cats/mammals. Will supervise staff. Elephant handling preferred. Salary \$15,000, plus benefits. Send resume by 18 June to Dave Jeffers, Director, Kings Dominion Zoology Dept., Doswell, VA 23047.

Positions available at International Wildlife Park, Grand Prairie, Texas:

ELEPHANT SUPERVISOR...requires 5 years' experience with elephants. Training experience desirable. Salary based on experience.

BIRD KEEPER/SUPERVISOR...requires three years' experience as bird keeper. Salary based on experience.

For either position send resume c/o Wildlife Manager, International Wildlife Park, 601 Wildlife Parkway, Grand Prairie, TX 75050.

GRAPHICS DESIGNER...requires knowledge of print graphics, interior/exterior interpretive and signage graphics, exhibit techniques and client relationships. Send resume with salary requirements to Angelo Monaco, Personnel Manager, New York Zoological Society, 185th & Southern Blvd., Bronx, NY 10460. EOE

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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.

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

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JULY 1984



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this month's Keeper/Artist is Cathy Taibbi, a keeper in the Reptile Dept. of the Atlanta Zoological Park. Cathy's drawing is of a Red-Eared Guenon (Cercopithecus erythrotis). Thanks, Cathy!

Scoops and Scuttlebutt

AAZK BOARD APPROVES NEW RC APPOINTMENT

The AAZK Board of Directors congratulates Diane Krug of the Riverbanks Zoo, Columbia, SC on her appointment as Regional Coordinator for North Carolina, South Carolina and Tennessee. We know her interest and her enthusiasm will benefit all AAZK members in her region.

INFORMATION SOUGHT ON INSTITUTIONS OFFERING ZOO CURRICULUM

Dear Fellow AAZK Members,

A question that we are often asked by our public and our personal friends is where can one go to school to learn zookeeping, or where can one find courses that relate to captive animal care. I have undertaken a project to identify these sources and will appreciate any help that you can give me. I thought that there would be an easily obtainable list of institutions and curricula, but it seems that universities do not share that information. The next most logical step is to ask for sources that you know.

I am familiar with the programs at Santa Fe Community College and at Moorpark College. Please let me know about full programs and even single classes that are available and that relate to zookeeping. I will especially appreciate leads to already established lists to use as guides.

Thank you for your help in increasing AAZK's sources of professional information.

Pat Sammarco, Zoo Keeper
Lincoln Park Zoo, Chicago, IL

from the President

To Mike Coker, Former AKF Executive Editor:

On behalf of the AAZK Board of Directors and our general members, thank you for the work, guidance and inspiration in putting out the monthly issue of Animal Keepers' Forum from 1977 to 1984.

Looking back through my copies of AKF it becomes evident that you have overseen the development of a quality publication for AAZK. Year in and year out I have never been disappointed by the AKFs I receive each month. When I consider that your editorship of AKF is not your principal job,

SCOOPS AND SCUTTLEBUTT, Continued

I'm even more impressed with the production quality. Additionally I need to thank you for probably inspiring and training your staff replacements. I seriously doubt that I will notice any significant change in the AKF format due to your departure. This is a sure indication of your regard for AKF and AAZK that such a smooth transition should occur upon your leaving the publication.

I hope that all continues well for you in your professional career and that you will continue to support AAZK and its publication, Animal Keepers' Forum. Thank you for your efforts on behalf of zoo professionalism and animal care.

Sincerely,



Kevin Conway
AAZK President

Nixon Griffis Establishes Fund For Zoological Research

New York Zoological Society trustee, Nixon Griffis, has established a unique fund for zoological research. Open to zoo and aquarium scientific staff members across the nation, fund recipients may be curators, keepers, veterinarians, and research and consulting biologists. Programs to be considered for support include those in: animal behavior, veterinary medicine, reproductive biology, genetics, exhibition design and other research areas that address the care, management and propagation of wild-life in captivity.

Mr. Griffis, a long-time supporter of zoological research and education, has been active on behalf of the New York Zoological Society through his work at the New York Aquarium and Bronx Zoo. Collecting trips for these institutions have taken him to such destinations as Cameroon to collect goliath frogs, Fiji for sea snakes and, recently, Papua, New Guinea in search of the rare green lace scorpionfish.

In describing his motivation for establishing the fund, Griffis commented, "With the world's wildlife both above and below the water threatened as never before, this fund will support research which will help zoos and aquariums fulfill their ever-increasing role as repositories of life".

Grants, not to exceed \$3000, will be awarded biannually. For information about the Fund and grant applications, interested persons are urged to write to the Nixon Griffis Fund for Zoological Research, c/o New York Zoological Society, 185th Street and Southern Blvd., Bronx, NY 10460.



Coming Events

AAZPA ANNUAL CONFERENCE

September 9-13, 1984

Miami, FL

BLACK-FOOTED FERRET WORKSHOP

September 18-19, 1984

Laramie, WY

Held at the University of Wyoming, the purpose is the first comprehensive meeting on the endangered black-footed ferret since their rediscovery in 1981. Biologists will discuss research, searching, and management. The workshop will close with a panel presentation and discussion on the direction of black-footed ferret research and management in the future. Registration fee is \$20/general, \$10/student. Fee includes published proceedings. For more information contact: Conference & Institutes, P.O. Box 3972, University Station, Laramie, WY 82071-3972.

THE 4TH ASSOCIATION OF ZOOLOGICAL HORTICULTURE CONFERENCE

September 19-22, 1984

Brookfield, IL

To be held at Chicago's Brookfield Zoo, 3300 Golf Blvd., Brookfield, IL 60513. Those interested in attending please contact Bill Torsberg at the above address.

AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at the Maidson Hotel. For information contact Mary Bennett, Registrar, 5500 Phinney Ave., North, Seattle, WA 98103.

ECOLOGY RESTORATION SYMPOSIUM

October 11-12, 1984

Madison, WI

To be held at the University of Wisconsin, the two-day symposium focuses on the scientific value of attempts to restore ecological communities and ecosystems. For information contact: Nancy Dopkins, 1207 Seminole Highway, Madison, WI 53711 or call (608) 262-2746.

THE FOURTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 7-8, 1984

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information contact Thomas Meehan, DVM, Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.



Births & Hatchings

TAMPA--BUSCH GARDENS.....Sandy Moher

May B&H include: Mammals - 3.1 Nyala, 0.1 Greater kudu, 4.5 Thomson's gazelle, 1.0 Reticulated giraffe, 8.13 Impala, 0.0.1 Ring-tailed lemur, 0.1 Muntjac deer, 0.1 Kafue (Red) lechwe, 0.1 Roan antelope, 2.0 Dorcas gazelle; Birds - 11 Orinoco goose, 5 Crested tinamou, 19 Indian peafowl (blue phase), 3 Indian peafowl (white phase), 20 Mandarin duck, 2 Illiger's macaw, 3 Green-cheeked conure, 1 Black-necked swan, 4 Mexican military macaw, 0.1 Lesser Bahama pintail, 1 Blue and gold x Military macaw, 9 Redhead duck, 3 Golden-capped conure, 4 Moustache parakeet, 4 Scarlet ibis, 2 Golden (Queen of Bavaria) conure, 1 Green (white-eyed) conure, 1 Greater sulphur-crested cockatoo, 6 Abdim's stork, 2 Pied cockatiel, 3 Black swan, 2 White-bellied caraque, 4 Severe macaw, 1 Ringed teal, 3 Yellow-cheeked (red lored) Amazon and 1 American flamingo.

DALLAS ZOO.....Tami Jones

B&H for May 1984 include: Mammals - 1.0 Slender-horned gazelle, 0.0.1 Spider monkey, 2.2 Ruffed lemur, 3.1 Markhor, 0.1 Kirk's dik dik, 0.1 Speke's gazelle, 1.1 Snow leopard, 0.1 Hamadryas baboon, 1.0 Bison; Birds - 0.0.2 Green-winged parrot, 0.0.3 Spur-winged lapwing, 0.0.1 Coscaroba swan, 0.0.1 Philippine duck, 0.0.1 Abyssinian ground hornbill, 0.0.1 Double-striped thick-knee, 0.0.2 Mute swan; Reptiles - 0.0.18 Bismarck ringed python (*Liasis boa*), 8.6 Green tree python (*Chondropython* *vididis*), and 0.0.6 Children's python (*Liasis childreni*)

TOPEKA ZOO.....Alice Miser

May and early June 1984 B&H include: Mammals - 1.0 Degu, 1.0 Dama wallaby, 1.0 Japanese macaque, 1.1 Cotton-headed tamarin (DNS), 1.1 Siberian tiger (0.1 DNS; first born at TZP, part of SSP program/sire is at Henry Doorly Zoo in Omaha, NE), 1.1 Przewalski wild horse (part of SSP; 10th birth at TZP of which 2 DNS), 0.0.? Bobcat (mother and kittens are in seclusion due to mother's past history of eating her kittens); Birds - 0.0.3 Lilac-breasted roller, 0.0.3 Red-crested cardinal, 3.0 Trumpeter swan, 0.0.4 Darwin's rhea (first at TZP; artificially incubated; 0.0.2 DNS).

MIAMI METROZOO.....Lori Bruckheim

The following are the B&H for May 1984: Mammals - 0.2 Defassa waterbuck, 2.0 Himilayan tahr, 1.1 Impala, 1.0 Markhor; Birds - 0.0.16 Ostrich (0.0.4 DNS), 0.0.4 Ruddy duck (0.0.3 DNS), 0.0.3 Wood duck (0.0.1 DNS), 2.1.9 Mandarin duck, and 0.0.3 Red-crested pochard (0.0.1 DNS).

THE LONG BEACH ZOO.....Victor Pant

Recorded B&H from November 1983 through March 1984 include: Mammals - 2.1.8 Virginia opossum, 0.0.7 New Zealand rabbit, 0.0.9 Beveren rabbit, 1.2 Pygmy goat (1 DNS), 1.0 Angora goat, 11.2 Chinchilla; Birds - 13 Rhode Island red, 8 Reeves pheasant, 3 Golden pheasant, 2 Ringneck pheasant, 14 Pharaoh quail, 6 Plum-headed parakeet, 8 Cockatiel, 24 Zebra finch, 10 Society finch, 2 Indian ring-neck pheasant (DNS); Reptiles - 1 Banded gecko, 6 California desert tortoise (1 DNS), 2 Texas desert tortoise, 14 Southern alligator lizard, 6 Western fence swift, 22 Ribbon snake; Fish - 47 Sailfin mollies, 52 Black mollies, 31 Jack Dempsey's, 14 Angelfish, 100+ Platties; Invertebrates - 2 Praying mantis.; Amphibians - 4 Fire belly toads.

BIRTHS AND HATCHINGS, Continued

METRO TORONTO ZOO.....*Oliver Claffey*

B&H for March and April 1984 include: Mammals - 0.0.16 Kowari, 0.0.6 Egyptian fruit bat, 0.0.2 Ringtailed lemur, 0.0.6 Plains rat, 3.0.1 Hamadryas baboon, 0.0.3 Hog-nosed badger (DNS), 0.0.1 Reeves muntjac, 0.0.1 Nubian ibex (DNS), 0.0.3 Common marmoset, 0.0.1 Geoffroy's cat, 0.0.1 American woodland caribou, 3.5 Aoudad, 1.1 Black lemur, 0.0.1 Douroucouli; Birds - 0.0.6 Emu (2 DNS), 0.0.3 Black-footed penguin, 0.0.5 Sacred ibis, 0.0.2 S.A. ostrich, 0.0.6 Yellow-billed duck, 0.0.1 Tawny frogmouth; Fish - 0.0.70 Brichardi cichlid, 0.0.2 Striped panchax; Invertebrates - 0.0.25 Brazilian cockroach.

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

April and May 1984 B&H include: Mammals - 0.0.13 White-toothed shrew, 2.2.11 Domestic goat, 0.1 Llama, 0.0.2 Dall sheep, 0.0.2 Callimico monkey, 0.0.2 Spiny mouse, 0.0.2 Acouchi, 0.0.3 Degu; Birds - 0.0.3 Inca tern, 0.0.2 Blue-shouldered robin chat, 0.0.2 Purple swamphen, 0.0.2 Purple honeycreeper (fledged); Herptiles - 0.0.3 Poison arrow frog and 0.0.4 Australian side-necked turtle.

BRONX ZOO.....*Margaret Price*

B&H for April and May 1984 are: Mammals - 2.0 Saddleback tamarin, 0.1 Pudu, 2.0 Lesser galago, 1.1 Axis deer, 3.0 Pen-tailed bettong, 1.0 Collared peccary, 4.0 Minnie down's mouse, 1.0 Red brocket deer, 2.1 Mongolian wild horse, 1.0 Slender-horn gazelle, 2.1 Pere David's deer, 1.0 Gaur, 1.0 American bison, 0.1 Reeves muntjac, 1.2 Patagonian cavy, 1.0 Mandrill, 1.1 Maxwell duiker, 1.0 Egyptian spiny mouse, 2.0 Barasingha, 2.0 Wild cavy, 1.0 Mexican fruit bat, 4.0 Snow leopard, 5.2 Thomson's gazelle; Birds - 5 Red-crested pochard, 1 Green jungle fowl, 13 Crested tinamou, 4 Tawny frogmouth, 1 Mauritius pink pigeon, 2 Kookaburra, 2 Humboldt penguin, 3 Black-rumped hemipode, 1 Malay peacock pheasant, 1 Rothchild's mynah, 1 Edward's lorikeet, 1 Inca tern, 1 Congo peacock pheasant, 1 Scarlet ibis, 2 Silver gull, 1 Andean gull, 1 Palawan peacock pheasant, 2 African purple glossy starling, 4 Lilac-breasted roller, 1 Hooded crane, 1 East African pratincole, 4 Kashmir koklass pheasant, 3 Melba finch, 2 White-naped crane, 1 American barn owl; Reptiles - 1 Travancope tortoise, 1 Siamese crocodile, 37 Russian viper and 9 Boa constrictor.

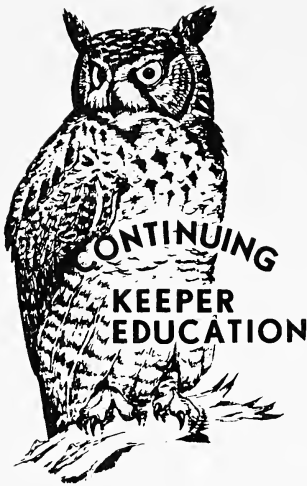
JACKSONVILLE ZOO.....*Anne Wiggins*

April and May 1984 produced the following B&H: Mammals - 0.1 Dama Wallaby, 0.1 Guanaco, 1.1 Eland (1.0 DNS), 0.2 Sitatunga, 0.0.1 Ring-tail lemur (DNS), 2.0 Cape hartebeest, 1.1 Grant's zebra; Birds - 0.0.3 Nanday conure, 0.0.6 Kookaburra (1 DNS), 0.0.8 Killdeer (1 DNS), 0.0.9 Masai ostrich (2 DNS), 0.0.2 Leadbeater's ground hornbill (1 DNS), 0.0.25 Wild turkey, 0.0.1 Pondicherry vulture, 0.0.1 Sacred ibis, 0.0.4 Indian spoonbill, 0.0.2 Rothchild's mynah (2 DNS), 0.0.2 Mandarin duck.

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

May 1984 B&H include: Mammals - 1.0.1 Tree shrew (1.0 DNS), 0.0.2 Common marmoset, 0.1 Miniature horse, 0.1 Canada moose, 0.2 Caribou; Birds - 0.0.2 Mute swan, 0.0.3 Barn owl; Reptiles - 0.0.7 Yellow anaconda.





Front Royal Visiting Keeper Program

Submitted By

Judie Steenberg, Coordinator
AAZK Education Committee

A special program is being offered by the Staff at the Front Royal Conservation and Research Center in conjunction with the AAZK Staff Exchange program. The Center, located near Front Royal, Virginia, offers the opportunity to learn about current conservation and research programs involving many species of birds, small mammals and ungulates.

The Visiting Keeper program would allow keepers to spend time at the Center in a working situation, learning and sharing

information and ideas. Guidelines for the program would be as follows:

1. If the participating Zoo or Keeper requests that training/experience be limited to either birds or mammals, the training period should cover a maximum of 4 weeks (mammals--2 weeks in small mammals and 2 weeks in ungulates; birds--4 weeks to cover this complex operation involving incubation room, rearing facilities, diets, etc.).
2. If the participating Zoo or Keeper requests that training/experience be gained in both birds and mammals (several zoos have keepers working both areas), the training period could be extended to 6 weeks (2 weeks in each "unit").

Visiting keepers would benefit from experience gained while working at this unique facility and the Center would benefit from the sharing of ideas and information as well as the additional help provided.

The Center would provide free-of-charge housing in the dormitory as it does for other volunteers. Participants would be responsible for their own transportation to and from the Center and for food while at the dormitory. Work would be on a regular 40hour/week schedule, which would allow time to visit the Tock Creek facility as well as other nearby institutions.

Examples of the variety of species currently being managed at Front Royal are: Birds - Rothchild's mynah, Jobi Island ground dove, mountain witch dove, blue-crowned pigeon, sun bittern, Schalow's touraco, satin bowerbird, Szechwan parakeet, black palm cockatoo, European hoopoe, tule geese, white-winged wood duck, Teminck's tragopan, satyr tragopan, Koklass pheasant, various crane species including Mississippi sandhill, saurus, white-naped, red-crowned and Stanley's. Mammals - Small mammal species include Matschie's tree kangaroo, golden lion tamarin, Goeldi's tamarin, clouded leopard, maned wolf, red panda and marsupial tiger cat. Ungulate species include Reeve's muntjac, Eld's deer, Pere David's deer, reindeer, bactrian camel, wisent, sable antelope, scimitar-horned oryx, Przewalski's horse, onager and zebra.

A maximum of two Keepers would be allowed to participate in the program at one time. Larry Collins, Mammalogist, DOC, will coordinate the program. All inquiries should be referred to him at: National Zoological Park, Conservation and Research Center, Front Royal, VA 22630.

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Riverbanks Southeastern Regional AAZK Conference

Submitted by

Stephen J. Danko, President
Riverbanks Zoo AAZK Chapter

Riverbanks Chapter Hosts Successful First AAZK Regional

The Riverbanks Zoo AAZK Chapter (Columbia, SC), decided to conduct a regional conference to further promote professionalism within the zoo keeping profession and to make the highly educational and inspirational zoo keeper conference available to financially restricted animal keepers within our region. The conference was held April 19, 20 and 21, 1984.

With these ideals in mind, it was decided to have only two and a half days of conference activities and that the conference would be managed in a "break-even" fashion for the Riverbanks Zoo AAZK Chapter. Cost cutting methods included: holding all conference activities at the Riverbanks Zoo to avoid renting any facilities; providing most of the meals thus saving by purchasing in bulk and saving on time and individual expenses of traveling to and from eating; selecting a fairly inexpensive but adequate motel located only a short distance from the Riverbanks Zoo; and soliciting contributions from various companies and individuals in the Columbia area.

To increase the educational value of this conference, we invited several noted individuals within the zoological profession. By inviting these people, we hoped to give our conference participants the opportunity to meet and talk with these individuals. We are extremely grateful to: Dr. Joe Erwin, Dr. Kenneth Gould, Miles Roberts, Les Schobert, Guy Smith, Dr. David Taub, Al Valenzuela and Bill Zeigler, who participated in the conference at their own expense!

The total conference intake including donations, registration fees and the auction amounted to \$1,819.00. The actual conference cost amounted to \$1,569.09, yielding a surplus of \$249.91. As previously agreed, all profits generated were to be split 50/50 with National AAZK.

I would like to thank the AAZK Board of Directors for their support and the assistance of the Editors of Animal Keepers' Forum for making this conference possible.

This first AAZK regional conference attracted a total of 75 participants representing 20 zoological institutions and eight states! Hopefully we have sparked some interest in AAZK from several non-AAZK keepers who attended. We sincerely hope that the Riverbanks Zoo AAZK Chapter, by the attitude in which this conference was managed, fairly represented the goals and ideals of AAZK in regards to professional zoo keeping to the directors, curators and keepers who attended.



Viewpoint

A TRIBUTE

To A Man Who Has Made A Difference

By
Michael G. Illig, Animal Keeper
Washington Park Zoo, Portland, OR
Former EATM Student

There is a man whose major contribution to the animal business should not go unheralded. This man, William Brisby, is the Director of the Institute for Wild and Exotic Animal Studies at Moorpark College in Moorpark, CA, 30 miles north of Los Angeles. Ten years ago, "Briz", as he is known to his students and friends, founded the Institute with one timber wolf and a dream that many believed would never come true. Today the collection comprises over 750 animals of 150 different species.

Competition for entry into the program is tough. There are up to 2000+ applications received every year for this 2½ year program where graduates receive an Associate of Science degree in Exotic Animal Training and Management (EATM). There are only 40 people chosen each year for the program. Applicants have ranged from those just out of high school to PhDs and Veterinarians.

What happens in this very condensed facility of 1¼ acres in what makes William Brisby so remarkable. Briz has created such an environment of learning and hands-on experience that it may be the perfect start for those wanting to work with animals. The standards are very high in this program. So high, in fact, that often less than half of the students who start the program ever finish. Brisby demands 110% effort from every student 110% of the time. Students will attend a full-time academic program with such classes as Biology of Exotic Animals, Exotic Animal Behavior, Animal Health and Safety, Exotic Animal Nutrition, Exotic Animal Care and Handling, Animal Parks Planning and Design, Veterinary Procedures, Public Relations and Administration, among others.

Every one of the 750+ animals are cleaned and fed by 8 a.m. Every past and present EATM student knows that it is like to have a flashlight in one hand and a hose in the other on a dark winter morning, making sure the animals' quarters are spotless. A student must also maintain a "C" average, cannot fail any class, and can be absent no more than three times or they are out of the program. There are no vacations, no regular days off, and many times a student will stay at the animal compound all night for a scheduled "nightwatch". In the program's ten-year history, there has been someone on the grounds every second. The students must also raise the majority of the operating funds themselves. So, along with their already grueling schedule of work and study, they put on hundreds of educational animal shows a year, and also an annual circus, among other fund-raising events. This all may sound rather harsh, but Briz has produced some of the most dedicated, hard-working people in the animal business.

The graduates of the EATM program are in demand. Many students with no prior experience have successfully competed for jobs in zoos, aquariums and research facilities around the world. There are many former EATM students who are past, present and, I am sure, future presidents, vice presidents and other officers in AAZK Chapters all over the country. William Brisby has helped create a high degree of professionalism in the animal business.

A TRIBUTE--To a Man Who Has Made A Difference, Continued

Another dream is now taking shape for Briz and the faculty and students of the EATM program. The cramped 1½ acre facility will soon be moving to 9 acres adjacent to the Moorpark College campus. There is no doubt in my mind that with the standards that William Brisby demands, that this will become a zoo of the highest quality.

Personally, I cannot say enough about what being an EATM student has done for me and has meant to me. I just want to join with hundreds of "ex-EATM-ites" in thanking Briz for all the sacrifices he has made and all the work he has done to make us better animal people and to improve the care that is given to animals all over the world.



THINK Safety!



THINK SAFETY - GET HELP BEFORE YOU NEED IT !

Keepers and Computers...Part Six

SOME FINAL CONSIDERATIONS

By

Jim Albert

*Colony Manager, Balcones Primate Laboratory
Graduate Student, Department of Anthropology
University of Texas at Austin, Austin, TX*

It's time to finish this series on Zookeepers and Computers, and I'd once again like to address the rationals for keeper use of computers. The temptation to wax philosophical is great at this point, but I'll try to keep it short and simple.

We are in the midst of an "information explosion". The advances in many fields in the past five years are monumental compared to the gains over centuries previously. These major leaps in technology and science have helped make modern zoos possible, by creating the leisure time and financial basis that makes parks a part of modern society, as well as contributing to better construction of exhibits and superior veterinary care.

Along with the information explosion, and in part caused by it, there has been a population explosion, and while people have increased, so wild places have been decreased, and the numbers of many species have dwindled and in some cases, extinctions have occurred. Efforts to conserve many critical areas of unmolested habitat, particularly in the tropics, are relatively recent and are of uncertain success, while captive conservation has not been particularly successful in some cases.

What is needed to enhance both habitat conservation and captive maintenance is simply more information. Specific knowledge of an animal's habits is required to effectively deal with threats to its existence in the wild as well as to ensure its survival in the zoo. Such knowledge is notably lacking for many species. It is extraordinarily difficult to conduct research on many animals in their native habitats, due to difficult conditions, both ecological and political.

Laboratories hold animals for a variety of research purposes, and have made meaningful contributions, but the species that they have are limited for the most part, to "standard" research animals. The place where most of the animals about which more information is needed to ensure their survival are located is in the zoo. The person with the most constant exposure to the animals and with the most intimate knowledge of their behavior is the zookeeper.

What is clearly needed is the transferal of what the keeper knows by routine observation or suspects by "professional intuition" from the keeper's private knowledge to a more public domain. AKF and AAZK conferences do much to meet this need within the zoo industry, and there are other, outside avenues as well.

Much about animals is subtle and complex. The professional keeper may nonetheless be aware that "something is going on", but unable to make systematic sense of it; this is where a computer can be of great assistance. The computer can also be useful in formalizing a report such that it commands the respect of the academic community, who may then turn their attention to the problem.

Zoos, zookeeping, and indeed our jobs will continue to exist only so long as there are animals to keep. Although the survival of many species in captivity is virtually a given thing, this is not so for a multitude of others, and numbered among them are many of the animals that "draw" people back to the zoo.

The computer is a product of the information explosion. I commend it to you as one of the tools that are useful in building our defences against the "extinction explosion", hoping that in putting computers to work, you have as much fun with them as I do.



Chapter

The Toledo Zoo AAZK Chapter is pleased to announce these newly elected officers for 1984:

President....Don Red Fox
Vice-Pres....Valerie Windus
Secretary....Joanne Terry
Treasurer....Terri Heminger
Sgt.-at-arms....Cheryl Hanzlick

We would also like to thank our outgoing officers for a great year in 1983. Our second annual AAZK haunted house (Halloween II) took in \$4,800 for our chapter. Some of our guest speakers included local wildlife rehabilitators, our county game warden speaking on wildlife laws; Dr. Tramer who spoke about migrant birds in the neotropics, and a program by one of our keepers who traveled to Venezuela. The weekly summer volleyball games sponsored by AAZK gave everyone a chance to socialize while they exercised. Our successful Keeper Continuing Education Program has become a part of the standing committees sponsored by the zoo. Keepers still sit on and chair the program, but we are no longer solely sponsored by the AAZK Chapter. The Toledo Chapter is participating in the KAL program and we welcome keepers from other zoos.

Submitted by Michelle Grigore

Newly elected officers for the Brookfield Zoo AAZK Chapter are:

President....Barbara Clauson
Vice-Pres....Jan Ramer
Assist. Vice-Pres....Mary Schollhamer
Secretary....John Stoddard
Ecology Officer....Fran Olson

News



Please send Chapter News to Lee Payne, Chapter Affairs Coordinator, at the Detroit Zoo. Also send a copy to the AKF editorial offices, 635 Gage Blvd., Topeka, KS 66606.



A HAUNTED HOUSE IN A ZOO?

By W. Whittaker
Toledo Zoo
Toledo, OH



It was a wild joke offered in response to a request for fund-raising ideas at an AAZK Chapter meeting. We didn't think anyone would take it seriously. Everyone laughed, but the man in charge, W. Dennler, TZ Director, was laughing as he said "yes" to the project. Beyond the basic idea of a haunted house, we had only Machiavellian fantasies. That was two years ago, and the "haunted house" is now a significant zoo event created and produced by the Toledo AAZK Chapter with the wholehearted support of zoo management, staff, volunteer organizations, members, vocational students, media, and private business. It has been an astounding success, especially financially.

If your chapter is looking for fund-raising ideas (and which chapter isn't?), you should consider a haunted house. The benefits are numerous and substantial, foremost of which is financial. This single annual event can significantly enrich a chapter's treasury. The first year our gross profit was \$950.00; the second year it was \$4,800.00! With our profits we help support the organizations that participate with us and other related professional organizations whose aims we share; we bring speakers to our zoo, fund zoo-related projects, and last, but not least, we have fun in the form of chapter parties and activities.

As long as we're talking about fun, let us point out that doing a haunted house can be just that. In spite of all the frustrations, fits of despair, etc., it is entertaining and rewarding. I know, I've sworn after each "I'll never do it again...but. Oh, Damn! Here I go again, "Hmmm, Halloween III." What we offer is not just a haunted house but also associated activities, such as a graphics display describing Halloween traditions, halloween movies with live action, and for zoo members only, a free children's party with games, prizes, and refreshments donated by local merchants.

The haunted house is live theatre, pure and simple, with props, special effects, costumes, characterizations, etc. We let our imagination run wild and then use what fits or feels right. The creative freedom is exhilarating.

The event is definitely worth the trouble when you consider the benefits to zoo personnel relations, public relations, and more significantly the opportunity to make Halloween a safe, enjoyable holiday again. The time honored tradition of "Trick-or-Treat" is rapidly disappearing. We are all too familiar with the increasing incidents of razor blades, needles, etc. hidden in the treats given to unsuspecting children. "Well, maybe just one more time."

Look at your zoo facilities. See what they offer or don't offer and let imagination go to work. Focus on the real spirit of Halloween and let it happen.

Our Chapter has learned a lot in two years of trial and error and we would be happy to help any chapters interested in trying it. Perhaps we can spare you some errors. Write to: Toledo Zoo AAZK, 2700 Broadway, Toledo, OH 43609, Attn: Halloween Committee.



Reptile Care: Relating To The Inquiring Novice - Part 2

BUYING

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

The snake scam of Atlanta Wildlife Exchange should have stimulated everyone (especially zoo keepers) to inform the reptile novice about the legalities of any animals being acquired. While not always obviously protective of our wildlife, animal welfare laws must be observed. Whether the reptile enthusiast is contemplating collecting an animal from the wild or purchasing one from an animal dealer, it is important to be familiar with federal, state, and local animal regulations.

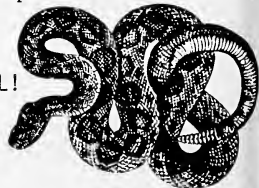
Deciding on the "right" reptile often requires considerable thought. Novices must ask themselves why they wish to own a reptile. As they ponder the reasons, consideration must be given to family members. Will the reptile in question be compatible with others who must live with it? How large will the animal be at maturity? Can it be financially afforded (housing, artificial environment, veterinary care, food, etc.)?

Once potential reptile owners have justified the need to own such an animal, they can begin to become serious about the matter. There is a great deal of research to be done. It is the moral obligation of any animal owner to thoroughly research the requirements of the intended acquisition so that it will receive the proper care. Also, background information about the particular animal is essential to know, its age, disposition, and current state of health, etc. However, the novice should not rely entirely on information offered by the seller. It will be necessary to exercise good judgement. If possible, the animal should be viewed before purchasing. It is also helpful if the novice invites an experienced herpetologist along to assist in choosing "the best of the lot"!

Some factors to consider are the animal's weight: is it in a proper state of flesh? Is it vigorous or listless? Does the animal look dehydrated? Are there any scars or cuts on its body? Are there missing appendages or broken bones? Check for retained sheds and eyecaps. Is the animal gaping (may signify mouth rot or respiratory problems)? Is it being housed in the same cage with other reptiles? If so, what kinds and how many others? What is the condition of the cagemates? Is there fecal material present, or is the cage clean? Does the animal have access to water, and if so, check for cleanliness and the presence of drowned mites.

If all seems in order, and before a purchase, the novice should be prepared to properly transport (Part 3) and house the new reptile.

THE REPTILE NOVICE SHOULD NEVER ACQUIRE A VENOMOUS ANIMAL!





AAZK
National Conference
SEATTLE 1984

1984 AAZK NATIONAL CONFERENCE REGISTRATION FORM

Sept. 30-Oct. 4, 1984



Please type or print. One name per form.
Return form with your fee to:

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Deadline for Pre-registration is August 15, 1984.

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VEGETARIAN YES _____ NO _____

WILL BE SUBMITTING PAPER YES _____ NO _____
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MEMBER OR SPOUSE \$50.00 each

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(After Aug. 15th)

TOTAL FEES ENCLOSED \$ _____

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(This will help us provide adequate inventory)

Papers, Papers, Papers!!!

As this issue goes to press, the deadline for papers is at hand. We hope your abstracts are in the mail and on the way. If you missed the deadline but have a paper, contact Phil Pennock right away. No guaranteed, but we'll try to squeeze it in. If you have a paper but aren't sure if you'll be able to come to the conference, let Phil know. Depending on the situation, we can try to work something out.

Auction Items

If you have an item for the auction, please consider sending it to us ahead of time, if at all possible. It might make your traveling easier and it will definitely make auction arrangements here go much smoother. Send all items to:

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Thursday...\$25.00 (evening)	covers banquet & evening at Space Needle

Tentative Schedule

SUNDAY

Board Meeting
Registration
Ice Breaker

MONDAY

Opening presentations
Morning paper session
Lunch on your own
Evening tour of Seattle Aquarium

TUESDAY

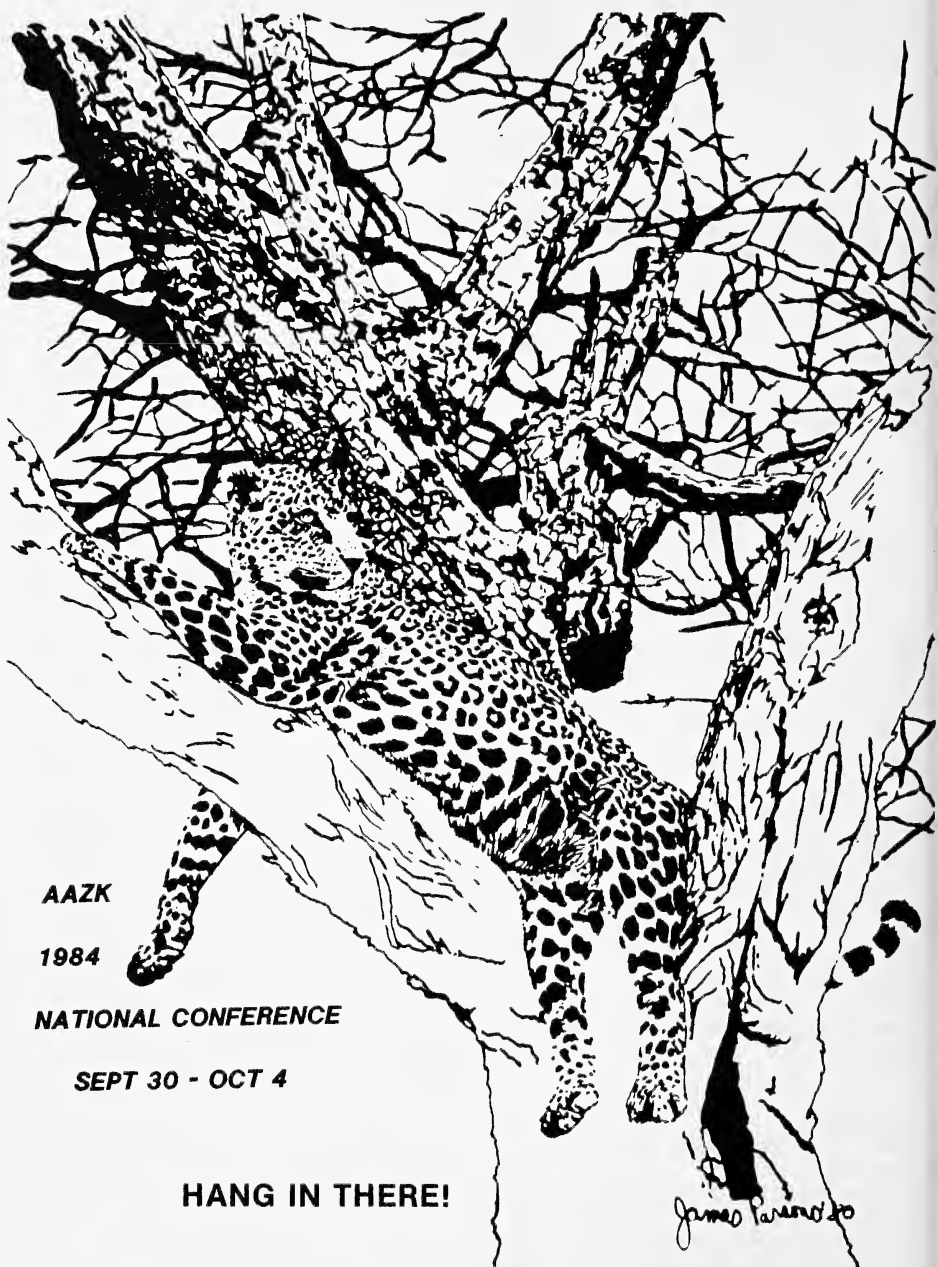
Bus to Woodland Park Zoo
Morning-tours
Lunch provided by WPZ docents
Afternoon-workshops, tours
Dinner provided by Seattle Zoological Society

WEDNESDAY

Bus to Pt. Defiance Zoo, Tacoma
Morning-tours
Lunch provided by Pt. Defiance
Early afternoon--demonstrations
Bus to Northwest Trek, Eatonville
Tram tours, walking tours
Dinner provided by Northwest Trek

THURSDAY

Morning paper session
Lunch provided at hotel-awards given
Afternoon-AAZK general membership meeting
Banquet at Seattle's famous Space Needle



AAZK

1984

NATIONAL CONFERENCE

SEPT 30 - OCT 4

HANG IN THERE!

James Parsons '80

ONLY 2 MONTHS TO GO.....

ELEPHANT SET

ELEPHANTS IN JAPAN MID-1982 TO EARLY 1984

Part 2

By
Yoshi. Yonetani
ZooDel/Zoo Design & Education Lab
Kobe, Japan



(Editor's note: The following is Part 2 of a two-part series on the history and current status of elephants in captivity in Japan. Only minor editorial changes have been made from the original text to provide continuity as it was our wish not to negate the original intent & flavor of Yoshi.'s manuscript.)

Captive Records

Records showing that many elephants were kept in the same location at the same time is included in the following matters.

In the Japanese Zoo-world, a real raising of elephant herds began at the Miyazaki Safari Park that is the first typed facility of this kind from 1975. This herd was made up of 8 African elephants.

Twenty-two African elephants (5.17) consisting of two groups, each with a matriarch, resided at the Africa Safari, Oita from September 1977 to April 1980. At the same time, three female Asians (=Indian elephants) were there, too. A supplementary thing, 10 African elephants exist together with 27 Cheetahs, 10 White Rhinos and 2 African buffalos in a mixed species exhibit in the same zone now.

I must mention three big elephant events in Japan. For one thing, many Asian elephants came from Thailand to Japan in order to join in a ceremony, "National Day" for Expo '70 in 1970. Twenty elephants (8.8 adults and 4 calves) marched in the street on foot from the port of Kobe to the suburbs of Osaka. This is the only time such a thing has happened in Japan. And then, these elephants spent 4½ months from early May until September at the Expo grounds. Moreover, it is worthy of special mention that the breeding success had been observed there. *See an item on "Breeding" for details.

By the way, 1 female calf of that group was purchased by the Phoenix Natural Zoo after Expo '70 came to a close. And more, 1 female calf was donated to the Osaka municipal Tennoji Zoo as a substantial reminder of the exposition by the government of India. She is doing well now.

As another thing, 11 Asian (Thai elephants) group came to Japan to appear on stage in a special elephant show which the Nagashima spa in Mie prefecture provided as entertainments for 50 days from mid-March to early May in 1979.

In a similar idea, 12 Asians came again to promote freindly relations between our country and Thailand on a larger scale. Their exhibition was held in the Nanki Shirahama-Adventure World for 165 days from mid-March to the end of Eugust in 1981. In remembrance of this elephant's festival, 2 females (4 and 3 years old) were presented by the government of Thailand on 13 August, 1982.

ELEPHANTS IN JAPAN, Continued

Longevity

Thirty-one elephants (3.28) had been with current owners for more than 20 years at the time of the survey (see June 1984 AKF for other survey results). However, the years indicated (See Table II) represent only the period in which the animal was maintained by the surveyed owner and may not state the animal's total years in captivity. All animals listed in Table II are Asians. In addition to those elephants listed in captivity in zoos and/or safari parks, I supposed 5 Asians (=females) over 20 years old at five different institutions including circus-companies.

The oldest elephant in the survey was 49-year-old "Indira" in the Ueno (pronounced "Way-no") Zoo, Tokyo. She arrived at the Zoo on 25 September, 1949 at the age of 15. The late premier, Nehru of India, presented here to the people of Japan as a messenger of peace. Her name was called after his daughter, who is currently Prime Minister of India, Madame Indira Gandhi.

The ceremony celebrating Indira's 30th anniversary since her arrival in Japan was held in the presence of an ambassador of India on 22 September, 1979.

Indira died at 1:42 a.m. on 11 August, 1983. Since 1967 when she injured her haunch in an altercation with another female who shared her night quarters, Indira couldn't lie down and had to sleep in a standing position. Due to this hard work, she was old for her age and this hastened her death.

Captive Situation of Male Elephants

As matters stand currently, male elephants in Japan are not very experienced in propagation. However, it is said that there is possibility of breeding success. From my point of view, some institutions which keep groups of Africans (1.1 elephants or more) may have the possibility for success in the future. But there is little chance for the Asians. I think that most of Japanese Zoos need to solve many problems such as correspondence of puberty, a disparity of the pair's ages, and a capacity of supervision of the males.

There are 11 Zoos and Zoo-related institutions that maintained male elephants in the past days no matter how short the term of keeping (more than 1 year) might be. I supplement 2 circus-companies to the above mentioned matter in 1984.

Asians....Asahiyama Zoo, Hamamatsu Zoo, Tennoji Zoo, Ikeda Zoo,
Cable Rakutenchi, Phoenix Natural Zoo, Hanayashiki
(=closed zoo), Yano Circus, Kigure Circus

Africans....Namegawa Island, Kanazawa Zoo, Yatsu Zoo (= a closed zoo)
and Shirahama Adventure World

At the present, 25 institutions have males including Asians and Africans. Two institutions have males of both species. The total number of males in captivity in Japan is 31. Twenty-four of them were older than 10 years of age. They included 12 Asians (including 1 Ceylonese) and 19 Africans (including 1 Forest elephant) in 1984.

ELEPHANTS IN JAPAN, Continued

Asians....Ueno Zoo (the individual number--1), Tama Zoo (1 *Ceylonese), Toyohashi Zoo (1), Takarazuka Zoo (1), Oji Zoo (1), Hirakawa Zoo (1), Kannawa Zoo (1), Elza Wonderland (1), Korankei Snake Center (1), Nasu Safari Park (1), Nagasaki Bio Park (1), Fureai Children Zoo (= a strolling zoo) (1).

Africans...Kushiro Zoo (1), Yagiyama Zoo (1), Tobu Zoo (1), Tama Zoo (1), Higashiyama Zoo (1), Asa Zoo (1), Okinawa-Kodomonokuni (1 *Forest elephant), Iwaki World Safari (1), Nasu Safari Park (1), Gunma Safari World (1), Fuji Safari Park (2), Himeji Central Park (2), Akiyoshidai Safari Land (1), African Safari (2), Miyazaki Safari Park (2)

Asian & African....Tama Zoo, Nasu Safari Park

Historical Review

Three institutions no longer maintain any elephants but have had experience in keeping them in the past. The Asians were in two places (Kochi Zoo: total 2 females; Matsushima Aquarium: total 1 female) and the African was in one place (Namegawa Island: total 1 male and 2 females).

There were six institutions that went through the keeping of both species up to this time. It didn't always follow that those Asian and African elephants were kept during the same period.

...Kanazawa Zoo, Oji Zoo, Tokuyama Zoo, Omuta Zoo, Yatsu Zoo (= a closed Zoo, *Forest elephant), Elza Wonderland (*Forest elephant).

Incidentally, there are eight institutions that maintain both species without regard to the sex distinction at each place at the present time.

...Asahiyama Zoo, Yagiyama Zoo, Tama Zoo, Higashiyama Zoo, Nasu Safari Park, Gunma Safari World, Nanki Shirahama Adventure World, African Safari.

Breeding

The Takarazuka Zoo received a pair of elephants from Thailand in 1950. On 10 April, 1962, they mated for the first time. The male was 13 years old and weighed 2.8 tons, the female was 14 and weighed 2.6 tons. After that, they mated every 30 days until the following May. The female was given a pregnancy test in August 1963. The result was positive. Around February 1964, her belly began to get large and her breasts to swell. On 6 May, 1965 at 8:47 a.m., a male baby was born. But it died of asphyxiation just before birth. It weighed 133.3 kg, and measured 87 cm from the ground to the shoulder, 224 cm from tip of trunk to tip of tail, the girth of the chest measured 113.5 cm, the trunk 44 cm, the tail 51 cm, the right ear: 30.5 cm by 27 cm. This was the first pregnancy and birth of an elephant in Japan.

The male of the pair died from complications of a dislocated forefoot on 9 June, 1964. At this time, their delivery room was much too small being only 45 square meters. Also, their enclosure was by the side of a railway and they were always troubled with the train's noises. The female, who is 35 years old, lives in the same place even now.

ELEPHANTS IN JAPAN, Continued

Moreover, it is worthy of special mention that the breeding success had been observed there when Expo '70 was held in Osaka. A male baby elephant was born on 16 August at about 2 a.m. This fact was the so called second birth in my country. The baby's mother was estimated at 18 years old and had given birth twice before. The calf measured 92 cm from ground to shoulder, length (from head to the root of the tail) 102 cm, the girth of the chest measured 120 cm, the trunk, a little less than 40 cm, the left ear: 30 cm by 25 cm.

On 31 January, 1984, one African elephant was born at the Gunma Safari World. It was a male, and before everything else, it was the first case of this species in Japan. However, his mother had a hard labor and the birth took 16 hours. Unfortunately the African baby died from breathing difficulties about 30 minutes after birth.

His mother, "Sakuve" was estimated at 15-16 years of age and she was imported through the International Animal Exchange, Detroit in the U.S. in March 1979. The sire was estimated to be the same age as the mother or perhaps one year older. The baby weighed 125.7kg and his length was 1.22 m. The remaining three females at Gunma Safari World are all pregnant and so we are looking forward to catch the good news at next time indeed.

* Compare with the first elephant pregnancy at the Takarazuka Zoo.

Symbol Mark (used as an institution's logo)

Several Zoo-facilities are putting to use the symbol mark from sittings given by an elephant at this time in Japan.

In case of an African elephant, Gunma Safari World, Nanki Shirahama Adventure World and Asa Zoological Park used it.

In another Asians, Obihiro Zoo and Dogo Zoo used it.

In addition to them, the Japanese Association of Zoological Gardens and Aquariums had a symbol mark of the Asian elephant. This organization affiliates 124 members being organized of 74 Zoos and 50 Aquaria in early 1984. Six institutions are currently applying for membership.

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Table II
Elephants Kept in Zoos Over 20 Years

ZOO	House-name	Species (sub-species)	Sex	Presumed- age
Sapporo-Maruyama Zoo	Hanako	Asian	F	36
Obihiro Zoo	Nana	Asian	F	22
Yagiyama Zoo-Sendai	Toshiko	Asian	F	27
Hitachi City-Kamine Zoo	Hanako	Asian	F	28
Gunma Safari World	ElieMay	Asian	F	31
Ueno Zoo, Tokyo	Indira	Asian (Indian)	F	49 (deceased)
	Jambo	Asian (Thai)	F	39
	Menam	Asian (Thai)	M	20
Tama Zoo, Tokyo	Anura	Asian (Ceylonese)	M	29
	Gacha	Asian (Cambodian)	F	above 25
	Takako	Asian	F	35
Inokashira Park Zoo, Tokyo	Hanako	Asian (Thai)	F	37
Nogeyama Zoo, Yokohama	Hamako	Asian (Thai?)	F	37
	Mariko	Asian (Thai)	F	29
Rakujuen	---	Asian	F	above 21
Kanazawa Zoo	Miyako	Asian (Thai)	F	40
Izu Natural History Park	---	Asian	F	29

TABLE II, *Continued*

ZOO	House-name	Species (sub-species)	Sex	Presumed- age
Ayameike Zoo, Nara	Hana	Asian	F	22-23
Misaki Park Zoo	Izumi	Asian	F	28-29
	Midori	Asian	F	28-29
Tennoji Zoo	Haruko	Asian	F	above 24
	Yuriko	Asian	F	above 24
Koshien Hanshin Park	Akiko	Asian (Thai)	F	37-38
	Kikuko II	Asian	F	33-34
Takarazuka Zoo	Mary	Asian	F	35
Kobe-Oji Zoo	Taro	Asian	M	36
	Suwako	Asian	F	40
Himeji Zoo	Himeko	Asian (Thai)	F	above 33
Ritsurin Park Zoo	---	Asian	F	above 21
Tokushima Zoo	---	Asian	F	above 21
African Safari	Winky	Asian	F	29
Hirakawa Zoo, Kagoshima	Dom	Asian	M	above 33

CORRECTION: In Part 1 of this series, several misspellings in the names of Japanese zoos inadvertently slipped through. The following are those errors and the correct spellings:

Page 180 - Odwara Zoo should be Odawara Zoo

Mishuma City Park, Rakujuen should be Mishima City Park

Page 182 - Touhoko Safari Park, Fukushims should be Touhoku Safari Park

Nagaski Bio-Park should be Nagasaki Bio-Park

Page 184 - Kimeji Central Park should be Himeji Central Park

We apologize for these errors to the author and to the zoos involved. It should also be noted that Table 1 listed the zoos in geographical order from north to south and not by size or experience of the facilities.



Legislative News

Compiled by Kevin Conway
AAZK Legislative Coordinator

GUAM RAIL GIVEN EMERGENCY PROTECTION

A small, flightless bird, the Guam rail (*Rallus owstoni*) was listed as an Endangered species under an April 11, 1984 emergency rule (F.R. 4/11/84) which will be in effect for 240 days. This bird, found only on the island of Guam in the Mariana Islands, has declined drastically over the past few years in numbers and distribution. An emergency situation developed when the U.S. Air Force was about to begin clearing an area adjacent to Andersen Air Force Base to enhance base security. The habitat that would have been cleared is one of the few areas still occupied by the rail. After concern was raised about the rail habitat, the USAF suspended its land clearing plans while it works with the USFWS and Guam wildlife officials to find a way to conserve the rail and still improve base security.

The severity of the rail's decline is illustrated by the fact that, over just the past 15 years, its numbers have declined 99 percent. By 1983, fewer than 100 birds were thought to survive, and the population may be down to fewer than 50. Besides habitat destruction, other possible reasons for the rail's decline include predation by an introduced snake species (brown tree snake), lizards, rats, dogs and cats. Another suspected cause for the sharp plunge in numbers is the possible spread of a yet undetermined avian disease.

Under the emergency rule, the Guam rail and its habitat will receive full protection of the Endangered Species Act for 240 days. In accordance with Section 7 of the Act, all Federal agencies, including the USAF, are required to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of the Guam rail or degrade its habitat. A proposal to list the species permanently as Endangered was published in November 1983 in the F.R., but that proposal is still under review.

---Endangered Species Technical Bulletin
Vol. 1X, No. 5

MARINE MAMMAL PROTECTION ACT FAVORABLY REPORTED OUT OF HOUSE/SENATE

On 8 May, the Senate Commerce Committee favorably reported out S. 2584, the reauthorization of the Marine Mammal Protection act. The bill would require that nominees to the Marine Mammal Commission--the body responsible for monitoring how the Act is carried out--be the unanimous choice of the Smithsonian, the Council on Environmental Quality, the National Academy of Sciences and the National Science Foundation. The bill would require the Marine Mammal Commission to maintain a minimum staff of 11. The staff has been steadily decreasing since 1972, and yet their duties have been increasing. Finally, the Act would extend the marine mammal permit currently held by the American Tunaboat Association and would include that foreign nations which export tuna to the United States will be required to meet restrictions on incidental killing of porpoise. S 2584 is now ready to go to the Senate floor for a vote.

On 10 May, the House Merchant Marine and Fisheries Committee favorably reported out H.R. 4997, its version of the Act's reauthorization. The bill had been amended to include several of the same provisions as the Senate bill. There was no attempt in the House Committee to amend H.R. 4997 to mesh it with those provisions in the Chandler bill which would prohibit the public display of killer whales. H.R. 4997 also is ready to go to the House floor for a vote.

---AAZPA Newsletter
June 1984

USFWS COMPILES LIST OF 1,000 INVERTEBRATES AS POTENTIAL
CANDIDATES FOR ENDANGERED SPECIES LISTING

The Interior Department's USFWS has published a notice of review that identifies over 1,000 species of invertebrate animals as candidates for possible addition to the U.S. list of endangered and threatened species. The notice, published 22 May, 1984 in the Federal Register, is the first such candidate list drawn up for invertebrates. Publication of the candidate list does not constitute formal proposal of the species for addition to the endangered species list, however.

The Endangered Species Act directs the FWS to review the status of species when scientific evidence indicates they may be endangered. To obtain that data, the Service has periodically compiled candidate lists as a tool to identify species for which formal listing may be justified. The notice mentions all known invertebrate species native to the U.S. that may warrant protection under the ESA, based upon the best available data, as well as those species for which listing could be considered once more conclusive data becomes available.

The Service has assigned different levels of status to the species on the candidate list, based on nearly three years of data collection and review. Of the 1,000 invertebrates, the Service considers 35 species as meriting formal listing based on existing biological information. Of the remainder, the Service feels that 841 species could be proposed for listing only if additional information about their status and biological vulnerability becomes available. A separate category of 141 invertebrates has been compiled to include those species whose extinction is suspected, or that do not meet criteria for listing under the act. The Service, however, is soliciting any additional data from the scientific community that might support a change in status of these latter species.

The candidate list of invertebrates is dominated by 335 species whose habitat is limited to the unique ecosystems of the Hawaiian Islands. These, and many other invertebrates in the list, represent animals that have evolved in very specialized areas--caves, windswept sand dunes, and isolated springs, for example. These restricted habitats, in many cases, make the species that much more vulnerable to natural or man-made disruptions.

---Department of Interior
News Release, 5/24/84

HARBOR PORPOISE PROPOSED FOR ENDANGERED LISTING

The National Marine Fisheries Service, which has management authority over most marine mammals, has proposed listing the *cochito*, or Gulf of California harbor porpoise (*Phocoena sinus*), as an Endangered species (F.R. 4/25/84). It is believed that only one small population remains, and that it has been seriously affected for over 40 years as an accidentally taken species during commercial gillnet fishing within its restricted range. Estimates have been made of an annual incidental catch of tens to hundreds of the porpoise.

---Endangered Species Technical Bulletin
Vol. IX, No. 5



Education Alternatives...

(Editor's Note: The following are two reviews of a training videotape entitled "Research Methods for Studying Animal Behavior in a Zoo Setting" which was co-produced by the Washington Park Zoo and the Minnesota Zoo. The tape is available in either 3/4-inch videocassette or 1/2-inch VHS format; has a playing time of 80 minutes divided into two parts and comes with ten copies of text which outlines the tape contents, gives examples of ethograms, bibliographies of research methodology and checksheets used for scoring the sampling methods. The cost is \$200 and the tape may be purchased from the Minnesota Zoo.)

Review By

Frank Kohn, Chairman
AAZK Research/Grants Committee

"Research Methods for Studying Animal Behavior in a Zoo Setting" is a multimedia project assembled jointly by the Washington Park Zoo and the Minnesota Zoo. A two-part video tape presentation--the first part an introduction to research and the second part an exercise in observational skills--is supplemented by a workbook, and combines excellent video footage with straightforward examples. The tape is geared to, and easily comprehended by, all individuals interested in gathering behavioral information in a systematic and organized fashion, regardless of previous experience.

Keepers will be pleased to learn that no distinction is made between keepers and researchers; keepers are considered researchers and are, as noted in the tape, one of the researcher's important sources of information of a given species.

The major issues addressed in the first tape include: Careful definitions of behaviors; an emphasis of the distinction of mutually exclusive behaviors; and the simplicity of the construction of an ethogram. In the second tape, six methods of studying interactions and recording predetermined parameters are presented using birds, mammals and reptiles as models. Although not exhaustive of all observational techniques, the video-workbook gives ample exposure to methods for the collection of basic meaningful data. An extensive bibliography in the workbook will aid beginners observers to major sources of research methods.

But the workbook also implies that research is as useful as a management tool for the study of endangered species and not as an end in itself. This point is an essential concept for the observer to realize.

I highly recommend any institution interested in training keepers, volunteers and students to obtain the tape. Although the cost is expensive, the benefits derived from its use will surpass the price.

Further information can be obtained from Jill Mellen, Washington Park Zoo 4001 S.W. Canyon, Portland, OR 97221.

Review By

B. Wayne Buchanan, Chairman
AAZK Keeper Education Videotape Committee

Originally designed for undergraduate students, this 80 minute video tape program is a very good introduction to behavioral research methods. It provides simple, yet clear explanations of the proper steps and their proper sequence for establishing a behavioral study that will yield objective, useable data. To zoo keepers, the usefulness of such a skill would be limited only by their imagination.

A unique feature of this video program is the extensive "practice" section. Here, using checksheets provided in an accompanying workbook, one actually collects data from various taped animal sequences. A variety of situations and collection techniques are practiced in this manner. This learn by doing approach should prove quite effective.

The above mentioned workbook contains virtually all the information in the video tape plus useful bibliographies. It would, in itself, be quite informative and valuable as a reference.

In general, the video quality is good with only minor, occasional flaws. These are by no means a significant distraction and would likely not even be noticed by most people.

The makers of this program state, and rightly so, that "statistical analysis of data is beyond the scope of this text." One may therefore require assistance in this area. Such help should be fairly easy to obtain, but one should also remember that many of the questions a zoo keeper seeks to answer require only very basic analysis.

The program was produced by the Washington Park Zoo and the Minnesota Zoological Garden. The latter is marketing the finished product. It is available in either 3/4 inch or VHS format and comes with 10 copies of the workbook. Beta format is apparently not available. The only real problem I see with this package is the price - \$200! This puts it out of reach of most individuals and possibly even some institutions. However, this is not really a surprising price for such a specialized video. I suspect that any responsible zoological institution will recognize the value of a keeper staff with basic research abilities and likely find the funds for quality instructional material such as this. I strongly encourage their efforts.



ANIMAL INTRODUCTIONS:

Some Suggestions For Easing The Trauma

By

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

There are a number of factors to consider when introducing new individual to an established social situation or to an entirely new arrangement. Every situation is different, characterized by species, environmental, social and individual differences. The objective of a successful introduction is to reduce the risk of injury or death by applying techniques which fit the particular situation.

Two general statements about natural populations should be kept in mind as you plan. First, fear of strangers is a normal adaptive response. It is the animal's way of protecting their resources, such as feeding trees, nest sites, territories, or mates, from rivals. A strange individual evokes an aggressive response when it intrudes into another individual's living space. Through this aggression, an intruder is either repulsed or gradually integrated into the social order. Second, animals in nature display a great variety of social arrangements. Therefore, the success of a social arrangement in captivity depends on how consistent it is with the natural tendencies of the animal in question. For example, it is easier to achieve heterosexual pairing for a social primate than for a solitary carnivore which has a very limited capacity for living in close proximity to others.

Because of nature's diversity, guidelines for introducing new members must be broad in scope and adaptable to the specific case. In order to predict the response of group members to a new individual, several questions need to be considered:

1. HOW DO THE INDIVIDUALS RELATE TO SPACE? If territorial, what is defended? At what time of year, and by whom? Which class of individuals usually assumes the defensive or protective roles?

2. HOW DO THE INDIVIDUALS RELATE TO EACH OTHER? What is the composition of the social unit in nature (monogamous pairs, harems, multi-male group)? Is there a status hierarchy? Which sex is usually dominant? Are alliances formed during conflict? Is infanticide known to occur?

3. WHAT ARE THE CHARACTERISTICS OF THE LOCAL GROUP? FOR EXAMPLE:

- A. Ranks of individuals
- B. Age/sex composition
- C. Reproductive status of females (in estrus, pregnant, lactating, quiescent)
- D. Kin ties or "friendship"
- E. Developmental history, particularly as it may affect sociality
- F. Individual temperament

4. CHARACTERISTICS OF THE NEW SPECIMEN(S)?

- A. Rank in past group, if known
- B. Reproductive state, if female
- C. Developmental history, i.e. normalcy
- D. Immediate past history, e.g. length of isolation period
- E. Temperament
- F. Physical attributes

ANIMAL INTRODUCTIONS; Some Suggestions For Easing The Trauma, Cont'd

The information derived from these questions will usually help to predict the source and direction of conflict. In most instances conflict is inevitable, but by understanding its source and function, there are procedures to follow to reduce its intensity. The three types are:

1. Handicapping those individuals which will be in a dominant position.
2. Permitting integration to proceed as far as possible before physical contact occurs.
3. Managing the physical environment in ways which will reduce negative social interaction.

HANDICAPPING THE DOMINANTS

1. Bring the dominant to the subordinate's home turf.
2. Place all in a new environment at once.
3. If there are multiple newcomers, introduce all at once to reduce the chances of concentrating aggression on one individual.
4. Remove temporarily, allowing a subordinate newcomer to become acquainted with lower risk members.
5. Socially distract, i.e. if the newcomer is female - introduce while in estrus.
6. Encumber with casts, bandages, etc.
7. Use drug therapy
8. Use negative conditioning, e.g. hosing, shock collar, etc.

PRE-CONTACT INTEGRATION

1. Visual, olfactory, and auditory familiarization with either juxtaposed cages or a cage within a cage.
2. Limited contact, such as grooming, licking, or muzzling through a wall.

- NOTE: A. Familiarity does not equal integration. A new individual must still establish its niche within the system, and can only do so after full introduction.
- B. Care must be taken to avoid injury to appendages during initial familiarization.
- C. Monitoring the interactions during pre-introductory familiarization allows one to predict more accurately whether the introduction will be successful. Some pairings will never work, and should not be forced or even attempted.

MANAGING THE PHYSICAL ENVIRONMENT

1. Space: the larger the cage, the better. Use of adjoining cages with a door between them adds flexibility to the introduction process.
2. Escape routes: apparatus or corridors for individual travel should be well defined.
3. Retreats: resting areas should be provided for the harrassed individual, such as a single-animal perch high on the cage wall.
4. Sight barriers: even temporary barriers, which can be removed later, are a consideration.
5. Displacement material: hay, straw, browse, grain, or other innocuous objects can be used. However, regular feeding may increase competition and should not be used in this context.

In addition to the foregoing, thought should be given to the most propitious time for initial contact. For instance:

ANIMAL INTRODUCTIONS: Some Suggestions For Easing The Trauma, Cont'd

1. New infants should be introduced at dawn, as occurs in nature for diurnal animals.
2. Consider the time factor of the female reproductive state. Offspring are most vulnerable during pregnancy (fetal stress) and during lactation (infanticide).
3. Take into account the timing of surrounding activities. Any change in the immediate vicinity would excite the animals, such as the appearance of visitors, construction, etc., and should be avoided.

PREPARING THE ENVIRONMENT

1. Are there any adjoining cages or pens available for the introduction phase?
2. Are there escape routes, visual barriers, safety perches, or other physical structures which would provide refuge for an individual?
3. Are there any potentially dangerous cage features which should be modified prior to introduction, such as moats, etc.?
4. Is there a plan for quick separation, if necessary?
5. Are there any outside disturbances (construction, view of other animals, visitors, etc.) which may unnecessarily arouse the animals?
6. Is there a more appropriate time of day to schedule the introduction, for instance, during periods of low activity or during feeding time?
7. Is there a plan to monitor the situation until stability has been achieved.
8. Have preparation been made to insure that feeding will not trigger violence? To insure that everyone gets food and shelter?
9. Is emergency equipment (nets, hoses, etc.) available and working?
10. Has the veterinary staff been alerted?
11. Is there a plan to record results accurately to benefit future introductions?

EVALUATING THE ANIMALS

1. Is the proposed arrangement socially compatible with what occurs in the wild state? If not, do the animals display enough flexibility to allow an unnatural arrangement to succeed?
2. If any young individuals, would their safety be jeopardized?
3. Is there a risk to submissive or low-ranking individuals? Can this situation be changed to reduce risk?
4. Are there any physically handicapped individuals with limited mobility?
5. Does any individual display stereotypic behavior, e.g. bizarre limb movements, self-biting, or unusual locomotor activity, to indicate inadequate early socialization?
6. Are there pregnant females which may be unduly stressed?
7. Can the sexual state of the females be used to advantageously divert males from aggression?
8. Are there any obvious temperamental traits (such as hyperaggressiveness, assertiveness, alertness, or their opposites) which will affect the outcome?
9. Regarding the animals to be combined, has there been any previous exposure to one another?
10. Are all the individuals equally familiar with the exhibit cage or pen?
11. Have previous caretakers been consulted about past experiences with the individuals?
12. Are there any individuals which should be temporarily handicapped with drugs or any form of restraint?

ANIMAL INTRODUCTIONS: Some Suggestions For Easing The Trauma, Cont'd

3. Can the introduction be gradual--a few minutes or hours a day?
4. Will the temporary removal of certain individuals facilitate the integration of a new member?
5. If more than one new individual, is introducing one-at-a-time or all-at-once more likely to succeed?

Animal Introduction Form

Species _____ Date _____
Location _____ Time _____
Staff in Charge _____ Weather _____

New Subject (s)

Recipient Population

Number _____ Number _____
Age _____ Age _____
Sex _____ Sex _____
Repro. State _____ Repro. State _____
Origin _____ Origin _____
Past History _____ Past History _____

Outcome

Terminated

Successful

- | | |
|--|--|
| <input type="checkbox"/> Physical Injury | <input type="checkbox"/> Initial Aggression, gradual decline |
| <input type="checkbox"/> Extreme Aggression, Risk | <input type="checkbox"/> Tense and wary, but non-aggressive |
| <input type="checkbox"/> Failure to Stabilize Socially | <input type="checkbox"/> Immediately Compatible |

Details _____



A NOT TOTALLY SUCCESSFUL
HATCHING OF A GREEN MAMBA

By Dave Sorenson, Rover and
Cliff Van Beek, Reptile Keeper
Milwaukee County Zoo, Milwaukee, WI

On 18 January, 1984 the Milwaukee County Zoo received a female Green Mamba (*Dendroaspis viridis*) from a reptile dealer in Florida. This animal had been imported from Liberia. On 24 February, she deposited seven eggs on the floor of her cage. The eggs were transferred to a plastic sweater box filled with wet vermiculite. The mixture of water/vermiculite was not measured out. The eggs were incubated at a fairly constant temperature of 83°F, although there was a brief drop to 80°F once, during a power failure.

Three of the seven eggs were almost twice the size of the other four, and it was assumed the four smaller eggs were infertile. The four smaller eggs quickly discolored and, upon dissection, showed no signs of fertility. Of the remaining three eggs, two began to show signs of spoiling and were opened on the 13th of April. They showed signs of having been fertile, but there was no visible embryo.

The remaining egg was first weighed on 8 April, weighing 51 grams. It continued to grow in size (see Table) until being slit on 19 May at about 4:30 p.m.; (it had weighed 109 grams earlier that day). After discovery of the slit, a small hole was cut in the top of the egg using a surgical scalpel. No measurements of the egg had been taken, but its approximate size was 4cm x 8cm.

Table
Egg Weight

<u>Date</u>	<u>Wt.</u>	<u>Date</u>	<u>Wt.</u>
4-8-84	51.0 g	5-1-84	72.0 g
4-13-84	55.0 g	5-2-84	73.5 g
4-17-84	58.0 g	5-4-84	76.9 g
4-19-84	60.2 g	5-6-84	79.6 g
4-21-84	62.0 g	5-9-84	84.5 g
4-23-84	63.6 g	5-14-84	95.7 g
4-25-84	65.3 g	5-17-84	104.7 g
4-28-84	68.5 g	5-18-84	107.1 g
4-30-84	70.7 g	5-19-84	109.0 g

The following day, as the young snake had not appeared and no new slits were evident, it was decided to investigate further. The juvenile, visible through the opening in the egg, was touched, and when no movement was seen, the egg was cut open. Unfortunately the young mamba was dead. There was a small yolk sac still attached to the apparently normal and fully-formed male. The snake and yolk sac weighed 22 grams. Its TL was 44cm; with a SVL of 34cm; and a tail length of 10.1cm. The ventral scales, which were divided, numbered 213; subcaudals 101+; midbody 13. Coloration was like that of an adult, dark green with black borders on each scale. The only difference between it and the adult was a yellow tail tip, a familiar juvenile characteristic in many snakes. Perhaps this is used as a caudal lure for lizards, etc.

Since the female who laid the eggs was intended as a mate for our male mamba, it is hoped that in the future we may again have the opportunity to try our hand at hatching out and raising green mambas.

We were unable to find any references to egg laying or hatching and raising of young for *Dendroaspis viridis* in any literature seen by us. If anyone has any information on this species, or for further information on our experience, please contact the Milwaukee County Zoo, 10001 West Bluemound Road, Milwaukee, WI 53226.



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Enclosed is a check for \$_____ payable to the **Puget Sound AAZK Chapter Conference Account.**

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.

ANIMAL TECHNICIAN (Veterinary Technician)...requires completion of 2-year veterinary assistant, animal health technology or equivalent program and 2 years' related experience. This person will assist full-time veterinarian in all aspects of zoo animal health operation including animal treatment, surgical assistance, and veterinary laboratory technology as well as direct animal care in the zoo nursery. This is a supervisory position, thus prior supervisory experience is desirable. Salary \$1,111-\$1,582 per month, plus excellent benefits. Send resume directly to: Earl Unell, Chief Examiner, City Hall, Personnel Dept., 414 E. 12th St., Kansas City, MO 64106. Closing date is 31 July 1984. EOE.

ASSISTANT ZOO MANAGER...requires BS in zoology or other life science and zoo management experience. Duties include care of animals and maintenance of buildings/grounds. Salary \$1,933-\$2,350 per month. Send resume and application to City of Fresno, Personnel Office, 2348 N. Mariposa, Fresno, CA 93721.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within the Conservancy Nature Center 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. Internship involved wildlife, as well as educational programs and special projects. Interns must be available for up to five months. Qualifications: a college student or recent graduate, studying wildlife or related field; some experience with people and animals; a sincere concern and interest in working with animals. \$55/week stipend, housing provided. Internships available year-round. To apply, submit resume, statement of goals and three references to : Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy Nature Center, 1450 Merrihue Dr., Naples, FL 33942, (813) 262-2273.

CURATOR...new position, to be responsible for planning and operation of proposed aquarium at the Denver Zoo. Applicants must be skilled in technical management of aquatic life forms. BS degree and 2 years' professional experience required. Salary begins at \$27,228 with excellent benefits. Mail resume to: Clayton Freiheit, Director, Denver Zoological Gardens, City Park, Denver, CO 80205. EOE.

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MOVING???

Please send change of address as soon as possible to:

Dolly Clark, Administrative Secretary
American Association of Zoo Keepers, Inc.
635 Gage Blvd., Topeka, KS 66606

AAZK MEMBERSHIP APPLICATION

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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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AUGUST 1984



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This month's Keeper/ Artist is Steve Gingras, who at the time he submitted this drawing, was a Keeper Two working with cats/primates/polar bears at the Utica Zoo, Utica, NY. Thanks, Steve!

Scoops and Scuttlebutt

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 may 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 Correll
Sedgwick County Zoo
5555 Zoo Boulevard
Wichita, KS 67212

ALL OTHERS:

South Florida Chapter AAZK
c/o Debbie Burch
17860 SW 112 Court
Miami, FL 33157

Keeper's Alert

SPECIAL SESSION ON STAFF TRAINING IN MIAMI

A special one-hour session has been set aside at the AAZPA Conference in Miami on the subject of Staff Training. The session will take place on Wednesday, September 12th from 9:00 - 10:00 a.m. in the La Brisa room of the Omni hotel.

The AAZK Keeper Training videotape "ZooKeeper Safety - An Attitude Adjustment" will be shown and information will be distributed on additional training videotapes. The Staff Exchange project will be updated and discussion will center on Staff Training.

For more information contact Judie Steenberg, Woodland Park Zoological Gardens (206) 625-5498.

AAZK SENDS GREETINGS TO ABWAK ON ITS 10TH ANNIVERSARY

(Editor's note: The following is a letter sent by AAZK President Kevin Conway and International Affairs Coordinator Connie Cloak to Mr. John Partridge, editor of RATEL, the journal of the Association of British Wild Animal Keepers.)

Dear Mr. Partridge:

On behalf of the Board of Directors of AAZK and all our members please accept our best wishes on the tenth anniversary of your founding. We will look forward to your second decade of existence with the excitement of what you will achieve for your members and the zoological collections you represent.

Since our founding in 1968, our organization has grown in ways that perhaps were not anticipated by the founders. Nevertheless, we now hold annual national and regional conferences, represent zookeepers all over the North American continent, we comment on and are asked to comment on matters of zoological interest and we continue to expand the information we provide our members each month in Animal Keepers' Forum. A review shows that our publication alone has expanded significantly in just the last eight years. When we review the recent progress of our own organization, we are able to see the future potential for ABWAK.

The most significant achievements of ABWAK must be the establishment of your four major objectives; these being:

1. To provide facilities for the meetings of keepers of wild animals in the British Isles.
2. To improve cooperation and communication between keepers and zoos, both nationally and internationally.
3. To improve the standard of all animal collections by promoting the education of all those involved in wild animal husbandry.
4. To support any projects of conservation that the association shall, in its discretion, think fit.

The establishment of such objectives and the work towards achieving them shows the dedication and professional attitude of your members on behalf of the animals placed in their care. We are very impressed with your desire to educate your members through meetings and actual class work provided by the Animal Management Course.

As you begin your second decade of existence please accept our offer to work closely together with you on behalf of international zoological cooperation. As you have found out through your meetings, the exchange of information between animal caretakers is one of the best ways to provide quality care for the animals we keep. This type of exchange on an international level is what we need now to insure the survival of both natural wildlife and captive wildlife.

From a sister organization, congratulations on your first decade and keep up the good work.

Sincerely,

Connie Cloak
International Affairs Coordinator

Kevin Conway, AAZK President



Births & Hatchings



TWIN BISON CALVES BORN IN BATTLE CREEK.....Karen Rinaberger

On 15 April, 1984, twin bison calves were born at the Binder Park Zoo in Battle Creek, MI. The 1.1 calves appear to be very healthy and are eating well. To our knowledge, very few cases of twin bison calves have been reported. Any additional information regarding the number and origins of twin calves would be greatly appreciated. Send pertinent data to: Binder Park Zoo, 7500 Division Dr., Battle Creek, MI 49017.

KANSAS CITY ZOO.....Dee Wolfe

B&H for April and May 1984 include: Mammals - 0.0.1 Patas monkey, 1.1 Yak (0.1 DNS), 2.0 Bison, 3.0 Barbados sheep, 0.0.1 Colobus monkey, 1.0 Roan antelope, 1.0 Blesbok, 0.0.2 Giant Indian fruit bat, 0.2 African pygmy goat, 1.0 Ayrshire/Holstein calf; Birds - 0.0.4 Grey-necked wood rail (2 DNS), 0.0.4 Emu, 0.0.5 Bali mynah, 0.0.2 White-tailed sea eagle (1 DNS), 0.0.2 Ostrich, 0.0.1 Victoria crowned pigeon, 0.0.5 Dyhal thrush, 0.0.1 Fairy bluebird (DNS), 0.0.2 Brazilian teal, 0.0.8 Northern pintail, 0.0.1 Umbrella cockatoo, 0.0.1 Shama thrush, 0.0.1 Brazilian cardinal (DNS), 0.0.2 Red-vented bulbul, 0.0.7 Ringed teal (5 DNS), 0.8 Trumpeter swan.

INSTITUTE FOR WILD AND EXOTIC ANIMAL STUDIES.....William L. Brisby

April and May 1984 B&H from Moorpark include: Mammals - 4.0 Raccoons, 1.3 Coatis, 1.0 Reeve's muntjac, 1.4 Bengal tiger, 2.1.1 Coyotes, 1.0.2 Rhesus macaques; Birds - 0.0.15 Blue peacock.

BROOKFIELD ZOO.....John S. Stoddard

June 1984 B&H include: Mammals - 0.0.3 White-toothed shrew, 1.0 Collard peccary; Birds - 0.0.1 Golden-eared tanager, 0.0.1 Paradise tanager, 0.0.2 Violet touraco, 0.0.4 Spur-winged plover, 0.0.1 Red and white crake, 0.0.11 Hooded merganser, 0.0.2 Ruddy duck and 0.0.3 Trumpeter swan.

TOLEDO ZOO.....Michelle Grigore

B&H from April through June 1984 include: Mammals - 2.0 Snow leopard, 0.0.1 Diana monkey, 0.0.1 Sooty monkey, 0.0.2 California sea lion; Birds - 0.0.2 Long-tailed grassfinch, 0.0.1 Lilac-crowned amazon, 0.0.6 Orange quit, 0.0.2 Plush-crested jay, 0.0.5 Black swan, 0.0.2 Blue-streaked lory, 0.0.1 Superb starling, 0.0.2 Violet-backed starling, 0.0.3 Golden pheasant, 0.0.5 Swinhoe's pheasant, 0.0.2 Herring gull; Herpetiles - 0.0.7 Haitian forest frog, 0.0.3 Indian pythons, 0.0.3 Cuban boa, 0.0.10 Monocled cobra, 0.0.7 Leopard gecko, 0.0.2 Tokay gecko, 0.0.4 Cone-head lizard and 0.0.4 Basilisk lizard.

HONOLULU ZOO.....Steve Robinson

May through July 15, 1984 B&H include: Mammals - 0.1 Pygmy hippo (DNS); Birds - 1.1 Grand eclectus parrot, 0.0.2 Burrowing owl, 0.0.1 Temple dove (Ringed turtle dove), 0.0.2 Blue and yellow macaw (DNS), 0.0.1 Scarlet macaw, 0.0.3 Red-billed hornbill, 0.0.1 Turkey vulture.

BIRTHS AND HATCHINGS, Continued

SAN ANTONIO ZOO.....Deborah Reed

Recent B&H at San Antonio include: Mammals - 1.0 Greater kudu (DNS), 1.0 Scimitar-horned oryx, 1.0 Addax, 1.1 Topi, 1.1 Thomson's gazelle (0.1 DNS), 0.1 Arabian sand gazelle, 0.1 Springbok, 1.2 Aoudad, 1.0 Himalayan tahr (DNS); Birds - 1 Sacred ibis, 2 Scarlet ibis, 9 Moluccan rajah shelduck (1 DNS), 9 Cinnamon teal, 7 Ringed teal, 1 Ruddy duck (DNS), 2 Roul-roul (1 DNS), 2 Palawan peacock pheasant, 23 Ocellated turkey (5 DNS), 2 Crested seriema, 2 Black-necked stilt, 2 Double-striped thicknee, 1 Inca tern (DNS), 2 Galah, 1 Queen of Bavaria conure, 1 Painted conure, 1 Pygmy kingfisher (DNS), 2 Dyhal thrush (1 DNS), 3 Rufous treepie, 1 Picathartes; Herptiles - 3 Central American milk snake, 5 Mexican milk snake; Aquarium - Koi, Tomatoe clownfish and Sarasota Springs pupfish (1st time in collection).

TAMPA/BUSCH GARDENS.....Susan Rackley

B&H for June 1984 include: Mammals - 2.4 Thomson's gazelle, 5.0 Impala, 2.1 Nyala, 1.0.5 White-bearded gnu, 4.2 Grant's gazelle, 0.1 Scimitar-horned oryx, 1.0 Muntjac deer, 0.1 Sitatunga, 0.1 Kafue (Red) lechwe, 0.1 Sommering's gazelle; Birds - 1 Hahn's macaw, 4 Orange-winged amazon, 8 American flamingo, 8 Crested tinamou, 2 Golden (Queen of Bavaria) conure, 4 Abdim's stork, 11 Mandarin duck, 1 Rosy-billed pochard, 8 Scarlet ibis, 1 (white) Egyptian goose, 2 Stone curlew, 1 Red-crested touraco, 1 Bare-eyed cockatoo, 1 Egyptian goose, 1 Blue-fronted amazon, 2 Sun conure, 9 Ringed teal, 1 Fischer's x Black masked lovebird, 3 Mitred conure, 2 Scarlet macaw, 2 Lear's macaw, 1 Pied cockatiel; Herptiles - 0.0.17 Nile crocodile and 0.0.2 Ball python.

RIVERBANKS ZOO.....Lex Glover & Tony Vecchio

Jan. to June 1984 -- The start of 1984 has proved to be a very exciting time for the staff at Riverbanks. On 10 May, 1984, we successfully hatched a Cinereous vulture (Aegyptius monachus). To the best of our knowledge this will be the first successful breeding for this species in the western hemisphere. The chick, which is being hand-raised, is doing great. The adults laid a second egg which they hatched, but the chick did not survive. Other hatchings include: 5 Stella's lory (2 DNS), 3 Black-footed penguin, 2 Victoria crowned pigeon (1 DNS), 10 Crimson seedcracker, 3 Blue-bill weaver, 3 Gouldian finch, 1 Tawny frogmouth (DNS), 3 Cape teal, 1 Roul roul, 4 Black-necked swan, 4 Coscoroba swan (1 DNS), 2 Military macaw, 4 Emerald starlings (1 DNS), 1 Leadbeater's cockatoo, 7 Mute swan, 18 Hooded merganser (9 DNS), 18 Wood duck, 7 Red-crested pochard, 11 Ringed teal, 2 Bare-eyed cockatoo, 2 Barn owl, 2 Green-winged macaw, 7 Sun conure, 10 Mandarin duck, 14 Ruddy duck (2 DNS), 1 Pintail, 2 Toco toucan (DNS), 2 Burrowing owl, 3 Rhea (1 DNS), 2 White-lined tanager, 1 Blue-necked ostrich.

The Mammal Department also is having a very successful year. We've had our first gemsbok birth (a male), and second generation births of both Black howler monkey and White-faced saki monkey. Other mammal births include: 1 Ground cuscus, 2 Matschie's tree kangaroo, 2.1 California sea lion (2.0 DNS), 1 Indian fruit bat (DNS), 1 Dusky titi monkey (DNS), 1.1 White-faced saki monkey, 0.1 Mandrill, 1.0 Ring-tailed lemur, 1.1 Black-and-white ruffed lemur, 1 Lion-tailed macaque, 6 Capybara (4 DNS), and 4 Golden lion tamarin.

BIRTHS AND HATCHINGS, Continued

DALLAS ZOO.....Tami Jones

June 1984 B&H include: Mammals - 0.1.1 Axis deer, 1.0 Suni, 0.0.1 Bolivian grey titi monkey, 0.0.5 Pygmy hedgehog tenrec, 1.1 Pygmy goat, 0.0.1 Patagonian cavy, 0.0.1 White-handed gibbon, 0.0.1 Red panda; Birds - 0.0.2 Himalayan impeyan pheasant, 0.0.1 Bleeding heart pigeon, 0.0.3 Red-vented bulbul, 0.0.1 White-winged dove, 0.0.2 Pied crow, 0.0.3 Double-striped thick-knee, 0.0.2 Red-legged seriema, 0.0.2 Hybrid sacred x oriental ibis, 0.0.2 Sacred ibis, 0.0.2 Roseatte spoonbill; Reptiles - 0.0.2 Children's python (Liasis childreni), 1.2 Mexican milksnake (Lampropeltis triangulum annulate) and 0.0.11 Pueblon kingsnake (Lampropeltis triangulum campbelli).

On an exhausting trip to Costa Rica, Herpetologist Donal Boyer, Bill Corwin and Dr. Jonathon Campbell managed to bring back an extraordinary assortment of amphibians and reptiles. These specimens were collected for the Dallas Zoo and the Herpetology Museum at U.T.A. Those in parentheses were collected for U.T.A. On their first trip they explored Sierra de la Muerte where they collected the following: 1.0 Palm Viper [Bothrops lateralis], 0.0.4 Web-toes salamander [Bolitoglossa subpalmatum] 0.0.11 Red-eyed tree frog [Agalychnis callidryas], 0.0.4 Small-headed tree frog [Hyla microcephala], (Alligator lizard, Barisia monticola, Montane swifts, Sceloporus malachiticus, Brown basilisk, Basiliscus vittatus, Smokey jungle frog, Leptodactylus species.) From there they visited Pavones on the Atlantic side where they collected: 0.0.3 Costa Rica tree frog [Hyla imbricata], 0.0.2 Spiny tree frog [Anotheca spinosa], 0.0.18 Blue-legged strawberry frogs [Dendrobates pumilio], 0.1 Double crested basilisk [Basiliscus plumifrons], (0.1 Bushmaster, Lachesis muta stenophrys, Eve lash viper, Bothrop schlegeli.)

MIAMI METROZOO.....Lori Bruckheim

B&H for June 1984 include: Mammals - 1.1 Himalayan tahr, 1.0 Cape buffalo; Birds - 0.0.3 Hottentot teal, 0.0.6 Mandarin duck, and 0.0.1 Stanley crane.

LITTLE ROCK ZOO.....Chris Rasums

Recorded B&H for the first half of 1984 include: Mammals - 1.1 Sloth bear (1 DNS), 1.0 Muntjac, 1.0 Capybara, 1.0 Wallaby, 0.0.1 Spider monkey, 0.1 Diana monkey (DNS), 0.0.1 Red kangaroo, 1.0 Geoffroy's cat, 2.1 Binturong (DNS), 0.0.2 Cotton-eared marmoset, 2.1 Coatimundi, 2.1 Bobcat, 0.2 Scimitar-horned oryx, 1.5 Nilgai, 1.0 Rock cavy, 1.0 Cape hartebeest; Birds - 0.0.6 Canada goose (2 DNS), 0.0.12 Wood duck, 1.1 Red-crested pochard (1 DNS), 1.2 Australian black swan, 0.0.1 Rhea, 0.0.1 Red crested cardinal (DNS), 0.0.10 Peafowl, 0.0.1 Bar-headed goose.

TOPEKA ZOO.....Alice Miser

An unusual occurrence happened in July with the birth of twin (1.1) Grant's zebras. The foals, both stillborn, weighed 37 lbs and 46 lbs. respectively. Keepers were also able to determine that the female bobcat who was mentioned in last month's AKF as having given birth to an unknown number of kittens, indeed produced 0.0.3 offspring and is caring for them. This female had a history of killing her kittens and had been isolated to give her maximum privacy.



Coming Events

AAZPA ANNUAL CONFERENCE

September 9-13, 1984

Miami, FL

BLACK-FOOTED FERRET WORKSHOP

September 18-19, 1984

Laramie, WY

Held at the University of Wyoming, the purpose is the first comprehensive meeting on the endangered black-footed ferret since their rediscovery in 1981. Biologists will discuss research, searching, and management. The workshop will close with a panel presentation and discussion on the direction of black-footed ferret research and management in the future. Registration fee is \$20/general, \$10/student. Fee includes published proceedings. For more information contact: Conference & Institutes, P.O. Box 3972, University Station, Laramie, WY 82071-3972.

THE 4TH ASSOCIATION OF ZOOLOGICAL HORTICULTURE CONFERENCE

September 19-22, 1984

Brookfield, IL

To be held at Chicago's Brookfield Zoo, 3300 Golf Blvd., Brookfield, IL 60513. Those interested in attending please contact Bill Torsberg at the above address.

AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

Hosted by the Puget Sound Chapter of AAZK at the Madison Hotel. For information contact Mary Bennett, Registrar, 5500 Phinney Ave., North, Seattle, WA 98103.

ECOLOGY RESTORATION SYMPOSIUM

October 11-12, 1984

Madison, WI

To be held at the University of Wisconsin, the two-day symposium focuses on the scientific value of attempts to restore ecological communities and ecosystems. For information contact: Nancy Dopkins, 1207 Seminole Highway, Madison, WI 53711 or call (608) 262-2746.

FIFTH ANNUAL ELEPHANT MANAGEMENT SEMINAR

Nov. 29-Dec. 2, 1984

New Orleans, LA

Hosted by the Audubon Park Zoo. Watch for further information and call for papers in the September issue of AKF.





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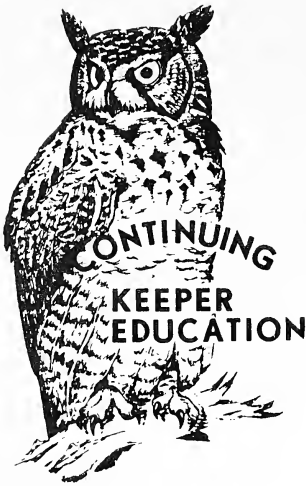
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Santa Barbara Zoo Keeper Education Program

*Submitted By
Nancy Hollenbeck, Education Curator
Santa Barbara Zoo, Santa Barbara, CA*

Last year's articles on Continuing Keeper Education started a trend at the Santa Barbara Zoo. Beginning in August, 1983, monthly, hour-long sessions were established for guest speakers to address our keeper staff. The speakers have included veterinarians, professors and other specialists from the area, as well as zoo volunteers and staff.

The following topics have been discussed so far:

Primate Enrichment
Elephant Medicine
Zoonotic Disease
Comparative Anatomy and Fossil Bones
Play Behavior in Squirrel Monkeys
Safety on the Job
Visual Acuity and Concept Formation In Asian Elephants: A Santa Barbara Zoo Research Project
Sea Lion Enrichment: A Santa Barbara Zoo Research Project
Dolphin Training
Disability Awareness

Topics we are looking forward to this summer are:

Public Presentation
Time Management
Routines in Veterinary Care
Our Public Relations, or What Do You Say To the Hundreth Person Who Says "What Kind of Bird Are You?"

The Keeper Education Program has been extremely rewarding and useful. It has also served a purpose to generate interest in the zoo for our guest speakers. It is easy to set up and we would encourage other zoos to develop similar programs. We also would like some exchange of ideas for topics and speaker sources.

ANIMAL MANAGEMENT COURSES

*Submitted by Judie Steenberg, Coordinator
AAZK Education Committee*

During the past month several letters have been received by the Education Committee requesting information on courses pertaining to animal management. Following is a list of addresses for two college programs that have established degree programs, and two correspondence courses on the subject.

TWO-YEAR:

Biological Parks Training Program and Teaching Zoo
Santa Fe Community College
P.O. Box 1530
3000 N.W. 83rd St.
Gainesville, FL 32602

...or a total four-year program in conjunction with:

State University of New York at Oswego
Oswego, NY 13126
Attn: Sigurd Nelson, Jr., Chairman
Dept. of Zoology

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

CORRESPONDENCE COURSES:

Seminars in Ornithology (bird biology correspondence course)
Laboratory of Ornithology
Cornell University
159 Sapsucker Woods Road
Ithaca, NY 14853

Animal Management Correspondence Course
National Extension College
Dept. Z, 18 Brooklands Ave.
Cambridge CB2 2HN
ENGLAND

(Editor's note: An open letter to the membership from Pat Sammarco requesting information on institutions offering zoo-related curriculum was published on page 193 of the July 1984 issue of AKF. If you have information on such institutions and the courses they offer, please send pertinent data, including contact person and address to Pat at the Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614.)



Information Please

Information is needed on the husbandry, breeding and hand-rearing of the Bat-eared Fox (*Otocyon megalotis*). Any information would be greatly appreciated. Please contact: Kaoru Araki, Takarazuka Zoological & Botanical Gardens, No. 1-57, Sakee-machi, 1-chome, Takarazuka, Hyogo pref.-665, JAPAN.

RESEARCH ASSISTANCE NEEDED: Request for ectoparasites, endoparasites, and fecal material from all zoo animals except birds, rodents, and ruminants. Parasites and fecal material should be preserved in 10% formalin or 70% alcohol. If collecting vials and preservatives are needed, please contact Sue Barnard, Senior Keeper, Dept. of Herpetology, Atlanta Zoological Park, 800 Cherokee Ave., S.E., Atlanta, GA 30315.

Viewpoint

"A QUESTION OF PRIORITIES"

By
Victor S. Monroe
Biologist and Herpetologist
Orangevale, CA

Today's zoological parks are in dire need of well-educated, well-trained, dedicated professionals. Reptile collections require specialists with the aforementioned prerequisites, as do the carnivores, ungulates, and so on down the line.

General purpose keepers who, "learned their trade on the farm", cannot, in my opinion, be expected to function in the capacity required by today's zoos. Medical procedures, habitat design, nutrition, and captive propagation require more than mere "on the job training".

Our world of declining species demands that keepers are biologists, zoologists, veterinarian technicians, or nutritionists. This can be achieved by separate members of a team effort, or by individuals with a duplicity of qualifications.

How many zoos presently require a college degree as a condition for keeper employment? Of those few that do, how many require that degree to be within a related field? Of the twenty-two major zoological parks contacted by this author, only two answered "yes" to either question.

One might assume that there is a shortage of qualified personnel, forcing zoos to hire both non-grads and applicants from other academic disciplines. A reasonable assumption, but entirely false. The real problem is more complex, and more demoralizing.

Most zoos, due to financial considerations, operate under local government jurisdiction requiring applicants to face the bureaucracy of the public employment procedure. Reams of paperwork, inadequate testing procedures, outdated hiring lists, and unions designed for city maintenance workers, are a few of the obstacles.

But these are by no means the only hurdles to be crossed--add nepotism, hiring freezes, and unqualified personnel protected by seniority. Of course money is the root of all evil, but the elimination of merely half of the above-mentioned obstacles would ease the burden. Besides, what realistic job hunter is our field expects to become wealthy?

A lack of qualified applicants? Explain impacted programs in wildlife biology, zoology, and their related fields. Explain high unemployment rates for graduates in the field, while non-grads, art majors, and city maintenance workers draw pay as full-time keepers.

Are these self-defeating procedures the means to achieve the goals of any quality zoological park? Are English teachers allowed to perform surgery, or salesmen to pilot commercial jetliners? Is the field of zoology less important? Is our mission less crucial?

Changes in the system are overdue, and critically important. It is up to responsible administrators and concerned keepers to demand professionalism through education, training, and practical application. There are creatures depending upon us that do not have the time to wait.



ZOO News From Japan

SEA OTTER BIRTH FIRST IN JAPAN

from material submitted by

Masanori Nishi, AAZK International Member

One young male and three adult female sea otters (*Enhydra lutris*) were accepted by the Toba Aquarium after being caught off the Alaskan coast last October. They have been housed in a specially constructed, temperature-controlled water tank designed for sea otters and built at a cost of 200 million yen (about \$87,000). The tank is 3.5m deep and the sea otters are being fed freeze-pasteurized shellfish.

On the morning of 23 February of this year, a keeper unexpectedly found a baby on the belly of one of the females. The infant had a body length of 40cm and a body weight of 1.5kg. None of the staff or veterinarians were aware that the female was pregnant or showed any signs of impending birth. Since the gestation period for sea otters is about 10 months, the female must have been pregnant when she was captured. The infant's sex is still unknown at this time.

The birth of a sea otter in captivity is quite rare and only 24 such instances have been reported in the U.S. and Canada. In addition to this fact, there is almost no example of long-term captive raising of a baby sea otter with the exception of the Seattle Aquarium's longevity record of two years. The Toba Aquarium contacted the Seattle Aquarium for the necessary technical information on captive husbandry prior to the sea otters' arrival and sought further advice following the birth of the baby.

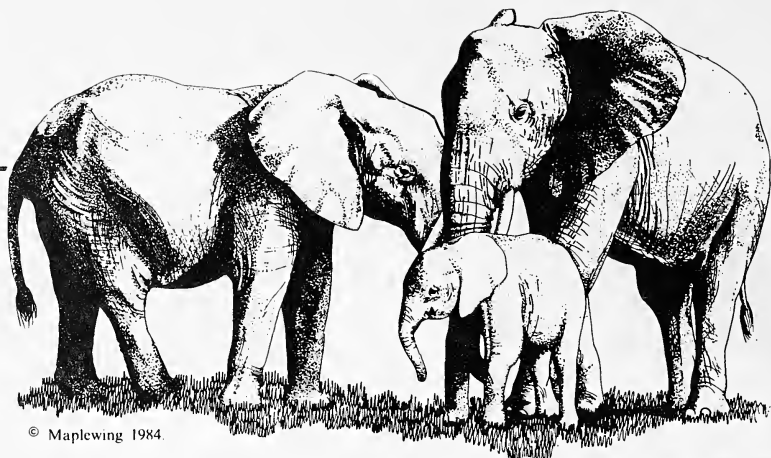
On the tenth day after the birth the baby nearly drowned because the mother took a long dive after being frightened by the shadow of a kite flying over the tank. But after that incident, the baby has been growing well with no other problems so far. The baby was named "Cha-Cha" by a fifth-grade schoolgirl.

According to the Japanese newspaper *Yomiuru Shinbun* of June 18, 1984, "Sea Otter Fever" has hit the Toba Aquarium. The baby and nursing mother have become very popular attractions and attendance at the aquarium has doubled since the baby's birth. The Aquarium staff is making careful daily observations of both mother and baby using both videotape and color slides to document information in anticipation of future sea otter births. Observation records have been made available to the visiting public. Included were the following daily entries:

- 20 March, 1984 - the baby took a bite off a fish and ate it for the first time.
- 27 March, 1984 - the mother broke a shell and handed it to the baby. The shell-breaking practice has begun.
- 13 April, 1984 - the baby becomes capable of diving to the depth of 1.2m under water picking up and playing with a shell.
- 1 June, 1984 - the baby's downy fur has started to turn from brown to black. The body length has grown to 85cm and the weight to 7.2kg.

This rare growth record and nursing behavior will be officially reported at the Marine Mammal Convention for Japanese marine biologists which is planned for December of this year.





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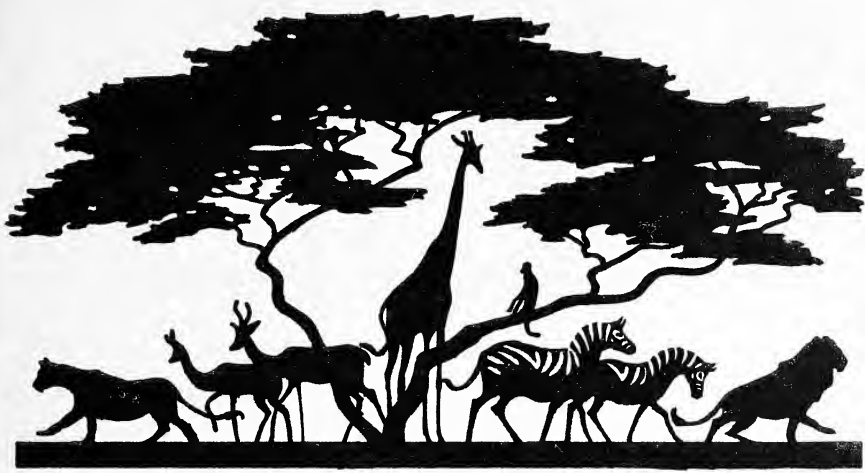
FOREIGN OBJECTS IN EXHIBITS: AVERTING A TRAGEDY

By
Michael J. Schofield
Curator of Animals
Worcester Science Center
Worcester, MA

On 20 June, 1984, our 7½ month old female Polar bear (*Ursus maritimus*) was found with a loop of ¼-inch reinforcing wire seven inches in diameter encircling her neck. Apparently she had found the loop of wire in a hole she had been excavating in the exhibit and managed to squeeze it over her head. A frantic half hour ensued whereby the young bear tried to remove the wire from her neck and the mother bear made several attempts to assist the youngster. We were able to isolate the juvenile in the den complex and successfully removed the wire in the following manner:

A blunt hook with a long shank was secured to a four-foot length of one-inch PVC pipe. Electrical tape was used to secure the hook to the pipe to ensure that the hook would break before damage to the bear's neck could occur. The bear cub was then encouraged to face the 4-inch by 10-inch keeper's viewpoint in a shift door and the wire was then hooked. The juvenile backed up as was expected and the wire was pulled safely from her head. A simple solution to a possible tragedy, but the best solution is routine daily examination of exhibits for foreign objects. We were lucky. Think twice the next time an animal is seen playing with something seemingly harmless. Maybe it isn't.





***10th National
AAZK Conference***

September 30th - October 4th

HOSTED BY

WOODLAND PARK ZOOLOGICAL GARDENS

SEATTLE, WASHINGTON

JOIN US!

1984 AAZK NATIONAL CONFERENCE REGISTRATION FORM

Sept. 30-Oct. 4, 1984

Please type or print. One name per form.

Return form with your fee to:



Mary Bennett, Registration Coordinator
Woodland Park Zoological Gardens
5500 Phinney Avenue North
Seattle, WA 98103
Phone: (206) 625-5488

Make checks payable to Puget Sound Chapter AAZK.
Deadline for Pre-registration is August 15, 1984.

1984 Registration

Name _____

ADDRESS _____

CITY _____ STATE/COUNTRY _____

ZIP/POSTAL CODE _____

ZOO AFFILIATION IF APPLICABLE _____

AREA OF INTEREST _____

VEGETARIAN YES _____ NO _____

WILL BE SUBMITTING PAPER YES _____ NO _____
(\$20.00 will be refunded on acceptance of paper)

AAZK MEMBERSHIP STATUS AND FEES:

MEMBER OR SPOUSE	\$50.00 each
NON-MEMBER	\$70.00 each
LATE FEE (After Aug. 15th)	\$15.00
TOTAL FEES ENCLOSED	\$ _____

ONE DAY RATES FOR INDIVIDUAL CONFERENCE EVENTS ARE AVAILABLE. PLEASE
CONTACT MARY BENNETT FOR INFORMATION.

Are you interested in purchasing a conference T-shirt?

YES _____ NO _____ Size S _____ M _____ L _____ XL _____
(This will help us provide adequate inventory)

CONFERENCE UPDATE

Weather

Weather in the Pacific Northwest is often unpredictable. Early fall is often cool, sunny days (50's-60's). We will be outside for several days and evenings during the conference, so a light, warm jacket and possibly a raincoat and hat would be good items to bring. You might also find a small daypack handy.

Hotel

Remember to register as soon as possible, before the registration deadline, so you will be eligible for winning a free night!

Although the hotel does require evening attire in the top floor restaurant and entertainment lounge, it is casually elegant. Jeans are quite acceptable for all other areas of the hotel. Also, if you do wish to be matched with a roommate, be sure and make that clear when calling in your registration.

OUT OF STATE...800 426-1172
IN STATE.....800 851-8010
LOCAL.....206 583-0300

Auction

If you have an item for the auction, please consider sending it to us ahead of time, if at all possible. It might make your traveling easier, and it will definitely make auction arrangements here go much smoother.

Send all items to: Woodland Park Zoo
5500 Phinney Ave. No.
Seattle, WA 98103
ATTN: Pat Maluy

No COD's please.



**Seattle,
The Emerald
City.**

Day Fees

Sunday.....\$10.00 includes ice-breaker
Monday.....\$10.00 includes evening tour of Seattle Aquarium
Tuesday.....\$5.00 includes lunch, dinner & buses to & from WPZ
Wednesday...\$15.00 includes buses all day, lunch & dinner
Thursday....\$15.00 includes lunch at hotel; does not cover evening
Thurs. eve..\$25.00 covers banquet & evening at Space Needle

Conference..... 84

1984 AAZK NATIONAL CONFERENCE SCHEDULED PAPERS

These papers are listed in order of presentation; numbers 1 - 14 are scheduled for Monday; numbers 15 - 23 are scheduled for Thursday morning.

1. "Gorilla Management at Lincoln Park Zoo", Pat Sammarco, Lincoln Park Zoo
 2. "Death of an Alpha Guinea Baboon (*Papio papio*) - the Effects on the Offspring", Lynne Villers, Indianapolis Zoo
 3. Jones and Jones, Zoo and Landscape Architectural Firm, Seattle, WA
 4. "ZooCamp - A Learning Experience", Diane Krug, Riverbanks Zoological Park
 5. "Activity Patterns and Sexual Behavior in Two Pairs of Snow Leopards", Elaine Barclay, Washington Park Zoo
 6. "Establishing a Pride of Lions at the New Pittsburgh Zoo", Regina Greeb, Pittsburgh Zoo
 7. "What to Do When Your Zoo Doesn't Have a Graphics Department", Cathy Taibbi, Atlanta Zoo
 8. "Husbandry and Breeding of Water Ouzels (*Cinclus mexicanus*), at the Washington Park Zoo", John H. Houck and Ralph Arrison, Washington Park Zoo
 9. "First Captive Breeding of the Common Trumpeter (*Psophia c. crepitans*)", Jim McNeal and Eric Kowalczyk, Woodland Park Zoological Gardens
 10. "Horticultural Enhancement of Exhibits at the ASDM", George Montgomery, Arizona-Sonora Desert Museum
 11. "Guidelines for Aquarium Designs in Zoos", Dave Gordon, Point Defiance Zoo and Aquarium
 12. "The Modern Keeper in a Small Growing Zoo", Wayne Sager, Valley Zoo, Alberta, CANADA
 13. "Sliding Door Nestboxes at Front Royal", Kevin Conway, National Zoo Conservation & Research Center
 14. "AAZK Exhibit Design Form", Diane Forsyth, Akron Zoological Park
 15. "Illness and Recovery of a Male Koala - A Case History", Don Richardson, Los Angeles Zoo
 16. "Training Asian Elephant Cows for Artificial Insemination", Mary Dukes, Santa Barbara Zoo
 17. "The Keeper As an Educational Resource", Joanie Stinson, Phoenix Zoo
 18. "Creating An Ethogram: A Fundamental Tool of Ethology", Diane Forsyth, Akron Zoological Park
 19. "Management and Husbandry of the Western Tarsier, *Tarsius bancanus*, at the National Zoological Park", Frank Kohn, National Zoo
 20. "Social Behavior of Two Groups of Lion-tailed Macaques", S.G. Hornshaw, J.D. Rempel, The University of Western Ontario
 21. "Investigation into Maintaining, Exhibiting and Breeding the Tailed Frog, *Ascaphus truei*, in a Zoological Park", Stanley Held, Washington Park Zoo
 22. "Fresno's Wolf Woods: Frustrations Resolved", Mary L. Swanson, Fresno zoo
 23. "Animal Keepers' Forum: A Decade of Growth and a Future of Challenge", Susan Chan, Topeka Zoological Park
- (Several late arrivals are still under consideration. Workshops/Disucssions/ Demonstrations will be listed next month.)

Reptile Amphibian Potpourri

Reptile Care: Relating To The Inquiring Novice - Part 3

TRANSPORTING AND HANDLING

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

Transport and inexperienced handling is stressful to an animal, and the risk of injury to them is increased. Too often a snake is transported around an owner's neck, in a paper bag, in a pocket, or by other undesirable methods. A reptile, being transported, should be placed in a clean, well-stitched cloth sack such as a pillow case (sacks must be made of a material that will allow a reptile to breathe). To prevent an animal from escaping, the sack should be carefully inspected for holes. If all appears in order, the sack's opening can be secured with tape, string, or by knotting the sack itself.

Once the reptile is secure within the sack, it is placed in an insulated container (styrofoam) of appropriate size. Unless the reptile is to be containerized for several days, it is not necessary to riddle the container with air holes. If an owner is concerned about a pet receiving insufficient air, a few holes can be placed on each end of the container. However, one should keep in mind that the more holes, the less effective the insulation will be. The zoo keeper should explain to the novice that insulated containers are used to prevent the reptile from being exposed to drafts and extreme temperatures.

The container should be secured with tape in the event the animal escapes from the sack. Also, it is desirable to label all containerized reptiles with their common and scientific names, the number of animals within, and the fact that they are non-venomous.

It cannot be stressed strongly enough that containerized animals should never be left in direct sunlight or in any other place where temperatures can exceed 90°F. Too often a reptile owner planned to make a "quick" stop somewhere, but upon arriving back to a sunbaked car, has found dead or overheated reptiles. Reptiles overheat quickly, so transport directly from point A to point B.

If many animals are being transported, the owner should avoid overcrowding. When sacking reptiles for transport, accidents can be avoided by placing one animal per sack. This is especially important with "snappy" animals that tend to bite each other.

After relocating a reptile according to the prescribed method, the sack(s) and insulated container should be washed and sanitized with a mild solution of Clorox[®], and then thoroughly rinsed and dried.

Most reptiles bite! Even the "tame" one that has been captive for years may have an unpredictable moment. Large specimens such as pythons can inflict severe wounds which may require medical treatment. A snake's recurved teeth may break off in a wound and must be removed. Whether a reptile is wild-caught or has been captive for years, proper handling will reduce the incidence of bite wounds. The first step in safe handling is to firmly grasp an animal with a smooth, rapid, and confident motion.


REPTILE CARE: RELATING TO THE INQUIRING NOVICE - PART 3, Continued

Hesitation upon an approach may provoke a bite. A larger and/or aggressive animal should be gently pinned behind the head with one hand while using the other hand to support its body. If an animal is too large for one person to comfortably support, employ an assistant.

Aggressive turtles, such as snapping turtles, can be held by the base of the carapace and/or plastron. Be sure that the novice understands that these animals must never be restrained by their legs or tails. Also, many lizards have fragile tails; therefore they must not be grasped by this appendage.

While leather gloves may prevent scratches and bites from a struggling animal, they are bulky and can prevent a firm grasp. Weak grips may allow an animal to injure itself or squirm free and escape.

Zoo keepers should attempt to instill confidence in new reptile owners, since their desire to own a reptile is greater than their experience. If one is determined to work with reptiles, one must not have a phobia for being bitten. Animal bites can be avoided with forethought and smooth technique.

Be certain that the inquiring enthusiast understands that one must NEVER HANG A SNAKE AROUND THE NECK! Even small snakes can inflict an injury to the face and neck when frightened. A gentle squeeze from a large snake can cut off circulation of blood to the brain causing unconsciousness and possible death to the handler. 

(Part 4 of this series will deal with "Housing: Design and Construction".)

AAZK Committee Reports

PUBLIC EDUCATION COMMITTEE


*Submitted by Eileen Gerity
Chairperson of AAZK Public Education Committee*

Although apparently silent, the newly-formed Public Education Committee has been hard at work. The committee has been contacted by many interested individuals from various sectors of the country concerning possible sub-committee ideas.

One suggestion, submitted by Oliver Claffey of the Metro Toronto Zoo, was on an SSP booklet; preparing keepers to answer questions from the public professionally, as this is an important aspect of public education.

Another suggestion was the preparation of a booklet containing commonly asked questions concerning the animal kingdom. This will offer the keepers insight into the type of information in which the public is interested.

Finally, an informative program educating the public concerning the life of a zookeeper has been suggested. Perhaps this could be achieved with a display demonstrating the daily activities of the zookeeper so that the public can see how the zookeepers interact with the various species of animals.

The Committee welcomes the suggestions of other members of AAZK and requests any ideas be forwarded to Eileen Gerity, Educational Coordinator, Van Saun Park Zoo, Forest Avenue, Paramus, NJ 07652. 

Education Alternatives...

SOME OF THE ANIMALS WORK FOR A LIVING:
THEIRS AND OTHERS

By
Heidi Ensley
Senior Animal Handler
Animal Chit-Chat Shows
Special Events Department
San Diego Zoo, San Diego, CA

The San Diego Zoo has, for years, had a very extensive Education and Public Relations Department. Creative and innovative programs have been developed by the instructors, who not only hold classes in our educational facilities all year around, but also go out to schools in order to bring "the Zoo to You". Animals have always been a vital part of these programs; a visual and tactile tool to get the children and adults closer to the theme--animal natural history and conservation.

Until recently, the animals used for education have been similar to those used by most zoological gardens; small, easily accessible, and common candidates such as: reptiles, raptors, psittacines, and small mammals. Usually these animals have either been donated pets, young, abandoned, local wildlife, or acquired animals known for their tolerance of human contact.

Because of the demand by the public to see and hear about new things, we have had to acquire other types of animals in order to avoid repetition. Some of the newly acquired animals are surplus, and they will stay with us throughout their lifetimes. Others are temporary animals that we house, work and show during a transitional period of their lives here at the Zoo. These animals are carnivores. They are a part of our educational animal collection and they are enclosed primarily in one area. They are cleaned, handled and talked about by a limited number of handlers.

These animals' participation in educational and public relations activities not only generates a substantial income for the zoo, but also introduces innumerable people to the plight of animals in the wild and to how our captive management goals are faring.

Here in sunny San Diego, the zoo is open 365 days out of the year. Our public is exposed to one of the largest collections of animals in the world. All of these animals are housed out-of-doors and, because of the temperate climate, all are pretty active subjects for the over four million visitors a year. We are also fortunate to have an environmentally-oriented press and, of course, donors. Because of this interest, the demand to see exotics close-up has increased over the years. Our Goodwill Ambassador, Joan Embery's appearances on the Johnny Carson Tonight Show, among others, has definitely added to their popularity.

In 1983 alone, our small collection of educational animals participated in quite a few public-oriented activities. The chart illustrates the diversity, and the following descriptions, hopefully, will depict just what it is that we do.

School programs - off zoo grounds. We have an educational van that transports two to three animals in crates to schools for these assembly programs entitled "The Zoo and You". It is designed for grade levels K-6, and each program lasts about 50 minutes. It includes a short slide

SOME OF THE ANIMALS WORK FOR A LIVING: THEIRS AND OTHERS, Continued

show introducing the conservation theme. The animals' spots are conducted by the handlers, and they exhibit the animals' uniqueness, natural history and allow some petting.

School programs - on zoo grounds. Kinderzoo, Juniorzoo and Summer school sessions bring grade levels K-12 to the zoo. The students are brought to our animal compound for an introduction to more specific animal information, i.e. adaptation, animal classification, behavior, care and management. There is some hands-on experience.

Special Tours - behind-the-scenes groups are led on a three and one half hour tour of different areas in the zoo; one being our animal compound. The smaller groups are invited into the animals' houses in order to get an "up close and personal" experience with our family. V.I.P tours, of four hours duration, allows a smaller group (usually a family) an exclusive tour.

Parties - day and evening parties are booked either in our catering facilities or at a local hotel/restaurant. They are usually held for promotional purposes for the zoo. Animal Pals is a package deal which includes a presentation with animals. This can be an informal walk-around during the pre-feed serving period, or a formal presentation. The price is determined by the number of animals and handlers requested, the length of time for the appearance, and whether or not we need to load and transport the animals to an out-of-zoo location. The larger activities, numbering up to 3,000 people are usually fund-raising enterprises for the zoo.

Media exposure - this includes a wide variety of television photo sessions and filming for special segments on T.V., and for commercials. Newspaper interviews and photo shoots are for both local and U.P.I. use. These sometimes occur spontaneously and can be either in our compound or at the studio.

All this is in addition to the 700-odd Animal Chit-Chat Shows a year in which our animals perform. We have one amphitheater at the zoo which seats 2500+ people. The shows are held twice daily, seven days a week, and are free.

Who are these animals? Our family of educational/public relations animals include:

Red-tailed hawk, 1.0, 6 years old
Great-horned owl, 1.0, 6 years old
Indigo snake, 1.0, 8 years old
California Harbor seal, 1.0, 8 years old
Guanaco, 0.2, 3 years and 1 year old
Mini-horse (registered) 1.0, 10 years old
Emu, 1.0, 6 years old
Eastern-grey kangaroo, 0.1, 8 years old
Indo-Chinese leopard, 0.1, 2 years old
South African cheetah, 1.0, 3 years old
Golden Retriever, 0.1, 3½ years old
Timber wolf, 0.1, 12 years old
Bengal tigers, 1.2, 1 year old
Asian lion, 1.0, 8½ months old
Dhole dog, 1.0, 1 year old

SOME ANIMALS WORK FOR A LIVING: THEIRS AND OTHERS, *Continued*

Educational Animal Activity Chart

Jan.-Dec. 1983

Activity	Animal Chat-total number involved in.	Total participants	Fee	Total revenue	Animals participating
School programs (off grounds)	48 schools	19,500 students	\$150.00 for first program, \$50. for additional programs	\$7,600.00	all but, seal, horse, emu, roo and wolf
School programs (on grounds)	76 classes	2,815 students	\$18.00-\$40.00 /person /session	\$77,607.00	all
Special tours	76 tours	approx. 13,162 people	\$5.75-\$13.25 /person \$300.00 for a V.I.P. tour	approx. \$101,979.63	all
Parties	68 appearances	3,284 people (partial)	\$150.00-\$500.00	\$2,250.00 (partial)	all but, wolf and leopard
Media exposure	63 sessions	undetermined	free	undetermined advertisement value	all

Associated animals:

Macaw (Blue and Gold), 1.0, adult
 Boa constrictor, 0.1, adult
 Rosey boa, 0.1, adult
 Tawny Frogmouth, 1.0, 2 years old
 Ferrets, 2.1, adults
 Kinkajou, 1.0, 14 years old

Coatimundi, 0.1, 5 years old
 Hedgehog, 1.0, adult
 Barn owl, 1.0, 15 years old
 Burrowing owl, 1.0, adult
 Green Iguana, 0.1, 6 years old

SOME ANIMALS WORK FOR A LIVING: THEIRS AND OTHERS, Continued

The permanent "lifers" you can probably guess. The transitional animals are the large carnivores; they have been rejected and hand-raised and are ear-marked for future breeding ventures. These animals have become too large for the Children's Zoo nursery facilities, but are still too young to be introduced to a viable breeding group. The wolf and the harbor seal are exceptions; these two were abandoned animals that have proven themselves tractible in adulthood. The leopard, tigers, and lion will, when sexually mature, be used either in our zoo as part of a breeding program, or loaned out to other zoos for the same purpose.

The cheetah is another exception. His acquisition as an education animal was funded by a private group of zoo donors. His is an inbred specimen and will not be used as a breeder, hence the dog as a companion. At over three years of age, he has proven himself well acclimated to public perusal. "Anna" and "Arusha" are zoo favorites.

We feel strongly about not keeping a viable breeding animal out of a concerted breeding effort. Carnivores seem to acclimate easily, and the hand-raising and personal contact they receive as juveniles and adolescents does not seem to deter their natural instincts when they mature.

Our cats are not declawed or defanged, and it is always a very challenging experience for the handlers. We have the discretion of dictating what our animals will tolerate. We basically call the shots as far as the strange environment, public handling, and length of exposure they may tolerate. Fortunately, everyone listens to our edicts.

We have an exceptional group of animals that tolerate a lot of strange people up close. We'd like to think that we are very protective of what they can and will do. In the process we have disseminated some important animal information, and our "show" animals have, perhaps, made it a little easier for the public to understand what other, less accessible animals need to survive. Our kids really work for animalkind!

Statistics indicated in the chart were compiled from information provided by: Education Dept., Special Tours/Group Sales Dept., Catering Dept., Animal Chit-Chat/Carlee Robinson.

Anyone having any questions, or possible animal alternatives for future animal acquisitions please contact: *Animal Chit-Chat, San Diego Zoo, P.O. Box 551, San Diego, CA 92112.*



Legislative News

Compiled by Kevin Conway
AAZK Legislative Coordinator

CHANGES TO THE MIGRATORY BIRD TREATY ACT REGULATIONS

On 7 June the U.S. Fish and Wildlife Service (USFWS) issued a proposal to enable all accredited institutional members of AAZPA to buy and sell lawfully acquired migratory birds or their progeny, parts, nests or eggs. Currently only zoological parks that are open to the public and not operated for profit are exempted from the migratory bird permit regulations and thereby permitted to buy and sell lawfully acquired migratory birds. AAZPA has been working with officials from USFWS for some four years in efforts to change these regulations.

In their published proposal, the USFWS noted: ..."propagation of various migratory bird species (i.e. flamingos, ibises, etc) benefits the migratory bird resource through the production of captive-bred birds, thereby promoting knowledge useful to their conservation, increasing the captive population, and reducing the demand for taking such species from the wild. The Service wants to encourage these zoological parks and aquariums to continue these activities by granting them an exception to the migratory bird permit regulations."

---from AAZPA Newsletter, July 1984
and Federal Register, 7 June, 1984

MARINE MAMMAL PROTECTION ACT PASSES HOUSE

On 5 June, the Marine Mammal Protection Act reauthorization passed the House of Representatives on a voice vote. There were no amendments to the bill (H.R. 4997) on the Floor. The bill contains no prohibition for the public display of killer whales.

---AAZPA Newsletter, July 1984

FINDING ON ALLIGATOR SNAPPING TURTLE PETITION

After a review of available biological information on the status of the alligator snapping turtle (*Macroclemys temmincki*), the USFWS has concluded that a proposal to list this species as Endangered or Threatened is not justified at this time. The review was carried out in response to a Feb. 23, 1983 listing petition from Dr. Peter C.H. Pritchard. Although the data gathered by the Service is not sufficient to warrant a listing at this time, they will continue to monitor the species status.

--Endangered Species Technical Bulletin
Vol. 1X, No. 3

MINNESOTA WOLF REGULATIONS AMENDED

The Federal regulations governing management of the gray wolf (*Canis lupus*) in Minnesota, a species which is classified as Threatened in that State, have been amended (F.R. 8/10/83). This revision will allow a limited, controlled taking of wolves by the public, as well as designated Federal and State agents. The FWS's current wolf depredation control program also will be modified. Sales of tagged Minnesota wolf parts will be permitted in interstate and international commerce. Wolf densities in the affected management zones within Minnesota will be maintained at or above the levels recommended in the Eastern Timber Wolf Recovery Plan.

In response to comments on the proposed rule, several changes were made in the final rule. Until a stable wolf population is established in Wisconsin, wolves may not be taken, other than in direct response to depredation, in the areas of Minnesota from where wolves are beginning to colonize northern Wisconsin, unless depredation in those areas becomes chronic. The regulations have also been modified to make it clear that they do not authorize trade in living wolves.

---Endangered Species Technical Bulletin
Vol. VII, No. 9

SELKIRK MOUNTAIN HERD OF WOODLAND CARIBOU NOW ENDANGERED

The southern Selkirk Mountain herd of woodland caribou, considered the Nation's most critically endangered large mammal, has been listed as an endangered species by the Interior Department's U.S. Fish and Wildlife Service. The action became effective on 3/30/84.

The herd, now estimated to number only about 30 individuals, twice was granted endangered status under emergency provisions of the Endangered Species Act; formal listing will now extend the protections of the act to the species permanently.

The Selkirk Mountain herd is the only caribou population that is found in the lower 48 States, occurring in northern Idaho and northeastern Washington as well as southern British Columbia. Critical Habitat for the species has not been designated because the Service feels such a precise description could lead to illegal take of the few remaining animals.

The woodland caribou was once found throughout the northern tier of States that border Canada; by the 1950's the last remaining population had dropped to an estimated 100 animals in the Pacific Northwest. Reasons for the species' decline include once-legal hunting, poaching, habitat degradation, low calf survival, and the absence of immigration from other herds in Canada.

---Endangered Species Technical Bulletin
Vol. I, No. 8



A COMMENT ON THE SPECIES SURVIVAL PLAN

By
Joseph W. Maynard, Director
Exotic Feline Breeding Compound, Inc.
Rosamond, CA

(Editor's Note: Mr. Maynard's article is in response to an article entitled "The Species Survival Plan; A Suitable Case For Treatment" written by Mike Clark, former keeper Jersey Zoological Park, and Doug Richardson, keeper at the Howletts Zoo Park. This article was published on Page 142 of the May 1984 issue of AKF.)

I agree with Mike Clark and Doug Richardson on their overall view of the SSP, but I think we should elaborate a little more on past management policies.

As most will agree, even though it may be a hard pill to swallow, that past management policies are the cause of today's overpopulation of poor stock, i.e. mixed breeds and uncontrolled in-breeding. Also, but possibly not as well known, past personality conflicts and ego have served well to eliminate genetically pure animals from current breeding stock. It wouldn't serve any purpose to dwell on this, but we should be able to utilize these past breeding mistakes in a constructive way.

Although in some cases euthanasia may have to be considered, instead of Mass Euthanasia, consider the following: Why not take these animals and use them for exhibit purposes and take the rarer animals off display to be used as the nucleus for the SSP project.

As Leopards (*Panthera unica*) were used in the original article, let us continue to use them in this discussion as an example.

To the general public a "Leopard is a Leopard". This is not meant as a derogatory slap in the face at the public, it is simply that the public at large does not know that there are different species or sub-species of Leopard. The same hold true about Tigers. A good example would be: How many of us at our facilities have both a normal Spotted Leopard and a Melanistic or Black Leopard? Those that do and have been present at the exhibit during visiting hours have undoubtedly heard the visitor remark upon seeing the Black Leopard, "ooo a Black Panther". If you try, you stand about a 50-50 chance of convincing them that both the Spotted Leopard and the Black Leopard are the same animal right down to their spots.

What all this boils down to is that most of the species of felines do not breed well when constantly on exhibit, and since the general public is mainly interested in the larger more colorful cats like the Lion, Tiger and Leopard, there shouldn't be any reason why mixed or hybrid animals that have been neutered or spayed couldn't be put on exhibit and pure stock isolated until such time there is a sufficient number available to put back on display.

We believe the above is at least worth considering as it alleviates two current problems in a mature way. One, it eliminates empty exhibits when animals are removed for breeding, and, two, it is a humane way to deal with past mistakes.

Again, Mike and Doug used the population figures for the Snow Leopard as an example--take a look at you zoo's most recent ISIS Species Distribution Report. What about the Temmincks Golden Cat, and Clouded Leopard, Pallas Cat, Flat Headed Cat, and on and on? All of these animals show only a decrease in population. Why? What is the reason? Let us just say that if old policy, and ego were eliminated from consideration, the SSP just might work. There are a lot of good people directing the efforts of the SSP Program. Let's all work together to help them.



HAND-RAISING INFANT INSECTIVOROUS BATS

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

Because of their small size, insectivorous bats are very difficult to hand-raise. The odds are against success; and even if the bat survives, it is unlikely that it can be returned to the wild. A training program of this kind is beyond the expertise of most people. Therefore, those attempting to hand-raise an infant insectivorous bat should be prepared to keep the animal, or turn it over to an institution housing captive bats of the particular species.

As soon as possible, the recently obtained bat should be identified as to genus/species. It is not enough to know the animal is a bat; each species differs in weight, and to determine if the bat is growing properly, its adult weight should be known. Furthermore, knowledge of the animal's weight will be useful in estimating the orphaned bat's age. For example, a Big Brown bat (*Eptesicus fuscus*) may range in adult weight from 11 to 16 grams. As Eastern Pipistrel (*Pipistrellus subflavus*) may range in adult weight from 4 to 6 grams. The newborns may exceed 25% of the mother's post-delivery weight.

In temperate regions, bats give birth in May and June. They are hairless but have milk teeth which allow them to cling to their mother's teat. These teeth are useless for eating insects, so beginning food must consist of a prepared milk diet such as Espilac[®]. Avoid supplementing the milk with syrups or vitamins as these may cause diarrhea. Infant bats should be fed frequently (approximately every 2 hours), but never overfed. Most will accept food readily, a drop at a time, from the palm of the hand (see Fig. 1.)

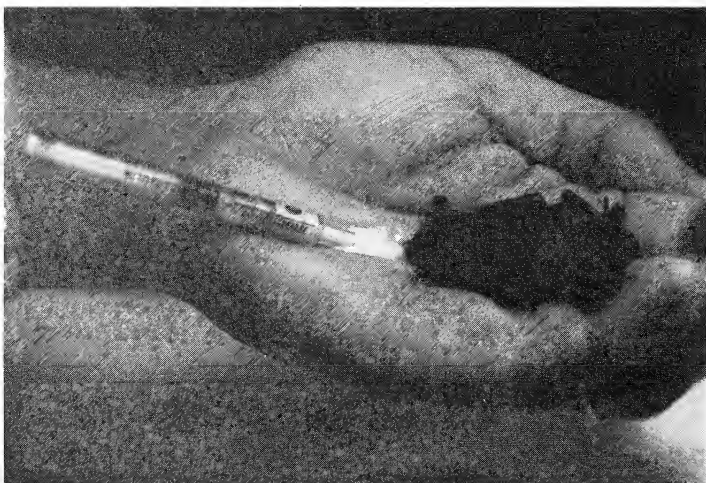


Fig. 1. An infant insectivorous bat's mouth is too small to suck from even a tiny doll bottle. The animal can derive enough nourishment by sucking drops of milk from the palm of the hand. Furthermore, this method helps prevent the infant from aspirating the fluid into its lungs. (Photo Rick Perry).

HAND-RAISING INFANT INSECTIVOROUS BATS, Continued

Baby bats grow very quickly. At the first sign of hair growth, the infant can be transferred gradually to a more substantial diet of glop. In most instances, the orphaned bat will probably be at an age where it can be fed this artificial diet immediately. There are many variations on the bat glop theme. I successfully raised several insectivorous bats on the following:

Daily, mix equal parts of --- Gerber's[®] strained baby egg yolk
Gerber's[®] strained baby banana
Sour cream
Mealworm guts

To this add -- 1 or 2 drops Polyvisol[®] multivitamin infant drops.

Bat glop should be slightly warmed prior to feeding, and offered from the palm of the hand. Baby bats dehydrate easily. After each meal of bat glop, offer the animal several drops of tap water, also from the palm of the hand. Most insectivorous bats are ready to fly at about 3 to 4 weeks of age. By this time their milk teeth have been replaced by their permanent teeth, and the infant is ready to receive chitin in its diet. Chitin constitutes the insect's exoskeleton, and is important to the bat for the formation of firm stools. Begin replacing the mealworm guts with finely chopped whole mealworms. Gradually decrease the amount of egg yolk, banana, and sour cream mixture each day until the bat is eating 100% insects. When the pure insect diet is started, place 1 or 2 drops of multivitamins in 10mls of water. To prevent drowning, use shallow water containers such as small petri dishes.

There is no definite rule to the number of mealworms a bat should consume each day. Variables include time of year, size (species) of bat, room temperature, and the amount of daily activity. My rule of thumb for determining what a bat should eat is by feeding it as much or as little as necessary to maintain a healthy weight. This can be determined by the animal's flight ability. Lean bats fly well, while fat bats can barely get airborne. From March through September, I maintain my Big Brown bat at between 14.5 and 15 grams which requires the consumption of 6 to 14 large mealworms daily. During the animal's dormant months (October through February) she received 1 to 4 worms weekly since it is a constant struggle to prevent her weight from increasing beyond 18 grams. On the other hand, I spend all year trying to drop the Eastern Pipistrel to 4½ to 5 grams. Rarely does this animal receive more than one to three small mealworms daily. During the winter months I drop her mealworm intake to 1 to 4 small worms per week. However, always provide fresh water daily with 1 or 2 drops of multivitamins. To insure that a bat is being maintained at a proper weight, it will be necessary to weigh the animal at least once a week on an appropriate scale - I use a triple beam balance.

Housing can be a problem, especially during the early hand-rearing period. It is very likely that anyone raising a baby bat will have to commute with it back and forth to work. The infant's home should provide it with warmth, safety, and security. It should be lightweight for ease of transport, and easy to keep clean. I have experimented with several designs and have found that a 5 gal. plastic container works best (Fig. 2). Within this container place a heating pad (be sure it is on lowest setting), and 1 or 2 ruffled pillow cases (Fig. 3). Notch the container to allow the heating pad cord to exit the container while the lid is tightly in place. It will also be necessary to drill air holes in the container's top to provide ventilation.

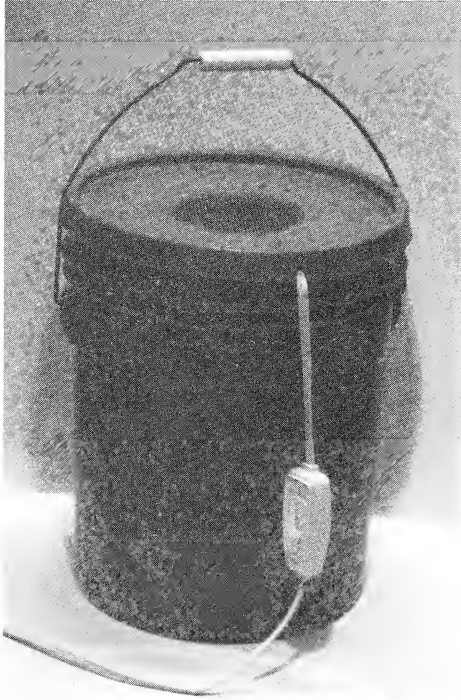


Fig. 2. - This batmobile is the result of many attempts to design the most suitable nursery for the "working mother".
(Photo: Rick Perry)

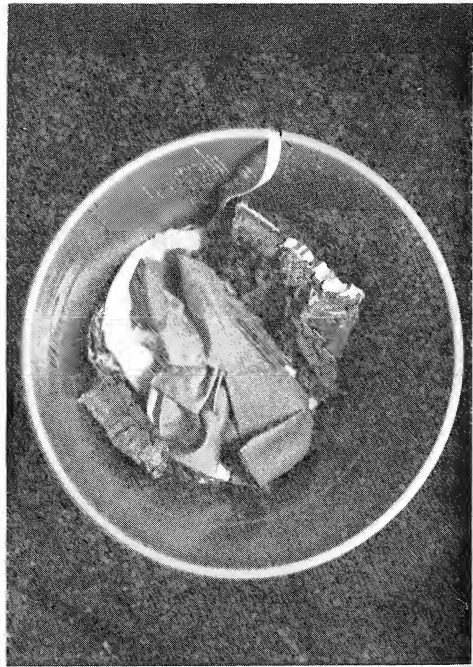


Fig. 3. - In addition to a heating pad and crumpled pillow cases, one or two pieces of lightweight cork bark may be included in the nursery container. Bats must have a rough surface upon which to hang (upside down).
(Photo: Rick Perry)

While this "batmobile" is suitable during the few weeks necessary to hand-raise the animal, it should not be used for permanent housing. I have found that cages designed for arboreal reptiles are also suitable for housing insectivorous bats. Only the size of the cage needs adjusting according to the bat species. For example, a 1 ft. deep X 2 ft. wide X 3 ft. high structure is suitable for the Big Brown bat. It should be front opening, and a 25 watt red light bulb should be mounted at the top of the cage, on the cage's exterior. My Pipistrel is housed in a 1 ft. deep X 1 ft. wide X 2 ft. high snake cage. However, unlike a reptile cage, a bat requires a rough interior surface. Cage contents should include non-resinous hardwood branches, and a substrate of newspaper or paper towels. Branches should be properly secured to prevent accidental injury to the bat, or cage damage.

The cage sizes do not permit flight. However, my bats are removed from their cages each evening for an hour of socializing and flying. I socialize the animals by placing them in my bathrobe pocket until each animal voluntarily leaves the pocket to fly. The time varies from 5 minutes to about an hour. If at the end of an hour the bats do not voluntarily leave my pocket, I remove them, one at a time, and encourage them to fly by gently tossing them in the air. This is a dangerous time for the bats. Because of their small size, they can easily be lost under or behind household furniture. Furthermore, it is absolutely essential that other pets be put outside while the bat is flying.

Bat experts have observed flight differences between differing bat species. My bats are also different in their flying styles. My Big Brown bat flies more quickly and for a longer period of time than my Eastern Pipistrel bat.

The Big Brown bat may fly from 5 minutes to about 15 minutes each evening, while the Eastern Pipistrel tires after about 5 minutes. However, what enthusiasm she lacks in flight, she makes up for on the ground. She spends about 5 to 10 minutes more flipping about the floor like a moth.

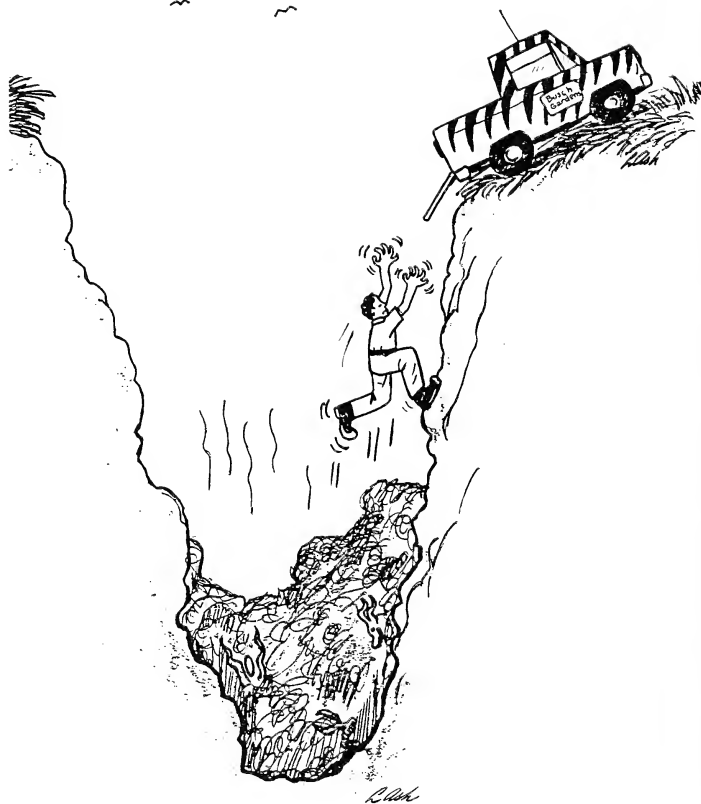
I advocate a reasonable amount of exercise to maintain a strong, healthy bat. For additional information on the care of captive bats, see BIOLOGY OF BATS OF THE NEW WORLD FAMILY, *Phyllostomatidae*, Part I, Care in Captivity, No. 10, Pgs. 89-131, by Arthur M. Greenhall; Special Publications The Museum, Texas Tech University.



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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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SEPTEMBER 1984



Dedicated to Professional Animal Care



Executive Editor: Alice Miser
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This month's artwork is by Gwen Yoshimura who is a Keeper at the Honolulu Zoo in Hawaii. This month's cover is of a Kookaburra. Thanks, Gwen!

Scoops

and

Scuttlebutt

NEW EDUCATION COMMITTEE MEMBERS APPOINTED BY AAZK DIRECTORS

The AAZK Board of Directors is pleased to announce the official appointment of Jay Jason, Marilyn Cole, Russ Mennard, Marcelle Guidry and Ken Reininger to the Keeper Education Committee. This is one of the most active and dynamic AAZK committees. The combined leadership of Judie Steenberg and Pat Sammarco and contributions of committee members help to achieve the objective of Article II section 3 of our constitution: "to establish materials beneficial to zoo keeper education." We look forward to the input and ideas of the new committee members.

REPTILE COLLECTION CENTER COORDINATOR NAMED TO DIET NOTEBOOK

Brit Spencer at the Minnesota Zoological Garden has been selected to coordinate the Reptile Collection for the Diet Notebook. Let's all make Brit feel welcome by sending him the diets of all those reptiles we're caring for!

INDIAN ZOO SEEKS ASSISTANCE/SUPPORT

The Friends of Mysore Zoo in Mysore (south India) is working hard to try to improve the conditions in their and other Indian zoos. This first and only zoo volunteer society in that country faces innumerable difficulties in trying to achieve these goals but their dedication and hard work is certainly a fine example of "ticktoitism". AAZK has sent this group back issues of AKF and other publications for their infant library. AAZPA has also donated materials. Sally Walker, Convenor and Secretary of Friends of Mysore Zoo welcomes all donations of printed material, particularly those dealing with zookeeper training. These materials can be sent to either of the following addresses:

Ragni Darashan
89 Park Street
Montclair, NJ 07042

Sally Walker, Convenor/Secretary
Friends of Mysore Zoo
Padmanilaya, 9th Main, 2nd Cross,
Saraswathipuram, Mysore-570 009

Sally also mentioned in correspondence that if any AAZK members are planning of a trip to India, she would be pleased to have them visit Mysore (with advance notice please) for a tour. She hopes that anyone doing so might be willing to donate a few hours instructing volunteers and/or keepers in various aspects of animal care.



Births & Hatchings

BRONX ZOO.....Margaret Price

June and July 1984 B&H include: Mammals - 4.3 Formosan sika, 0.1 Blesbok, 0.1 Himalayan tahr, 2.1 Large Malayan mousedeer, 4.0 African spotted grass mouse, 1.0 Reeves muntjac, 1.0 Pere David's deer, 7.0 Minnie down's mouse, 5.0 Egyptian spiny mouse, 1.0 Black-backed duiker, 0.1 Maxwell duiker, 1.0 Wisent, 1.0 Capybara, 2.0 Axis deer, 1.1 Gaur, 3.0 Red brocket deer, 1.0 Pen-tailed bettong, 0.2 Barasingha deer, 2.0 Common marmoset, 0.1 Blackbuck, 1.0 Pygmy hippopotamus, 0.1 Mandrill, 1.0 Talapoin monkey, 0.1 Pudu, 0.1 Mongolian wild horse; Birds - 12 Crested tinamou, 2 Temminck's tragopan, 1 White-naped crane, 2 Tufted puffin, 1 Crested guinea fowl, 1 Northern masked weaver, 2 Giant laughing kingfisher, 4 White-headed jay thrush, 7 American ruddy duck, 1 Emperor goose, 4 Malay peacock pheasant, 3 Tawny frogmouth, 1 White-headed piping guan, 1 White-quilled black bustard, 2 Satyr tragopan, 19 Mandarin duck, 7 Marbles teal, 4 Green wood hoopoe, 2 Andean gull, 1 Wood thrush, 1 Ovenbird, 1 Louisiana water thrush, 1 Ocel-lated turkey, 1 Humboldt penguin, 2 Common rhea, 3 Rothchild's mynah, 1 American eider duck, 2 Caribbean flamingo, 1 Mauritius pink pigeon, 1 Red-crested touraco, 1 Hooded crane, 1 Black-winged stilt, 2 Chilean flam-ingo, 3 Red-crested pochard, 2 Lilac-breasted roller, 1 Impeyan pheasant, 2 Patagonian conure; Reptiles - 2 Tracancore tortoise, 20 Yellow anaconda and 9 Mojave sidewinder.

DALLAS ZOO.....Tami Jones

B&H for July 1984 include: Mammals - 0.1 Yellow-backed duiker, 2.2 Suni, 1.0 Pygmy x white goat, 0.0.1 Dusky leaf monkey; Birds - 0.0.2 White-winged dove, 0.0.2 Red-vented bulbul; Reptiles 1.1 San Lucan speckled rattlesnake (*Crotalus m. mitchelli*), 0.0.1 Texas rat snake (*Elaphe obsoleta lindheimeri*), 0.0.4 Grey banded kingsnake (*Lampropeltis alterna*), 0.0.3 Mexican milksnake (*Lampropeltis triantulum annulata*), 0.0.8 Ottoman viper (*Vipera xanthina exathina*) and 0.0.2 Mexican king snake.

BROOKFIELD ZOO.....John S. Stoddard

B&H for July 1984 include: Mammals - 4.0 Sitatunga, 1.1 Collard peccary, 0.1.2 European wisent, 0.0.3 White-toothed shrew, 0.0.2 European harvest mouse; Birds - 0.0.1 Blue-shouldered robin chat, 0.0.1 Paradise tanager, 0.0.2 Purple honeycreeper, 0.0.2 Brazilian cardinal, 0.0.2 Purple swamphen, 0.0.4 Grey-headed kingfisher, 0.0.1 Red and white crane; Herptiles - 0.0.8 Poison arrow frog.

TOPEKA ZOO.....Alice Miser

Recent B&H at Topeka include: 0.0.1 Burrowing owl, 2.2 Puma and 0.0.2 Brown-headed tamarin.

MIAMI METROZOO.....Lori Bruckheim

July 1984 B&H include: Mammals - 0.1 Red deer, 1.0 Cape buffalo, 0.1 Greater kudu; Birds - 0.0.5 Ostrich, 0.0.1 Grosbeak starling, 0.0.9 Java tree duck and 0.0.1 Sarus crane.

BIRTHS AND HATCHINGS, Continued

SAN ANTONIO ZOO.....Debi Reed

July 1984 B&H include: Mammals - 5 Four-toed African hedgehog (4 DNS), 0.1 Aardvark, 1.0 Chapman's zebra, 0.1 Greater kudu, 0.1 Scimitar-horned oryx, 0.2 Brindled gnu (DNS), 0.1 Blackbuck (DNS), 0.1 Markhor (DNS), 0.1 Thomson's gazelle; Birds - 8 American flamingo, 2 Crested screamer (1 DNS), 4 Cinnamon teal (2 DNS), 1 Rosy-billed pochard, 5 Ocellated turkey (2 DNS), 1 Black-necked stilt (DNS), 1 Sun Bittern, 1 Inca tern, 3 Diamond dove, 1 Crested quail dove, 1 Painted conure, 2 Green-winged macaw, 1 Burrowing owl (1st time in collection), 2 Yellow-headed rockfowl (1 DNS); Reptiles - 1 Honduran night lizard (DNS), 3 Dumerk's ground boa, 5 Baird's ratsnake, 3 Palestine viper, 7 Taylor's cantil (1 DNS); Aquarium - 12 Seahorse (DNS), Casseopia jellyfish, Glass shrimp and Tomatoe clownfish.

In other news, we've received 1.1 Black-footed penguins and will receive 0.0.3 mire. All will be in a breeding situation. We are constructing a seal/sea lion exhibit and our new Children's Zoo is primarily complete. A Langur exhibit has begun construction. We are truly growing!

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

Included in July 1984 B&H are: Mammals - 1.0 Thomson's gazelle, 2.0 Grant's gazelle, 0.2 Scimitar-horned oryx, 0.2 Addax, 3.1 Impala, 0,2 Uganda Kob, 0.0.1 Chimpanzee, 0.0.1 Grant's zebra, 2.3 Greater kudu, 1.0 Gerenuk, 0.0.1 White-bearded gnu, 0.1 Topi, 1.0 Soemmering's gazelle, 1.0 Reticulated giraffe; Birds - 13 American flamingo, 18 Indian peafowl (blue phase), 7 Redhead duck, 2 Blue and gold macaw, 1 Forsten's lorikeet, 7 Jandaya conure, 1 Garganey teal, 1 Red-necked ostrich, 1 Indian peafowl (white phase), 3 Red-crested touraco, 7 Sun conure, 3 Abdim's stork, 4 Violet-crested touraco and 2 Red-crested touraco.

JACKSONVILLE ZOO.....Anne E. Wiggins

June and July 1984 B&H include: Mammals - 1.0 Sitatunga, 1.1 Eland, 0.1 Cape hartebeest, 0.1 Brindled gnu; Birds - 0.0.4 Nanday conure, 0.0.4 Whooper swan, 0.0.1 Red head duck, 0.0.2 Wild turkey, 0.0.3 Indian spoon-bill, 0.0.2 Mandarin duck (1 DNS), 0.0.1 Golden pheasant, 0.0.1 Lesser tern; Herptiles - 0.0.2 Aldabra tortoise, 0.0.12 Red rat snake, 0.0.2 Indigo snake, 0.0.27 Florida water snake, 0.0.2 Leopard gecko, 0.0.24 Florida cooters, 0.0.5 Yellow-bellied sliders.

ATLANTA ZOO.....Alan Sharples

Recent B&H at Atlanta include: Mammals - 0.1 White-handed gibbon, 0.0.1 Mandrill, 0.0.2 Caracal (1st at AZP), 0.1 Grant's zebra, 1.0 Domestic donkey, 1.0 Rothchild's giraffe (1st at AZP, stillborn); Birds - 0.0.2 East African crowned crane; Reptiles - 2 Spotted turtle, 2 Mexican beaded lizard (1st at AZPO, 11 Black rat snake, 15 Corn snake, 12 Black racers, 1 Northern pine snake, 8 Leopard gecko, 1 Eastern diamondback (DNS), 11 Urocoan rattlesnake (1 DNS), and 1 Bog turtle.

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

B&H for June and July 1984 include: Mammals - 1.0 Red kangaroo, 0.0.3 Common marmoset, 0.0.2 Squirrel monkey, 1.0 Mandrill (DNS), 0.1 Greater kudu, 0.0.1 Bongo (DNS), 0.1 Impala; Birds - 0.0.3 Common pintail, 0.0.1 Wood duck, 0.0.2 Laughing gull, 0.0.2 Morning dove, 0.0.1 Barn owl.

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

Selected B&H for April through June 1984 include: Mammals - 3.2 Golden lion tamarin, 0.1 Northern Douc langur, 1.1 Goeldi's monkey, 0.0.3 Ring-tailed lemur, 5.4 Black and white ruffed lemur, 7.6 Red ruffed lemur, 1.1 East African bongo, 0.1 Black lemur, 0.1 Clouded leopard, 2.3 Slender-horned gazelle, 0.0.2/1.2 South African cheetah, 3.4 Arabian oryx, 1.0 Mhorr oazelle, 0.1 Przewalski's wild horse, 1.0 Barasingha deer, 1.0 Indian gaur, 1.1 Addra gazelle, 0.0.1 Queensland koala, 1.5 Scimitar-horned oryx, 1.2 Formosan sika deer; Birds - 0.1.5 California condor, 1.0 Andean condor, 2.2 African pigmy goose, 0.0.2 Congo peafowl, 0.0.5 Chinese monal, 0.0.16 Temminck's tragopan, 0.0.1 Tahiti blue lori, 1.1 Nene goose and 0.0.3 Brown eared pheasant.

Coming Events

AAZK NATIONAL CONFERENCE

Sept. 30-Oct. 4, 1984

Seattle, WA

ANNUAL MEETING OF THE ASSOCIATION OF ZOO VETERINARY TECHNICIANS

October 12-14, 1984

Louisville, KY

Held at the Hyatt House. Registration fee is \$60.00 which includes all lectures, the business luncheon and banquet dinner. Student fee is \$35.00 and includes everything except business luncheon and banquet dinner. All interested persons are encouraged to attend and are eligible for either registration fee. Preconvention activities will be held on Friday, Oct. 11, and includes transportation and admission to the Spendthrift Horse Farm and the Keenland Race Track. The fee for these activities is \$10.00. All checks are to be made payable to Virginia Morton (Louisville Zoological Garden, 1100 Trevilian Way, Louisville, KY 40213. Phone No. (502-459-2181). For a listing of scheduled lectures contact Barb Baumeister, Oklahoma City Zoo, 2101 N.E. 50th St., Oklahoma City, OK 73111. Phone: (405-424-3344).

FIFTH ANNUAL ELEPHANT MANAGEMENT SEMINAR

Nov. 29-Dec. 2, 1984

New Orleans, LA

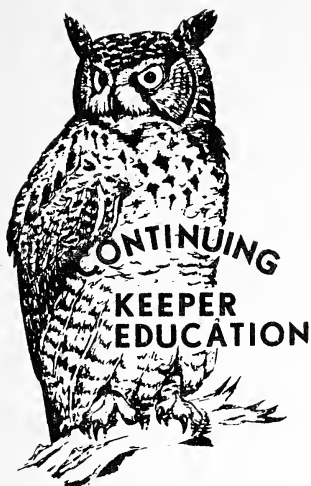
For further iaformation, contact: Carol Sullivan, Audubon Park and Zoological Garden, P.O. Box 4327, New Orleans, LA 70178, (504) 861-2537. See CALL FOR PAPERS on page 270 of this issue of AKF.

THE FOURTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 7-8, 1984

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information contact Thomas Meehan, DVM, Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.



A Look Back At The Accomplishments Of The AAZK Education Committee

By
Judie Steenberg
Coordinator, AAZK Education Committee

As the annual Education Committee meeting draws near, I'd like to recap the goals that were set for 1984, a year ago in Philadelphia.

- To identify and phase in a new Education Committee Coordinator by October 1984.

Accomplished: Pat Sammarco will assume all duties and responsibilities as of September 30th.

- To establish a liaison from the AAZK Education Committee to the AAZPA. This is very near happening and should be accomplished by October.

- To distribute the videotape on ZooKeeper Safety and produce two additional tapes.

Accomplished: This project is right on schedule and the new tapes are expected to be ready for viewing in Seattle.

- To pursue the possibility of having a special session on staff training at the annual AAZPA Conference.

Accomplished: A special session on staff training was held on 12 September at the AAZPA Conference in Miami.

- The Manual Review Project and Reference Search Project are both in the process of additional development, the results of which will be presented in Seattle.

- The Exhibit Design Form is ready for publication and will be presented and distributed to the membership in Seattle with subsequent distribution to zoos.

- The Zoonoses Reference Guide (or Notebook) will be ready for Committee and Board review and approval in Seattle.

- The ZooKeeper Husbandry Fundamentals Project is underway. This will be at least a two-year project.

Work is being done on the Animal Management course, Zoo/University Relationships, Information Brochure and the Staff Exchange by various Committee members.

Following is the schedule for the Committee at the Seattle Conference:

Pre-conference: All project coordinators will submit written reports for Board review.

Sunday Board Meetings: Updates by each coordinator and discussion of each project. Decisions will be made on budgets.

CONTINUING KEEPER EDUCATION, continued

Monday	Committee Meeting	7:00-8:00 p.m. in Hospitality Room
Tuesday	Preview and approval of new Keeper Training Videotapes by the AAZK Board and Education Committee.	
Thursday	Project Reports at the General Membership Meeting	

Throughout the paper sessions at the Conference, Committee members will be stationed at a table displaying materials from the various projects. It is possible there will be another early morning meeting of the full committee on Thursday in addition to the sub-committee meetings of members working on various projects.

As you can see, the Committee will be hard at work all during the Conference. If you are attending the Conference, please plan to attend the workshop and feel free to discuss Keeper Education with committee members. If you can't attend let Pat Sammarco (Lincoln Park Zoo, 2200 N. Canon Dr., Chicago, IL 60614) know if you have a special interest or need regarding Keeper education. This is your Association and the Committee is working on behalf of all Keepers in the on-going effort to improve animal care. Remember our motto, "Dedicated to Professional Animal Care"; this can be accomplished through "Continuing Keeper Education".

In closing, I wish to express my sincere appreciation to all who have served on the Education Committee and to all who have given encouragement and support to our efforts. A special thank you to the Woodland Park Zoological Park Staff for their support of the Committee and all AAZK projects at both the Chapter and National levels. A large debt of gratitude is owed to Rick Steenberg for his patience, understanding and help. Serving as Coordinator of this Committee since its inception in June, 1982 has been a very rewarding experience.



Dear Fellow AAZK Members,

Judie Steenberg has been doing an incredible job of coordinating the Keeper Education Committee. The committee has been active in a number of directions, and within many projects meeting the stated purposes of our association "through projects that will strengthen the zoo keeper's job knowledge," and "to establish materials beneficial to zoo keeper education". Judie's logic and organizational skills have kept this very busy group of keepers working together for the good of us all. We all appreciate her efforts, and will show it by continuing the committee's programs as she takes a break from the leadership responsibilities.

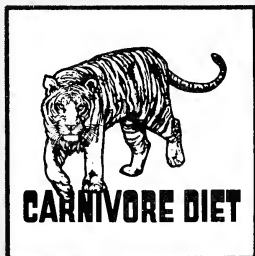
As we go through discussions with the AAZK Board members and the members at the National Conference, some projects will come to completion, some will be further defined, some will grow and others will find birth. The magic of our association is that we are enthusiastic professional Zoo Keepers who realize the need to share the knowledge each of us has gained, to further the quality of care our captive wildlife deserves. Those who coordinate projects know that the rest of us will do our best to contribute ideas and data and inspire more enthusiasm.

I hope that each of you will look carefully at all of the AAZK projects and commit to add information to existing activities as well as suggesting new ways for AAZK to help us all be better keepers. Reports on each project will be published after the conference and you will find questions to answer and to ask. As I assume the coordinating position in the Keeper Education Committee, I will appreciate all your help and will try to insure that the committee continues to help you. Thanks for your support.

Sincerely,
Pat E. Sammarco
Zoo Keeper

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Reptile Care: Relating To The Inquiring Novice - Part 4

HOUSING (Design and Construction)

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

Before purchasing or constructing an enclosure for a reptile, there are important questions the new reptile owner must ask. Will the pet be turtle, lizard or snake? How large will the chosen reptile become by maturity? What is its habitat (land, underground, trees, or water)? Will it have cagemates? Is its enclosure easily cleaned and secure?

Arboreal reptiles require clean, non-resinous, hardwood branches. These should be placed in such a way as to provide the tree-dweller with several basking areas to allow it to regulate its body temperature. To prevent an animal injury or death the branches should be properly secured.

Terrestrial turtles and tortoises require greater space than their semi-aquatic counterparts. During warm weather, the reptile owner may wish to consider outdoor facilities for all chelonians; these can be moveable wire enclosures. Routine moving of wire enclosures provide fresh grazing areas and prevent the accumulation of pathogens. However, outdoor enclosures must be predator-proof as well as escape-proof. Zoo keepers should remind the novice that chelonians can escape by digging under or climbing over wire fencing.

Semi-aquatic snakes should be maintained in the same manner as terrestrial snakes. Semi-aquatic snakes will soak excessively if large water bowls are provided, causing them to develop skin problems. Large water bowls should only be provided during feeding. However, the novice should never deprive the animals, or any reptile, of water.

Semi-aquatic chelonians require water sufficient to bathe and feed, and basking areas of floating bark are essential. Avoid explaining complicated designs and enclosure contents. Simplistic enclosures provide ease of cleaning, and prevent the accumulation of pathogens from excreta and uneaten food. Unless filters are employed, the use of gravel or other substrates should be avoided. While aquariums provide excellent enclosures for small species of semi-aquatic chelonians, cattle stock tanks are more suitable for large specimens. Only overhead lighting should be used as heating devices since they simulate the "natural" heating of the water environment. Since water provides a means of cooling for basking chelonians, reptile enthusiasts should avoid the use of underwater heating devices.

Open bottom caging (Fig. 1) for giant boids prevents excessive humidity since these animals excrete large quantities of fluid. Built-in shelves for basking offer safe alternatives to tree limbs. Furthermore, the larger the boid, the less likely it is willing to sit on a tree limb. These animals require sturdy and comfortable support features for basking.

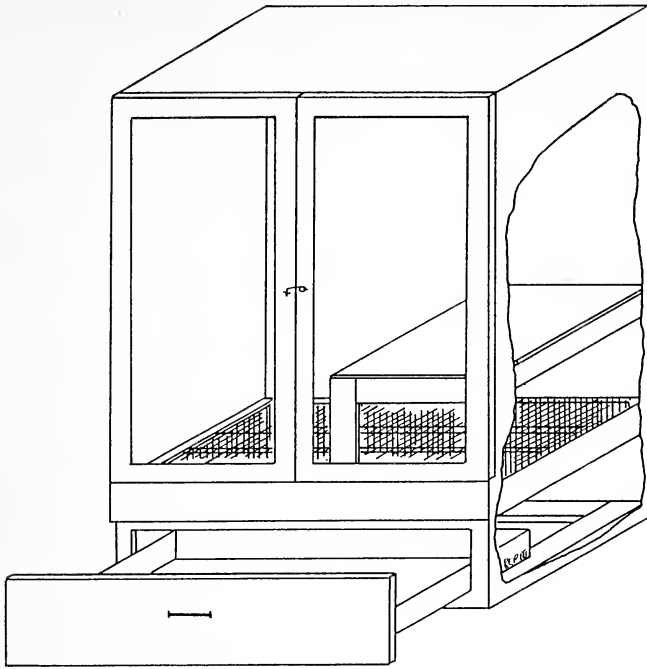


Fig. 1 - Open-bottom cages are preferable for giant boids. Wire flooring prevents the accumulation of moisture. A collecting tray can be built-in or placed under the cage. Newspaper placed over the wire flooring may serve as the substrate, or additional material (non-aromatic mulch or gravel) can be placed on top of the newspaper; newspaper will prevent most of the substrate material from falling through the wire mesh flooring. (Illustration by Rick Perry).



Great Ape Loan In Atlanta

The Atlanta Zoological Society and the Yerkes Primate Center signed an agreement on 11 July, 1984 for the interim support of gorillas and orangutans destined for exhibition at the Atlanta Zoo in 1986/87. A portion of the cost of feeding and maintaining these animals at Yerkes will be assumed by the AZS. When a naturalistic facility of sufficient size and complexity is built, these animals will be placed on breeding loan to the zoo.

The zoo hopes to exhibit at least two families of gorillas (1.3 to 1.4 size plus assorted offspring), a third pair or trio and our present solitary gorilla Willie B. The plan permits flexibility in management including the potential for resocializing Willie.

The orangutan plan is equally dramatic, calling for separate male areas and female-only access routes to all males. The total number of orangs exhibited would likely be 3.5 plus assorted offspring (10-12 animals total). Pairs of gibbons would be satellite exhibits completing the Asian Rain Forest effect.

When the design phase is entered, the keepers will play an important role in planning the exhibits.



Viewpoint

COUNTERVIEWPOINT - Education and Exotic Animal Keepers

By
Karen Salesmen-Basmagy
Animal Caretaker
Greenport L.I., NY

A Question of Priorities, an article which appeared in the August 1984 issue of Animal Keepers' Forum has upset me greatly.

I am an Animal Caretaker, very interested in obtaining work in a zoological park. Though my practical experience has been with domestic animals, I feel I would do a darn good job as a keeper. Even though I am not, as Mr. Monroe would put it "a professional" in the field of exotic animal management, my dedication and concern for today's wildlife is something which I believe overrides my lack of a degree in the field.

I think I speak for many people struggling to involve themselves in wild animal conservation who, for various reasons (most because of lack of availability of wild animal management degree programs), have not obtained a degree as "a professional" in the field. Many PhD's, biologists and the like aren't half as dedicated as those who fight for employment on sheer sincerity.

Alot of zoos, I am sure, have employees there that are much less concerned than others. But I feel the majority of people working with exotic animals are there because they have a genuine love and concern for wild animals. So why can't a non-grad work as a keeper so long as he shows a commitment to the field and an eagerness to learn "on the job"?

Sure, today's zoos need professional biologists, veterinarians and nutritionists, but why shut out inexperienced personnel because they don't have a piece of paper declaring their book knowledge?

If the majority of employees working as keepers are there working towards a common objective - then half the battle is over. Instead of complaining about "un-professionals", why not work towards having every zoo employees having the same dedication and commitment that we, as non-grads, strive twice as hard to achieve?



CALL FOR PAPERS --- 5th Annual Elephant Workshop

Members are invited to submit abstracts and papers for consideration for presentation at the Fifth Annual Elephant Workshop to be held in New Orleans, LA, 29 November to 2 December, 1984. Presentations to be 30 minutes, abstracts to be submitted by 25 October, 1984; final manuscript prior to 25 November, 1984. Please submit to: David E. Anderson, Audubon Park and Zoological Garden, P.O. Box 4327, New Orleans, LA 70178 (504) 861-2537.



ZOORIFIC EXPERIENCE

By
Merrilee Truett
Volunteer
Lafayette Zoological Park
Norfolk, VA

There has never been a time when I wasn't simply infatuated with animals. When I was little, I ran around on "all fours" pretending to be a dog, horse or Rudolph the Red-Nosed Reindeer. As I grew, I focused my attention on collecting model horses (instead of baby dolls) and reading every book I could get my grubby little hands on. With my career goal set on being a veterinary surgeon, I readily accepted volunteer experience at the local Zoo. I fully expected to do nothing more than clean and sometimes feed, nonetheless I was in the presence of hundreds of animals! Little did I know that as I proved myself dedicated and trustworthy, I gained enough freedom from the keepers to make "poop scooping" the most self-expanding experience of my life.

The amount of knowledge and handling experience I received vastly contradicted my original expectations. I was allowed rapport with the animals. Such a handling experience was the one I shared with Jill. On my very first day, while being introduced to the barn animals, I noticed the black Sicilian donkey that David called Jill, run out of the door every time one neared her stall. As the days progressed, I was able to groom her stablemate, the loveable Jack, but poor Jill always remained aloof. I started talking softly to her and tossing tidbits of apple to her. The process was time consuming, but I gradually found her trust. After several weeks she would come within a foot of eating an apple out of my hand. Even later, I succeeded in hand-feeding her. Gradually I began to pet her and touch her halter. She began to nibble at my shirt the way Jack did. The affection-starved creature eventually brayed a welcome every morning when I walked into the barn. This valuable experience taught me that laughter isn't the best medicine, patience is.

Working at the Zoo also gave my "animal sense" a chance to blossom. That is, I gained valuable insight into the psychological characteristics of man as well as beast. Obviously my "cutsie", "Bambi-syndrome" attitude was abolished and I became less tolerant of those who are unaware of the damage a sweet little monkey can do. I have picked countless plastic bags, paper boxes, cigarette butts, and even aspirin out of the goat yard although the sign explicitly say "Please do not feed". People like to pretend Zookeepers do not exist, and that animals do not defecate by snobbily turning their heads at a smelly, but knowledgeable keeper. Some idiots go as far as to try to climb into enclosures containing bears, rhinoceros and the like. I am infuriated when I find rocks that have been thrown at poor Leona the lion to make her roar. Observations such as these have led me to conclude that I prefer the animals inside the cages!

Finally, my work at the Zoo has brought me closer to life and death situations. The episode most clear in my memory concerns shipment of doomed wallabies. After almost finishing the required 30-day quarantine period, we lost a new wallaby to pneumonia. The hairless joey in her pouch was placed in a incubator to hand raise. Two days later, two more of the remaining three wallabies, one with another joey, were found dead in the yard, their faces bloodied. Closer inspection revealed that the wallabies had been frightened by local feral dogs, and had banged themselves into the fences until their muzzles were crushed and they drowned from fluid

ZOORIFIC EXPERIENCE, Continued

filling their lungs. The final wallaby escaped death but severely damaged her jaw. The staff was outraged at losing four thousand dollars worth of animals because of neglectful citizens. Authorization to shoot the dogs was given, and a hunt organized. Although the keepers felt relief at not finding any dogs to kill that night, the anger was still present. I witnessed the last of the joeys die in a tear-eyed keeper's hands. As it did, she declared "Damn those dogs." My thought were "Damn their owners!" Through all the pain of death, a little light must shine. Later that afternoon, a baby Aoudad (Barbary sheep) was born. As I witnessed the mother licking the wobbly thing dry, an intense feeling of exhilaration filled me as I thought of a new life replacing that of the ones that died. I went home and had peaceful, instead of vengeful, dreams that night.

The Zoo has been a major part of my life for three years now. I have grown as a person from working there. The keepers and the animals are very dear to me. The handling experience, the insight I have gained, and the massive emotional experiences are unequalled. There is so much more to the Zoo than cannot be expressed, that no one but I could understand the state of euphoria I was in when Ed, the supervisor, declared he no longer considered me a volunteer.



Keeper's Alert

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 Chaoter AAZK
#1 Jonesboro Drive
Little Rock, AR 72204*

MAMMAL COLLECTION CENTER

*Terrie Correl
Sedgwick County Zoo
5555 Zoo Blvd.
Wichita, KS 67212*

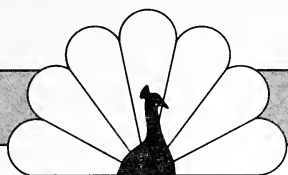
REPTILE COLLECTION CENTER

*Brit 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*





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San Diego Zoo Was Birthplace Of American Association Of Zoo Keepers

By
Melissa Janssen, Former Editor
Zoo View
San Diego Zoo/ Wild Animal Park
San Diego, CA

Everyone knows that AAZK stands for the American Association of Zoo Keepers and that the San Diego Chapter has monthly meetings with interesting discussion, informative films and GREAT food. But, few people know that this national organization began right here at the San Diego Zoo.

The Association, founded by seven San Diego Zoo zoo keepers, was organized "...to promote and establish a means to stimulate incentive and create greater interest in the zoo keeper profession, and to exchange ideas and ideals beneficial to the field of animal care." Four of the founding members are still at the Zoo--Dick Sweeney, Animal Care Manager/Mammals; Red Thomas, Senior Elephant Trainer; Dennis Melvin, Senior Keeper; and Ken Willingham, Animal Care Manager/Mammals. (Conrad Grayson is now a deputy sheriff; and two of the former keepers, Carl Pyle and Walt Bromley, have passed away.)

On December 5, 1967, the first chapter of the AAZK, the San Diego Chapter, was chartered with 29 participating keepers. The founding members began promoting their fledgling organization through the mail. At first, people joined as affiliate members of the San Diego Chapter, but then Cincinnati Zoo and the Central Park (N.Y.) Zoo founded chapters of their own. By the fall of 1968, the organization had grown to include 44 zoos in 25 states.

At that time, Dick Sweeney, the first President, presented the organization to the AAZPA (American Association of Zoological Parks and Aquariums) meeting in Los Angeles. In his address to the members, he asked that they endorse the organization and pointed out that "...we keepers have a sincere desire to contribute our best to make our zoos successful."

There are now over 30 active chapters in North America (two in Canada) with a membership of approximately 1700 all over the world. (An AAZK committee for international affairs keeps in touch with sister organizations overseas.)

Not all members are professional zoo keepers. People associated with a zoo or an aquarium may join as affiliate members and interested individuals may participate as associate members.

AAZK's purpose is to foster communication among professional zoo keepers and to provide them with educational information. Animal Keepers' Forum, a monthly publication, is the national association's major means of meeting these goals. Contributions range from book reviews, to scientific articles; from articles on animal-related legislation to animal/human interest stories. Committees and projects headed by members report their progress in the pages of the Animal Keepers' Forum.

The association has produced video films on keeper safety. Research grants made to keepers by the association have resulted in books, articles and studies on subjects such as animal nutrition and reptile parasites.

San Diego Zoo Was Birthplace of AAZK, Continued

On the local level, the San Diego Chapter is still carrying on the fine work begun here nearly 20 years ago.

Every month, in keeping with the association's stated purpose of providing 'materials beneficial to zoo keeper education', the chapter arranges for a guest speaker and a film or slide presentation on a subject of interest to the membership. According to current President Connie Carson, Senior Keeper, the meetings are attended by about 60-70 people, but keeper attendance is sometimes disappointing.

The chapter is self-supporting. It uses the proceeds from keeper T-shirt sales and raffles to pay for general expenses and to fund the cash prizes for the annual photo contest. Often, the proceeds from a particular meeting will be donated to a worthy organization. The topic of the March meeting was the Muriqui (or wooly spider monkey). Members held a raffle, sold Muriqui T-shirts and posters and donated the money to the "Save the Muriqui Foundation".

In the future, Carson hopes for stronger participation in Animal Keepers' Forum, development of keeper training films and development of a newsletter for the San Diego Chapter. Plans are also being made to expand the speaker series and to sponsor more educational programs.

AAZK memberships--and meetings--are open to everyone who is interested in learning a little bit more about animals, particularly the professional zoo keeper who is charged with their care.

(Editor's note: This article originally appeared in the April 1984 issue of ZooView, the employee newsletter of the San Diego Zoo/Wild Animal Park. It is reprinted here with the permission of the author and the current editor Peggy Blessing.)



Information Please

Salmonier Nature Park is planning to display several Labrador species. We are requesting any husbandry or diet information on the following or similar species: Little brown bat, star-nosed moles, ungava lemmings, northern bog lemmings and water shrews. Please send any information to: Kevin Moore, Salmonier Nature Park, P.O. Box 190, Holyrood, Newfoundland AOA 2R0.

Information is needed on Arotocephalus australis (South American fur seal) regarding diets fed, supplements, molt patterns, seasonal weight fluctuations, fur problems, nutritional and/or housing problems. Please send any of the above information, or referrals to people and/or literature to:

Sita & Uwe Horn
c/o Holiday Park
6733 HaBloch
Pfalz, West Germany
Europe

or

Sita & Uwe Horn
c/o Diana Guenero
P.O. Box 154
Laytonville, CA
95454



AAZK Committee Reports

COMPLETING A THOUGHT

By

*Diane C.M. Forsyth
Project Head-Exhibit Design Form
Akron Children's Zoo, Akron, OH*

If you look for information on, for example, black bears, you can find volumes dealing with their wild habitat, behavioral patterns, nutritional requirements, blood values, and reproductive information. If you turn to ISIS, you can find out how many zoos have how many bears, each bears' lineage and so on. The volumes of information are blank, or at best scattered when you research turns to enclosure specifics for your animals; strength and type of wire, substrate materials, drains, ponds, furniture, plantings, etc. To gather information of this sort takes hours of gleaning small paragraphs here and there from the written information and countless phone calls and visits to zoos across the country to view, review, question and then revamp their enclosures to your landscape, terrain, and price range. Not to be found is a handbook on "Building an enclosure for your Black Bear" with a variety of sizes, shapes and price ranges from which to choose. Creating a workable and useful exhibit that will serve the animal, the keeper and the public is an extensive research proposition. Few zoos have the time or funds for such an extensive endeavor.

Exhibit planning is obviously not a perfect science. Mistakes can easily be made in all aspects of exhibit designing. Too often the ideal exhibit for the animal creates an unviewable situation for the visitors. Frequently the beautiful exhibit plantings are destroyed by the animals, or closer to home, the keeper finds that the journey to the drain is all uphill!

This lack of available information coupled with the prevalence of avoidable mistakes during designing led to my decision to create the Exhibit Design Form for use by all AAZK members. I don't for a minute profess to know everything that should be done to make the ideal exhibit. I do claim a curious mind, four years of keeper experience, and a passion for learning. My primary goal and the goal of those who have helped me "think through" this project is to offer a useful exhibit design tool to be used in conjunction with architectural planning, overall zoo design and staff brainstorming. The success of this goal is based on the knowledge and experience available to the members of AAZK through our own membership. Zookeepers carry around with them a lot of the information needed for exhibit designing. We are the ones who know that our tamarins are shy, that the screech owls need a cavity to nest in, that the rheas will destroy the three-foot area of grass in no time, that the scarlet macaw will eliminate that wooden cage and on, and on. We're also the ones who have to make the water flow uphill to the drain, who bang our heads on too-short entry doors, who create hiding places for our tools because the architect didn't leave room for storage, etc. How often have we conferred with each other, cross-country, for breeding information, training hints, medication suggestions, all questions difficult to impossible to find answers for in publications but frequently obtainable to a persistent keeper.

Completion of each Exhibit Design Form will utilize most departments within the zoo. The bulk of the information can be gathered by the exhibit keeper. Maintenance personnel will be helpful when diagraming the exhibit,

COMPLETING A THOUGHT, *Continued*

directors and curators will be needed to supply cost analysis. Two sides of every problem are sought in each category; the advantages and the disadvantages. The reasoning behind each phase of the form is extensive, but one thing stands out as a positive result of the form completion - cooperation is a necessity. Cooperation underlines all aspects of the form; the request from one zoo to another, the staff answering the questions, the staff that receives and reviews the questions, the director that uses the form in conjunction with other exhibit design sources.

Because of the knowledge available to us to organize and publish, this form exists and will be available to members as early as the 1984 National conference. Those requesting forms for use or interested in further information are urged to write: *Diane C.M. Forsyth, Akron Zoological Park, 500 Edgewood Ave., Akron, OH 44307.*

A special and heartfelt thanks to Judie Steenberg, Beth Poff, Jay Jason and the AAZK Board who helped an idea take "form" and take off!

(The following is a condensed version of the Exhibit Design Form. Spaces normally provided for answering questions are omitted due to space limitations in AKF.)

EXHIBIT DESIGN:

Specifics: Enclosure, Species, Keeper

Scientific Name:

Common Name:

Contributor:

Institution:

Designer/Architect:

Year of exhibit construction:

Total cost of exhibit:

Local weather conditions: (C)

Mean:

Extremes:

Director's signature:

I. ENCLOSURE SPECIFICS:

A. Description of exhibit including: Terrain previous to building, dimensions, area, substrate materials, barriers (glass walls, moats, fencing, Tec.), roofing, lighting, humidity and/or heat controls, and any features within enclosure (trees, specific plantings used, apparatuses, etc.) A labeled drawing should be included. Attach sheets if necessary.

1. List the advantages of the enclosure in respect to keeping techniques, public education and viewing, animal needs (psychological/behavioral needs, flight distance, stress factors, recurring problems, etc.)
2. List the disadvantages of the enclosure (include specifics listed above).

B. Shift and/or off-exhibit areas: Dimensions, substrate material, barriers (see A), roofing, features within area, keeper areas, etc. Labeled drawings should be included. Attach sheets if necessary.

1. List any advantages to this area taking into consideration animal's needs (solitude, separation, reproductive needs, etc.), and keeper considerations.

COMPLETING A THOUGHT (Exhibit Design Form), *Continued*

2. List disadvantages of the shift area considering all factors as above.
3. Describe in detail the method used for shifting (including difficulties encountered, positive/negative reinforcers used, etc.)
4. Describe in detail any part of the off-exhibit area specifically designed for unique purposes: Built-in squeeze cages, special maternity dens, etc.

C. Enclosure Inhabitants:

1. List the total number of inhabitants within the exhibit including a ratio of males/females; adults/subadult/infant.
2. Mixed exhibits: List the total number of inhabitants: co-inhabitants and ratio of male/female; adult/subadult/infant/species/species.
 - a. Discuss the benefits of this mixed exhibit. Include: Public reactions, educational aspects, etc.
 - b. Discuss the problems encountered within a mixed exhibit. Include: feeding difficulties, aggression, reproductive problems, etc.

II. SPECIES SPECIFICS:

- A. Handling and/or moving of species: List reasons for so doing, problems, encountered and solutions to these problems.
- B. Common or recurring medical problems: List reasons for these problems, possible solutions, treatments, etc.
- C. Routine medical treatments: Annual vaccinations, procedures for eliminating and/or controlling parasites, etc.
- D. Diet (per animal): Include favorite foods, problem items, vitamin/mineral supplements, etc.

III. KEEPER SPECIFICS:

- A. Suggestions for keeper and animal safety when working with this species. Include: Special techniques, flight distance, daily routine, etc.
- B. Specific husbandry tools used and address for their acquisition.
- C. What degrees of maintenance effort is required for the upkeep of this exhibit (i.e. daily, weekly, monthly, annually, etc.)?
- D. Suggested reference material for further research on this species.

Publications Available



Bear Essentials is an American Source Book and Guide to Planning Bear Education Programs. An ideal guide for teachers, interpreters, outdoor group leaders, wardens, conservation officers, or anyone who may be giving talks on bears. In a simple step-by-step process, the guide can help you plan, present, and evaluate your talk on bears. Bear topics covered in the guide include safety, history, biology and ecology, as well as many suggestions on program presentation and information sources. Bear Essentials can be ordered from the Great Bear Foundation, P.O. Box 2699, Missoula, MT 59806. The cost is \$6.00.



The logo for this year's Conference, a male Lion-Tailed Macaque, was drawn by Judy Sievert. Judy is currently part of Woodland Park's Primate Crew, working the Gorilla unit and the Primate house. She started as a volunteer, was hired full time in 1979, and has since worked several areas around the zoo. Prior to becoming involved with the zoo, she studied art at the Cornish Institute in Seattle. Her skills as an artist are very evident and we thank her for all the time she has spent preparing this excellent drawings for the conference

1984 AAZK BOARD OF DIRECTOR MEETING:

Proposed Agenda

Sunday, September 30

MORNING 8:00 a.m.

Keeper Education Committee
Zookeeper Fundamentals
Exhibit Design Form
Reference Search
Staff Exchange
Public Education
Library Resources
Program Library
Zoonoses Notebook
Diet Notebook
Infant Development Notebook
Biological Values Book
Membership Directory
Book Reviews
Animal Keepers Forum (Membership
and Career Brochures)

AFTERNOON 1 p.m.

AAZK History
Awards Committee
Research Grants Committee
Keeper Data Committee
Professional Standards Committee
Legislative Information Committee
Regional Coordinator System
Chapter Affairs
International Affairs
National Headquarters
Keeper Care Buttons
Logo T-Shirts
Logo Decals
AKF Anniversary T-Shirts
Keeper Accomodations List (KAL)
Animal Data Transfer Forms (ADT)
Conferences
Proposals

There will be a limit of 40 minutes discussion per topic.

CONFERENCE UPDATE

Weather

Weather in the Pacific Northwest is often unpredictable. Early fall is often cool, sunny days (50'-60's). We will be outside for several days and evenings during the Conference, so a light, warm jacket and possibly a raincoat and hat would be good items to bring. You might also find a small daypack handy.

Hotel

It isn't too late to register to stay at the hotel. The accommodations are excellent and we feel you'll find the Conference much more enjoyable if you join the other delegates at this central location.

Although the hotel does require evening attire in the top floor restaurant and entertainment lounge, it is casually elegant. Jeans are quite acceptable for all other areas of the hotel. Also, if you do wish to be matched with a roommate, be sure and make that clear when calling in your registration.

OUT OF STATE.....800 426-1172
IN STATE.....800 851-8010
LOCAL.....206 583-0300

Transportation

Members arriving at Sea-Tac Airport are reminded to either take the Airporter bus directly to the Madison or to call or write ahead and let the Committee know when you will arrive so that you can be picked up at the airport. Members are discouraged from taking a taxi to the hotel as the fare is around \$25.00.

Auction

Don't forget to bring your auction item. The greater variety of items to bid on, the more fun for everyone involved. And keep in mind...this is where we show our support for National AAZK by generating money for the treasury. (Most other monies just cover the actual cost of putting on the Conference).

A successful auction means a healthy treasury, with benefits for all members.

Day Fees

Sunday.....\$10.00 includes ice-breaker
Monday.....\$10.00 includes evening tour of Seattle Aquarium
Tuesday....\$ 5.00 includes lunch, dinner & buses to & from WPZ
Wednesday...\$15.00 includes buses all day, lunch & dinner
Thursday....\$15.00 includes lunch at Hotel; does not cover evening
Thurs. eve..\$25.00 covers banquet & evening at Space Needle

DON'T FORGET THAT ATTENDING AN AAZK CONFERENCE IS TAX DEDUCTABLE!!!!
SO SAVE THOSE RECEIPTS.....



HOTEL · SEATTLE

515 Madison
Seattle, WA 98111

800-426-1172 Out of State

800-851-8010 In State

(206) 583-0300 Local

Our conference headquarters is the Madison Hotel, a quality hotel within Seattle's business and financial district. Shopping, entertainment and many of Seattle's scenic and historic attractions are within a easy walk.

Each of the Madison's 575 guest rooms has its own seating area with sofa and chairs, from which you can enjoy a sweeping view of Puget Sound and the Cascade and Olympic Mountains.

Special room rates for the conference delegates are: \$55.00 single
\$60.00 double

Use the toll free number (800 number) to make your reservations, and identify yourself as being with the American Association of Zookeepers.

If you wish to be matched with a roommate, let the hotel know when you call, and they will attempt to do so.

We feel the Madison offers a unique mixture of "new hotel", while retaining a sense of warmth in its smaller size. With the busy schedule we have planned, it would be advantageous to stay with us at the hotel. It is one of Seattle's finest hotels and we think you will enjoy it, especially at our reduced conference rates.

NOTE: The hotel also has a swimming pool and health club so you will want to bring your swimsuit! There is nightly entertainment at Visions, a video disco. Their rooftop restaurant, Pregos, serves a fine Italian cuisine. Be sure to bring evening attire for these.

Transportation from Sea-Tac Airport to the Madison is easy! Just take the Airporter bus directly from the airport to the hotel. The Madison is the first stop! It leaves every half hour from United Airlines Baggage Terminal, and the ride takes 20 minutes--Cost \$4.75.

Tentative Schedule

SUNDAY

Board Meeting
Registration
Ice Breaker

MONDAY

Opening presentations
Morning paper session
Lunch on your own
Evening tour of Seattle
Aquarium

TUESDAY

Bus to Woodland Park Zoo
Morning-tours
Lunch provided by WPZ docents
Afternoon-workshops, tours
Dinner provided by Seattle
Zoological Society

WEDNESDAY

Bus to Pt. Defiance Zoo, Tacoma
Morning-tours
Lunch provided by Pt. Defiance
Early afternoon--demonstrations
Bus to Northwest Trek, Eatonville
Tram tours, walking tours
Dinner provided by Northwest Trek

THURSDAY

Morning paper session
Lunch provided at hotel--awards given
Afternoon-AAZK general membership
meeting
Banquet at Seattle's famous
Space Needle

SCHEDULE FOR TOURS, WORKSHOPS & DISCUSSIONS

Woodland Park Zoo.....October 2nd

During the morning: Brief introduction and orientation to WPZ
Self-guided tour of zoo through lunchtime. Docent-tours until lunch.

Demonstration of giraffe squeeze cage.

Demonstration of mountain goat chute/restraint system

Workshop on plants in small tropical exhibits.

Lunch: 11:30 to 1:00

In the Afternoon: Specialized discussions about: 1) Night Keeping and zoo security; 2) The gorilla collection of WPZ; 3) Small felines in captivity - Results of a national questionnaire; 4) Animals in education - Running your own business.

Main afternoon workshops: 1) AAZK Education Committee projects; 2) Research in zoos.
Volleyball.

[Some of the above workshops will run concurrently
Sponsored by Seattle Zoological Society.

Dinner:

Point Defiance Zoo and Aquarium, Tacoma.....October 3rd

During the morning: 45 minute bus ride to zoo. Brief orientation on bus.
Tours of zoo most of the morning.

Lunch: 11:30

In the afternoon: Handling demonstrations and feeding programs for: elephants, llamas, raptors, Beluga whales, dolphin and seals. [These will also be given in the late morning.]

Northwest Trek (North American Wildlife), Eatonville.....October 3rd

Powered tram tours of part of the nearly 600 acres of exhibits. Tour and video tape presentations on large mammal handling systems. Walking tours of smaller exhibits.

Dinner: 6:00

...[See August AKF, pg. 244, for a list of schedules papers.].....



Watch for Conference Committee members Debbie Stecher and Phil Pennock on ABC's early morning program "Good Morning America", Monday, October 1st with "hellos" from the National AAZK Conference in Seattle!

Wildlife Research....

RESULTS OF A POST-RELEASE TELEMETRY STUDY INVOLVING BARN OWL (Tyto alba pratincola) IN NORTHERN ILLINOIS 1983

By
Joan M. Daniels
Senior Keeper/Bird Program Supervisor
Brookfield Zoo's Children's Zoo
Chicago Zoological Society

The following paper reports the results of a study conducted by the author in cooperation with the DuPage County Forest Preserve District, Willowbrook Wildlife Haven, and Dr. Daniel Ludwig PhD.)

The purpose of this release was primarily to observe the behavior of two radio-tagged juvenile barn owls (Tyto alba pratincola) before and after release. During the pre-release training, handling and post-release periods the methods being used were evaluated for future reference.

There are a number of theories as to why the barn owl population has declined in the midwest (Peterson 1979, Steeg 1981, Colvin 1981). Many of these theories have been debated but one fact still remains true, there are definite underlying problems, such as secondary rodenticide poisoning, that need to be considered and studied so that the problems affecting the population can be corrected.

Lack of nesting sites and suitable hunting territories are thought to be two of the major factors contributing to the decline of barn owls. (Colvin, 1981). Illinois has enough rural and protected areas available to support at least small isolated populations of barn owls where now none are present. An extensive nest box program was developed in Illinois to provide suitable places for owls to raise their young, but this has not improved the situation in that state. The lack of suitable hunting territory is not a valid reason for a decline in the barn owl population because other owl and raptor species are unaffected by prey availability. Recently, a pellet study done on long-eared owls (Asio otus) in northern Illinois very close to the release site) showed that these birds, which are similar to the barn owl in prey habits, are fairing well on the prey available in the area. (Darmofal, 1983). Illinois has never had a large barn owl population in comparison to the great-horned owl (Bubo virginianus) and others, but small numbers should not make this valuable species any less important when considering the possibility of a re-introduction effort in their behalf.

There is some question about linking a decline in the barn owl population with the barn owl's tendency to migrate southward or with the increasingly severe winters. Banding reports and analysis (Stewart, 1959 and 1980) have shown that northern range species very seldom show a southern migration. The barn owl is not truly a migratory species; however, there is some northward movement in spring and southward movement in autumn. Adult barn owls are very site loyal and seldom leave the nest area. If they do, there is a high chance of spring returns to preferred nesting sites. Therefore, the decline of the barn owls in Illinois is most likely not due to a natural trend of the birds to move southward. Surrounding midwestern states are having success re-establishing dwindling populations of owls, and the birds are remaining in suitable habitat. (Colvin 1981, Denne 1979, Peterson, 1980).

RESULTS OF A POST-RELEASE TELEMETRY STUDY INVOLVING BARN OWLS IN
NORTHERN ILLINOIS, 1983, Continued

Periods of extreme cold and snow cover adversely affect barn owl population throughout the U.S. The barn owl has low fat reserves and can survive only 4 to 7 days without food. Heavy rains following spring hatchings can also affect the population of juvenile birds, especially in areas where the adults choose nesting sites that are not sheltered. Severe population declines occur following winters with large amounts of snowfall, but populations usually recover within the next breeding season. (Bunn, 1982). The decline in Illinois birds has never recovered and is not just a trend resulting from bad weather.

The final, but least understood theory on population decline is related to the effects of pesticides and rodenticides on the barn owl. Because the barn owl preys mainly on mammalian species, it is generally accepted that they are not affected by pesticides which readily accumulate in avian prey. However, the effects of rodenticides in the secondary poisoning of the barn owl (1953-1963) was listed as the number one factor contributing to the decline of the barn owl in Europe. (Bunn, 1982). The use of these compounds has increased over the past decade here in the U.S., especially in the mid-western states. A study done on the effects of six anti-coagulant rodenticides on the barn owl showed these compounds in moderate levels cause major hemorrhages of subcutaneous tissues and the ultimate death of the bird. (Mendengall and Pank, 1980). Some studies have concluded that the use of primary generation rodenticides do not contribute to the decline in natural populations studied. (Kaukeinen 1982, Clark 1978). However, second generation anticoagulants (considered more lethal), brodifacoum in particular, are still under investigation. Small levels of rodenticides may be causing the barn owl problems such as weak egg shells, infertility, and lowered hunting ability. The neurological effects of the toxins could also make the birds more likely to have collisions with cars and electrical wires. The barn owl could be exposed to these low levels of rodenticides by ingesting rodents that are carrying toxic residues in their tissues from sub-lethal dosages of the poison. It has been found that there is a larger range of rodenticide sensitivity among animals. (McKelvie and Anderson, 1981). It is therefore possible that the barn owl, because it is a species with lower fat reserves, is more susceptible to low levels of rodenticides. This would then explain the strong populations of other raptors that share the same prey as the barn owl as compared to their dwindling populations.

Whatever the cause of the decline, measures should be taken to insure the survival of this rare raptor in the midwest. The following study provided an opportunity to develop a number of options for improving re-introduction efforts. These options are discussed at the end of the paper.

MATERIALS AND METHODS

The 1.1 young were hatched on 18 and 19 July 1982 by a pair of captive barn owls at Brookfield Zoo's Children's Zoo. The owlets were raised by the parents without human interference. Cage cleaning and feeding was done with minimal disturbance. Generally, the diet consisted of killed domestic mice (*Mus musculus*), leghorn chicks and ZuPreem Bird of Prey diet. As the owlets developed, live food was introduced so that the parents could demonstrate "hunting" techniques.

The owlets were removed from the parents' cage at three months of age, 22 October 1982. The birds were then color banded, weighed, measured and examined for physical abnormalities. Both birds were in excellent condition and were determined to be male and female due to differences in coloring, wingspan, and body weight.

RESULTS OF A POST-RELEASE TELEMETRY STUDY INVOLVING BARN OWLS IN
NORTHERN ILLINOIS, 1983, *Continued*

Release of the birds was anticipated after a period of live food training, but the release was delayed until the proper permits could be obtained from the Illinois Endangered Species Board. The optimal time to release owlets is considered to be 8-10 weeks. (Bunn 1982, Hancock 1981). Under normal conditions young fledgling owls begin a progressive dispersal from the nest site at 66 days of age, reaching peak dispersal at eight months of age. (Stewart, 1952).

The birds were released into a small barn loft (60ft. long X 20ft. wide) with a floor covered by dried leaves and straw and a few logs placed on the floor. The owlets were fed a diet of dead and live animals according to methods outlined by McKeever (1979). They were offered cottontail rabbit (*Sylvilagus floridanus*), white-footed mouse (*Peromyscus leucopus*), domestic rat (*Rattus norvegicus*) and meadow vole (*Microtus pennsylvanicus*) in addition to laboratory mice and chicks in order to introduce some of the wild prey they would be encountering after the release.

The owlets were observed frequently and weighed every week to assure that they were hunting and maintaining their weights. They were maintained in the loft until transferred to the release site.

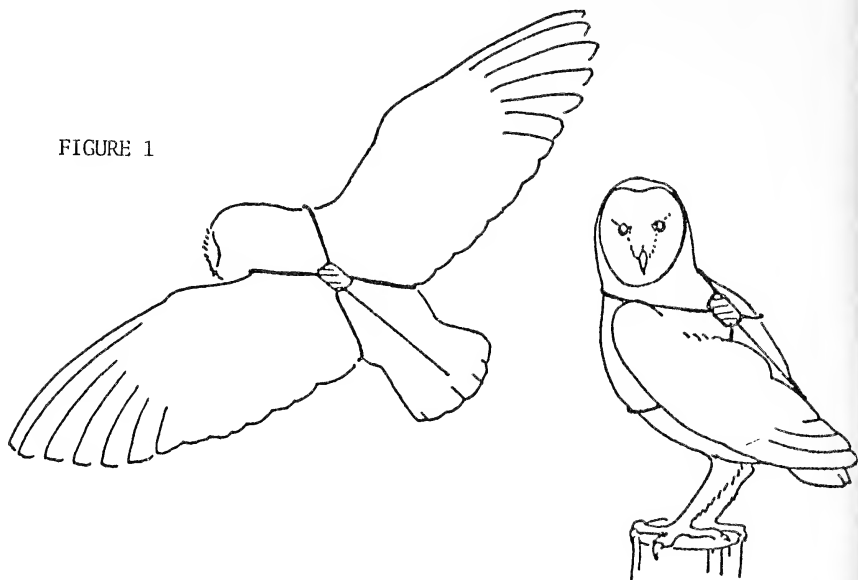
The birds were removed from the loft on 1 March 1982, banded with USF&W lock-on leg bands, weighed and measured. The 1.1 birds weighed 561 and 669 grams respectively. The color bands were removed and telemetry transmitter backpacks were attached. The birds' reaction to the backpacks and the operation of the transmitter was observed for 8 days prior to transferring the birds to the release site. During this observation period, the backpacks did not seem to bother or hinder the birds in any way. They ate normally, passed pellets, and spent a great deal of time exploring the barn loft. The transmitters produced strong regular signals.

The transmitter harness (Fig. 1 and 2) consisted of teflon coated antenna wire fastened around the birds in a backpack fashion with the transmitter in the middle of the bird's back. The teflon coated wire prevented the bird from chewing through the harness and eliminated hard edges that would cut the bird. The wire was tied in square knots and sealed in heat shrink tubing so that the knots would not untie. The transmitter and battery were sealed in dental acrylic. The acrylic package had two small holes for the antenna wire. The antenna was trimmed to a length slightly longer than the retrices. The backpack system was used instead of the traditional tail mount because of the small size of the retrices.¹

The release site was a large abandoned barn adjacent to Pratt-Wayne Forest Preserve in northwest DuPage County, IL. This area consists mostly of tall meadow grass fields, marsh and wet prairie and a small lake and streams. The area was selected because of the variety of habitats and the abandoned barn. There were a number of barn owl nest boxes in the area, and the prey population was considered adequate. The prey in the area included: meadow

¹Telemetry equipment: AVM Instrument Co., Dublin, CA, Portable Telemetry receiver, hand-held Yangi antenna and car mount whip antenna. AMI transmitter: Frequency - 150.000-150.714MHz, Pulse rate - 80bpm. Mercury battery - Life span - 4 months. Total weight - 5 grams.

FIGURE 1



TELEMETRY HARNESS

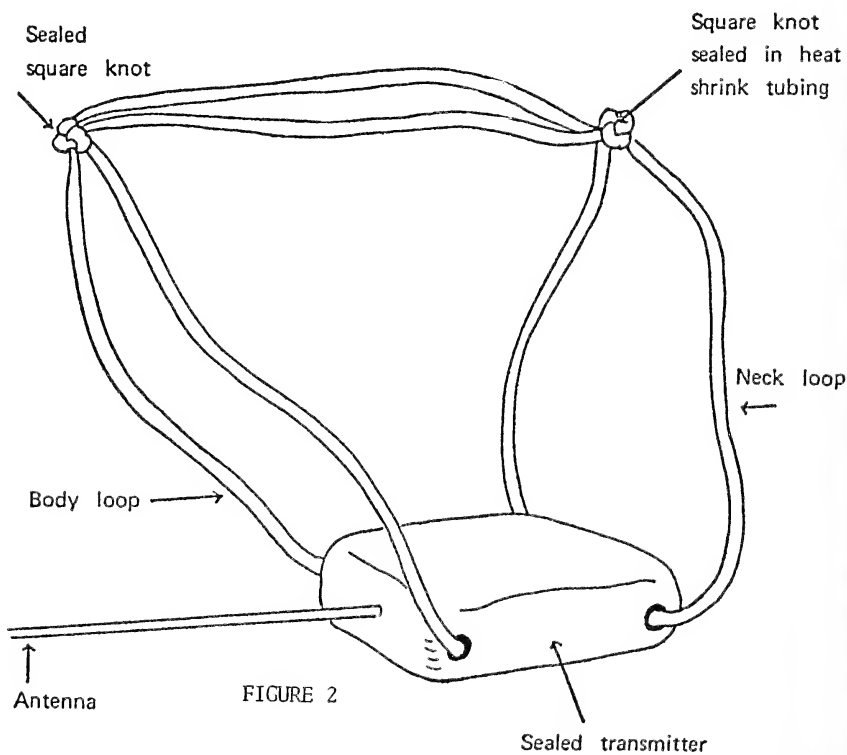


FIGURE 2

RESULTS OF A POST-RELEASE TELEMETRY STUDY INVOLVING BARN OWLS IN
NORTHERN ILLINOIS, 1983, *Continued*

Microtus pennsylvanicus), white-footed mouse (*Peromyscus leucopus*), masked shrew (*Sorex cinereus*), short-tailed shrew (*Blarina brevicauda*), house mouse (*Mus musculus*), and muskrat (*Ondatra zibethicus*). Sightings of numerous raptors in the area indicated that the prey population was viable. The raptors sighted included: red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), marsh hawk (*Circus cyaneus*), kestrel (*Falco sparverius*), and the great-horned owl (*Bubo virginianus*). The small town of Wayne is 3.2 km. south of the release site but most of the surrounding area consisted of open farmland, pastures and horse barns.

The barn from which they were released was secured earlier by placing burlap over windows and openings, a burlap flap was attached over the doorway to prevent the owls from escaping when anyone entered to feed. The barn was well ventilated and had more than adequate perching space, as well as two nesting boxes on either end.

The owlets were then released in the barn for a nine day "acclimation" period in the hopes that they would utilize the barn after the release. They continued to receive a daily supply of dead food on feeding platforms and the barn was "seeded" to encourage wild mice to enter the barn and provide the owls with a chance at hunting. The owls utilized the entire barn, including the nest boxes. Pellets were collected during the nine days for later analysis.

Before release a small perch was placed at the entrance to the barn. An opening to the barn was made on 22 April 1983. After release the birds were checked during the day to determine roosting sites and were followed at night for 6 to 7 hours to determine hunting activities and patterns.

RESULTS

The birds were followed from the time of release until they could no longer be located on 26 April 1983. A Department of Conservation helicopter was then commissioned to help locate the birds, using a direction three-element Uagi antenna on 17 May 1983. This attempt was unsuccessful even though an area of approximately 706 sq/km around the release site was searched. Concentrated search efforts were made on the area up to 25km southwest of the site because the birds seemed to have been moving in that direction throughout the ground tracking period. The owls did not return to the release site at any time during the tracking but did utilize a field adjacent to the barn for what appeared to be hunting activities.

DAILY ACTIVITY

The owls left the roost site a few hours before sunset each evening (1715) at an average time of 1950 hours.

ROOSTING SITES

The birds utilized tree lines, hedgerows and large conifers as roost sites. However, four of the six roost sites observed were in residential areas, sometimes even in residential backyards. The two owls overlapped in roost site area utilization. The birds seemed to be attracted to roost sites with a light source nearby, such as house lights and streetlights. The birds averaged 2.9 km away from the release site.

RESULTS OF A POST-RELEASE TELEMETRY STUDY INVOLVING BARN OWLS IN
NORTHERN ILLINOIS, 1983, *Continued*

MOVEMENTS

Both owls returned to the barn area to hunt at night but did not enter the barn or utilize it as a roost site even though food was provided inside the barn. Generally, the birds stayed in the area from four to six days before leaving the area and moved in a southwesterly direction. After 14 days without contact, an aerial search was conducted, but the birds could not be located within a 20 km radius of the release site.

HELICOPTER AERIAL SEARCH

A 705.6 sq/km radius was covered. Efforts were concentrated in the area directly SW of the release site and a distance of 24.5 km was covered in that direction and 19.5 km in a SE direction.

DISCUSSION

The most pressing question posed by this study was why the birds left the study area so quickly. There are several theories concerning this question. Normally, the optimal time to release barn owl fledglings is at 3 months of age. The barn owls were released at 9 months of age due to the delay in obtaining permits. According to Stewart (1952), fledgling owls usually begin to roost away from the parents at two months of age and begin a progressive dispersal at 3 months of age. The peak dispersal is reached by 8 months of age and usually averages 10-11 km away from the nest site. Due to the age of the owls they may have been simply dispersing from what they considered their "nesting area". If the birds were released at a younger age they may have remained close to the release site for a longer period of time. There are other possible reasons why the birds left the area, such as pressure from resident raptors (great-horned owls in particular) or predation by other raptors, but these are not the likely cause.

An obvious improvement for this type of study would be constant monitoring of the birds from the ground and routine aerial searches. Other improvements are related to the hacking of the birds. On site propagation and release of barn owls may be a valuable alternative to hacking birds from a release site because the owls do not seem to be site loyal unless dispersing from a nest site as youngsters. The parent owls could be maintained in release "barn" while they raise the youngsters and then the young owls could be allowed to leave the barn when they are at an appropriate age, along with the parent owls. This type of release would allow more observation and increase the ability of the researchers to insure the survival of the owlets after the release. This type of program is also less time consuming than hand-raising the release candidates and then hacking them from a release site. Other types of release and captive breeding schemes have been suggested (Binn, 1982) that combine a number of possible alternatives to the traditional methods of re-introduction. These different schemes should be tested so that the most efficient method of re-introducing this species can be determined. In conclusion, the dwindling numbers of barn owls in our midwestern states may be a sign indicating future problems with other raptor species. If we continue to ignore the urgent need for measures to insure the survival of this species, in an area where it was once abundant, what will happen when we begin to see a dying off of other raptors?

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Legislative News

Compiled by Kevin Conway
Legislative Coordinator

AMERICAN ALLIGATOR PROPOSED FOR RECLASSIFICATION IN FLORIDA

On 20 June 1984, the USFWS published a proposed rule in the *Federal Register* to reclassify the legal status of the American alligator (*Alligator mississippiensis*) in Florida to threatened due to similarity of appearance under provisions of the Endangered Species Act. The proposal is based on evidence that the species is not biologically threatened. Reclassification of Florida alligators would reduce restrictions on the State for future management and research while still protecting look-alike species and other populations of American alligators. Certain populations in other southeastern states have already been reclassified to this same status.

---AAZPA Newsletter
August 1984

FINAL RULE ON SNAIL DARTER RECLASSIFICATION

The USFWS published its final rule reclassifying the snail darter (*Percina tansai*) from endangered to threatened in the *Federal Register* on 5 July 1984. Recent field surveys have located additional small populations of snail darters in six tributaries of the Tennessee River and in the main stream of the river near the mouth of these tributaries. Threatened classification is thought to more accurately reflect the true biological status of this species. Because of habitat vulnerability, however, the Service does not believe that a complete delisting of the snail darter is warranted and it will continue to receive protection as a Threatened species.

---Endangered Species Technical
Bulletin, Vol. 1X, No. 3

EXTINCTION OF RARE BUTTERFLY MAY HAVE BEEN CAUSED BY ERROR

Earlier this spring, when a swatch of dry scrub on a steep hillside was plowed under, Rancho Palos Verdes, Ca., got rid of far more than a fire hazard. Federal officials now fear that for the first time ever, one of the 286 creatures protected by the federal Endangered Species Act has become extinct: a rare butterfly that lived only amid patches of locoweed on the staggered terraces of the Palos Verdes Peninsula south of Los Angeles.

The embarrassing demise of the Palos Verdes blue butterfly, a tiny powder-blue creature whose liking for foggy canyons and terraces kept it undiscovered by scientists until 1977, came after a series of missed opportunities to preserve its dwindling breeding grounds. The apparent first loss of an endangered species already has triggered a round of finger-pointing among environmentalists, Rancho Palos Verdes officials and the federal Fish and Wildlife Service, which has the legal duty to protect the insect.

The city says that it tried to save the butterfly, which has distinctive dark camouflage markings on the undersides of its wings, but was never properly instructed on how to go about it. Environmentalists say that the Wildlife Service stood by while a three-year building boom decimated the indispensable locoweed patches, and then lagged in investigating who

s responsible for the destruction. Fish and Wildlife officials deny anything on anything, and say that they still may file criminal charges if wrongdoing is found.

d a California entomologist who spent five years and a chunk of federal money charting the butterfly's decline says that it sometimes seemed as if nobody cared much whether the creature lived.

he Fish and Wildlife people did not always keep the city advised of the status of the colonies," said Richard A. Arnold, the University of California, Berkeley, scientist who had a federal contract to work on the diurnal insect's preservation. "And the city had some bad advice and maybe no sympathy for the butterfly as well."

ederal officials hold out the hope that more of the Palos Verdes blues, which have been confined to the peninsula because they depend for food and egg-laying sites on a strain of locoweed found there, will turn up again--perhaps after next year's spring mating season. But Arnold is less optimistic. An intense search has turned up no eggs, caterpillars or butterflies in any of the remaining areas where the insect should be found, he said. "The likelihood is very high that it's extinct, he said. There's always a chance that it will pop up again. But in this case, the habitat destruction was so complete and so quick that I think that's very unlikely."

---L.A. Times-Washington Post Service
June 1984



RECTIONS/ADDITIONS: The following corrections and/or additions should be noted in the two-part series on "Elephants in Japan" which appeared in the June and July issues of AKF.

June issue:

- p. 180 - Asahikawa-Ashiyama Zoo should be Asakikawa-Asahiyama
 - Tatsu Zoological & Botanical Gardens should be Yatsu....
 - Tobu Zoological Park is a private institution and therefore should not be noted with an asterik (*)
- p. 182 - Omutu Zoo should be Omata Zoo
 - Africa Safari should be African Safari
 - Phoenix Natural Zoo, Miyazaki should be Miyazaki
 - Okinawa-Kodomokuni should be Okinawa-Kodomonokuni
This institution is a public one and therefore should be noted in Table 1 with an asterik (*)
- p. 183 - Kakima Circus should be Kakinuma Circus
 - in section (a) Nanki Shirahama Adventure World has 0.2 Thai elephants NOT 2.0 as listed

July issue:

- p. 216 - Add the following to the bottom of the table II on that page:

Nagoya-Higashiyama Zoo	A-ko	Asian	F	21
	Martha	African	F	20
- p. 212 - Additional information from the author notes that there are 34 (4.30) elephants which have been with current owners for more than 20 years at the time of the survey.
- p. 213 - Additional information from the author notes that there were four places which maintained elephants in the past but no longer are doing so. These four are: Kochi Zoo, Matsushima Zoo, Higuchi Zoo of Atami-city and the Saki Zoo, Osaka.



Chapter

TOLDEO ZOO AAZK CHAPTER

Chapter Secretary Joanne Terry reports that Michelle Grigore has been appointed Historian. The Chapter has established the following goals for this year:

1. Achieve 100% Keeper membership
2. Attain a more active group with greater participation.
3. Promote relations between AAZK and administrative staff.
4. Organize community service projects.
5. Contribute articles to AKF
6. Standardize Board meetings.
7. Restructure parts of the by-laws through the constitution committee.

Our activities during the past year include:

1. Working with Boy Scout/Explorer Post.
2. Haunted House Project
3. Volleyball game and ski trip
4. Speakers on wildlife rehabilitation, bird migrations, Ohio game laws, Beaded lizards, and South American wildlife.
5. Tour of Medical College of Ohio Research Facilities
6. Christmas Bake Sale

---Joanne Terry
Secretary

METRO TORONTO ZOO AAZK CHAPTER

It is with deep regret that we have to report the passing of Gary Belz, a long-time member of our local chapter and an enthusiastic devotee of gorillas. Gary was an active member, turning out for almost every meeting and he will be greatly missed. In his memory, we have made a donation to the Digit Fund.

---Marilyn Cole
1st Vice-President

COLUMBUS ZOO AAZK CHAPTER

The Columbus Zoo is proud to announce the reinstatement of the AAZK Chapter in Columbus, OH. The new officers are:

President....Andy Lodge
1st Vice Pres....Ted Spellmire
2nd Vice Pres....John Becker
Secretary....Stacy Katz
Treasurer....Brad Booth

The Columbus Zoo AAZK Chapter has many fun & exciting projects in the making. For example, A Keepers Octoberfest/campout; olympics with the Keepers and a Keeper exchange program. We are very proud that our fine organization has once again come together and united with AAZK.

---Stacy Katz
Secretary

News



Please send Chapter News to Lee Payne, Chapter Affairs Coordinator, at the Detroit Zoo. Also send a copy to the AKF editorial offices, 635 Gage Blvd., Topeka, KS 66606.



THINK Safety!

RADIATION SAFETY

By
Debra Scheuerman
Veterinary Intern
Woodland Park Zoo
Seattle, WA

The following is an article provided by Judie Steenberg on radiation safety. It was presented at a monthly training session at the Woodland Park Zoo as an aid to keepers involved in the manual restraint of animals on x-ray. The Woodland Park Zoo has an ongoing safety program, as does Busch Gardens. I would be interested in knowing whether any other zoos have similar set-ups. I am also still looking for volunteers to handle the AAZK Safety Buttons and Bumper Stickers. This would be a nice chapter project, as it is relatively inexpensive and easy to put together. Please send all contributions to this column - articles, pamphlets, cartoons - to: Jill Grade, Station Manager, International Bird House, 956 W. Huron St., Chicago, IL 60622.)

Here are just a few simple concepts which need to be understood in order to know how to protect yourself from X-ray exposure. Perhaps the most difficult of these is convincing people that there is a danger. X-rays don't hurt when they enter the body but they certainly damage. Most people are aware of the birth defects which can occur when a woman is exposed to X-rays in the early stages of pregnancy. The damage to gonads also seems to be fairly common knowledge, but few realize that blood formation and the immune system can also be impaired by X-ray exposure. An increased incidence of cancer is also seen in people exposed to radiation repeatedly. Examples of this include:

1. Survivors of nuclear explosions in Japan have an increased incidence of leukemia, bone cancer, colon cancer, and cancer of the cervix.
2. People treated with X-rays for irregular bone formation in the spine (ankylosing spondylitis) are prone to leukemia.
3. Children treated with X-rays for ring worm in the scalp are prone to cancers in the head and neck areas as adults.
4. Radiologists and radiology technicians have a greater chance of having children with birth defects and of developing cancer.

Any of these problems were unknown until recently because the results of low level repeated exposure to radiation takes 10-20 years to develop. This disconnection of cause and effect by so long a time interval makes it easy to think that the radiation is having no effect. In fact, it took careful retrospective studies to discover this serious danger, but now that this information is known, we should take advantage of it.

TECHNICAL ASPECTS

X-rays are formed in the head of the X-ray machine and are allowed to escape through a collimator which directs the X-rays toward the target and minimizes escape of radiation in other directions. Collimators are simply moveable lead shields which are opened and closed to change the width and length of the area to be exposed. The X-rays which are allowed to escape in this fashion are referred to as the primary beam. A regular white light is also located in the X-ray machine head and shines in the same area that will be exposed by the X-rays. By watching the white light you can tell where the actual X-rays will be going. This is impor-

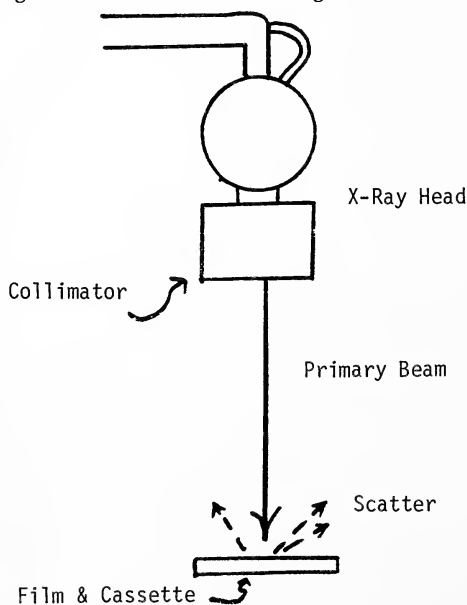
RADIATION SAFETY, Continued

tant to the technician so the correct portion of the animal can be exposed but it is also important to the animal holder so exposure to this primary beam can be avoided.

The X-rays in the primary beam are very high energy radiation so most will pass through your body and come out the other side without damaging anything. However, because there is so much total radiation, the amount damaging your body cells is significant. On the other hand, scattered radiation (which comes from bouncing off of the patient, film cassette and floor or table) is too low energy to pass through your body. This means that most of it remains within your body to damage things. Therefore, although the amount of scattered radiation is low, nearly all of it is interacting with cells, so again the amount damaging body cells is significant.

SUGGESTED PRECAUTIONS

1. Anyone within 30 feet of the machine should be wearing an apron and gloves. This means that you shouldn't be in the same room with the X-ray machine unless you are protected. If you are not needed in the room at the time the X-ray is taken, LEAVE.
2. When possible, animals should be anesthetized and/or taped to the cassette so hands can be kept out of the primary beam.
3. Hands, even when protected with lead gloves, should not be in the primary beam as the lead is strictly to eliminate low energy scatter. One thickness of lead which is thin enough to be worn will not always stop all of the primary beam.
4. Gloves should be worn, not laid over hands, because much of the scatter from which you are trying to protect yourself is bouncing up from the cassette/floor/animal.
5. Gowns should be hung, not folded or dropped in a heap on the floor because folding will cause cracks through which radiation can leak.



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These shirts are made of quality 100% heavyweight cotton and are only available through the 1984 AAZK Conference. This limited edition T-shirt is available to you for \$7.50 and includes postage and handling. Please allow 3-4 weeks for delivery of your T-shirt.

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Enclosed is a check for \$_____ payable to the **Puget Sound AAZK Chapter Conference Account.**

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.

ZOOLOGICAL CURATOR (Reptiles)...responsible for acquisition and maintenance of reptile collection. Requires degree and considerable experience in field. Salary range \$26,400 - \$29,100. For application, contact Detroit Personnel Department, 314 City County Building, Detroit, MI 48226. Application deadline: 30 days from date of publication. We are a merit system and equal opportunity employer.

CURATOR/BIRDS...requires advanced degree with supervisory, managerial and captive management experience. Will be responsible for large bird collection. Salary negotiable. Send c.v. by 15 October to: Sandy Friedman, Search Committee Chairman, Brookfield Zoo, 3300 Golf Rd., Brookfield, IL 60513.

ZOO DESIGN SPECIALIST...requires BA in art-related field plus experience and working knowledge of contemporary materials and techniques. Will design, engineer, supervise and construct zoo and museum exhibits. Salary \$16,740 - \$24,852. Contact Tom Evanhoff, Exhibits Curator, Tulsa Zoo, 5701 E. 36th St. N., Tulsa, OK 74115.

BIRD NURSERY SUPERVISOR...requires data recording/communication skills. Responsible for supervision of employees and care of psittacine nursery. Experience preferred. Will work directly for Director and Staff Veterinarian. Salary \$1,400 per month. Contact Dale Thompson, Director, Aviculture Institute, 16425 Placerita Canyon Rd., Newhall, CA 91321 (805) 252-4871.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within the Conservancy Nature Center in Naples, FL. Involves wildlife as well as educational programs and special projects. Interested applicants must be available for up to five months. Housing and \$55/week stipend provided. Internships available year round. To apply send resume, statement of goals and three references to : Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy Nature Center, 1450 Merrihue Drive, Naples, FL 33942. Phone : (813) 262-2273.

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MOVING?????

Please send change of address as soon as possible to:

Dolly Clark, Administrative Secretary
American Association of Zoo Keepers, Inc.
635 Gage Blvd., Topeka, KS 66606



AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

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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, 35 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.

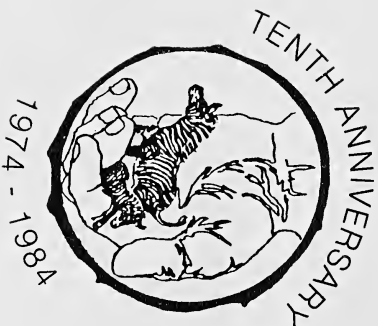
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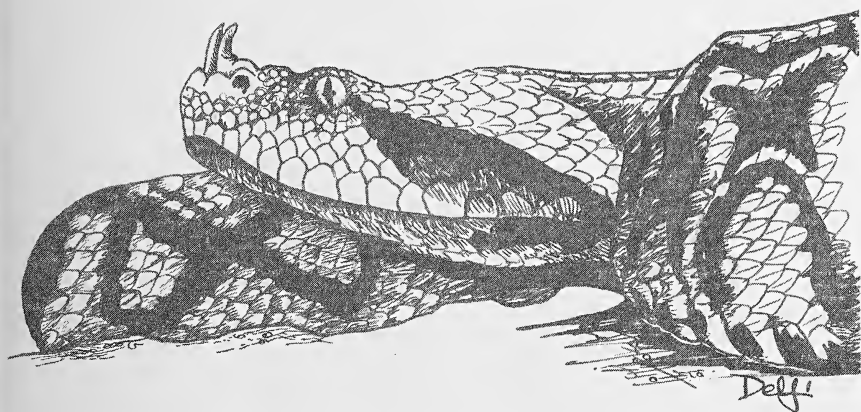


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OCTOBER 1984



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OCTOBER 1984
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Vacancy		Canada

This month's cover art is by AAZK Associate member Delfi Messinger who was formerly at the Sedgwick County Zoo in Wichita, KS and is currently serving in the Peace Corps in Africa. Thank, Delfi!

Scoops and Scuttlebutt

QUESTIONS NEEDED FOR 'FEED BAG' COLUMN

Do you have a question about the present diet being fed the animals on your routine or perhaps a question concerning dietary changes and its effect on an animal? AKF needs your help in getting the "Feed Bag" column active again. Dr. Sergio Oyarzun, Nutritionist at the Metro Toronto Zoo is willing to answer your questions in this column. Please send questions, including pertinent data, to Dr. Oyarzun c/o Metro Toronto Zoo, Box 280, West Hill, Ontario, Canada M1E 4R5.

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



1983 AMERICAN ASSOCIATION OF ZOO KEEPERS AWARDS

The following awards were presented at the AAZK National Conference held in Seattle, WA on September 30 - October 4, 1984. The Excellence in Zoo Keeping, Meritorious Achievement and Certificate for Merit in Zoo Keeper Education Awards are selected by the AAZK Awards Committee. Mike Crocker of the Dickerson Park Zoo in Springfield, MO is Chairman of this committee. The Excellence in Journalism Awards are selected by the Animal Keepers' Forum editorial staff.

1984 EXCELLENCE IN ZOO KEEPING AWARD WINNERS

Steven M. Wing, Milwaukee County Zoo, Milwaukee, WI
Patricia E. Sammarco, Lincoln Park Zoological Gardens, Chicago, IL
Albert Worner, Philadelphia Zoological Gardens, Philadelphia, PA
Eugene Maliniak, National Zoological Park, Washington, D.C.
Anita Cramm, Sedgwick County Zoo, Wichita, KS

AAZK MERITORIOUS ACHIEVEMENT AWARD

In recognition of outstanding contribution in the field
of wildlife conservation and animal husbandry

Janet McCoy, Washington Park Zoo, Portland, OR

CERTIFICATE OF MERIT FOR ZOOKEEPER EDUCATION

Woodland Park Zoological Gardens
Seattle, WA

AAZK OUTSTANDING SERVICE AWARD

In appreciation for hosting the 1984 AAZK National Conference

Woodland Park Zoological Gardens
Seattle, WA

CERTIFICATE OF RECOGNITION

Gary K. Clark, Director
Topeka Zoological Park, Topeka, KS

1984 AKF EXCELLENCE IN JOURNALISM AWARDS

Outstanding Mammal Article: "Elephants in Japan
Mid-1982 to Early 1984"

Yoshi. Yonetani, Zoo/DEL, Zoo Design and Education Lab, Kobe, Japan

AAZK AWARDS, Continued

Outstanding Herpetology Article: "The Care and Reproduction of the Giant Day Gecko at the Santa Fe Community College Teaching Zoo"

Brenda Brochstein, Atlanta, GA

Outstanding Avian Article: "Artificial Incubation of Bird Eggs"

Ken Keininger, Burnet Park Zoo, Syracuse, NY

Outstanding Narrative Article: "A Unique Zoo in Chiapas, Mexico"

Dr. John P. Ehrenberg, Baltimore, MD

Outstanding Exhibit Design Article: "From Giraffes to Tree Kangaroos"

Judie Steenberg, Woodland Park Zoological Gardens

Outstanding Series: "Keepers and Computers"

James Albert, University of Texas at Austin

Outstanding Uncategorized Article: "Beneficial Aspects of Photographic Documentation of Captive Wildlife by Animal Keepers"

Milton H. Tierney Jr., National Zoological Park, Washington, D.C.

Outstanding Cover Art Award: Jan. 1984 Issue of Animal Keepers' Forum

Donna Mason Smith, Birmingham, AL

HONORABLE MENTION AWARDS

Mammal Articles

"Readapting a Tropical Species to the Tropics" by Sally Lieb
Dreher Park Zoo
West Palm Beach, FL

"Maternal Behavior and Infant Development of the Lowland Gorilla at Metro Toronto Zoo" by Marilyn Cole and Linda Ervine
Metro Toronto Zoo
Toronto, Ontario, Canada

Cover Art

September 1983 Issue of AKF - Artist: Mike Turri, Memphis Zoo, Memphis, TN

November 1983 Issue of AKF - Artist: Cathy Taibbi, Atlanta Zoo, Atlanta, GA



Births & Hatchings

KANSAS CITY ZOO.....Dee Wolfe

B&H for June and July 1984 include: Mammals - 0.0.1 Meerkat (DNS), 5.2 Eland, 2.2 Himalayan tahr, 3.1 California sea lion (0.1 DNS), 8.8 African pigmy goat, 0.0.1 Caracal (1 DNS), 1.0 Yak; Birds - 1.1.4 Brazilian teal (1 DNS), 0.0.1 Emu, 0.0.3 Hooded merganser (3 DNS), 0.0.5 Grey-necked wood rail (2 DNS), 0.0.2 Shama Thrush (DNS), 1.0.2 Mandarin duck (1 DNS), 0.0.1 Palawan peacock pheasant, 0.0.1 Rosybill pochards (DNS), 0.1 Canvasback, 0.0.1 Speckled pigeon, 0.0.9 Red-billed whistling duck (1 DNS), 0.0.2 Ruddy duck and 0.0.1 Double yellow-headed Amazon parrot.

PITTSBURGH AVIARY.....Curt Robbins

Hatchings for April through July 1984 include: Birds - 0.0.1 Elegant Crested tinamou (DNS), 0.0.5 Green-backed heron (5 DNS), 0.0.5 Ringed teal (5 DNS), 0.1 Gray junglefowl, 0.0.1 Lady Amherst's pheasant, 0.0.1 Palawan peacock pheasant (DNS), 0.0.2 Malay great argus pheasant, 0.0.8 Moorhen (3 DNS), 0.0.2 Sun Bittern (2 DNS), 0.0.2 Killdeer, 0.0.2 Red Lory, 0.0.4 Plum-headed parakeet, 0.0.4 Greater roadrunner (4 DNS), 0.0.2 Burrowing owl (2 DNS), 0.0.1 Speckled mousebird (DNS), 0.0.1 Kookaburra, 2.3.2 African gray hornbill, 0.0.3 Black-collared barbet (2 DNS), 4.6 Levillant' barbet (0.1 fledged April, hatched March), 0.0.2 Pale-mandibled aracari (possible first captive breeding), 0.0.2 Magpie robin (1 DNS), 0.0.2 Blue-necked tanager (2 DNS), 0.0.2 Troupial (possible first captive breeding 1 DNS), 0.0.2 Red-winged pytilia (2 DNS), 0.0.9 Blue-capped cordon-bleu (7 DNS), 0.0.4 Gouldian finch, 0.0.3 Phillipine glossy starling (2 DNS), 0.0.2 Purple glossy starling, 0.0.4 Blue-eared glossy starling X Purple glossy starling (4 DNS), 0.0.7 Ruppell's long-tailed starling (4 DNS), 0.0.4 Chestnut-bellied starling (possible first captive breeding, 3 DNS), 0.0.9 Rothchild's mynah (3 DNS), 0.0.1 Hill mynah (1 DNS); Reptiles - 0.0.8 River cooter (Chrysemys concinna concinna).

CENTRAL FLORIDA ZOOLOGICAL PARK.....Kathy Speckman

B&H for April through July 1984 include: Mammals - 0.1 Margay, 0.1 Black howler monkey, 0.0.1 Squirrel monkey; Birds - 0.0.3 African grey, 0.0.3 Medium sulphur-crested cockatoo, 0.0.6 Rothchild's mynah (4 DNS), 0.0.7 Fischer's lovebird, 0.0.1 Rhea, 0.0.3 Budgerigars, 0.0.3 Cherry-headed conure; Reptiles - 0.0.16 Eastern garter snake and 0.0.7 Common snapping turtle.

BLACK HILLS REPTILE GARDEN.....Bill Texel

The first half of 1984 produced the following B&H: 1.2 Pygmy goat, 0.0.2 Albino black-tailed prairie dog, 1.2 Sicilian donkey, 0.1 Miniature horse, 0.0.10 Zebra finch, 0.0.? Giant cockroach; 0.0.12 Red rat snake, 0.0.31 Banded water snake, 0.0.6 Columbian rainbow boa (DNS), 0.0.12 Prairie rattlesnake.

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

B&H for August 1984 include: 0.0.1 Red rattlesnake, 0.0.3 Elaphe obsoleta x E. guttata, 0.0.7 Snapping turtle, 0.0.4 Common turkey, 0.0.2 Indian fruit bat, 2.2 Tree shrew, 0.1 Black and white colobus, 2.1 Acouchi, 0.0.1 American elk and 1.0 Greater kudu.

BIRTHS AND HATCHINGS, Continued

SAN ANTONIO ZOO.....Deborah Reed

August 1984 B&H include: Mammals - 0.0.3 African hedgehog (2 DNS), 0.0.3 Kusimanse (2 DNS), 0.1 Chapman's zebra (DNS), 0.0.1 Nile hippo, 1.0 Cape buffalo, 1.3 Greater kudu (0.1 DNS), 0.1 Common waterbuck (DNS), 1.1 Beisa oryx, 0.1 Blackbuck, 3.4 Dama gazelle (1.0 DNS), 1.0 Thomson's gazelle, 0.1 Springbok; Birds - 0.0.2 Scarlet ibis, 0.0.2 American flamingo, 0.0.4 Moluccan rajah shelduck, 0.0.1 Palawan peacock pheasant, 0.0.2 Goeldie's lorikeet (1st time in collection), 0.0.1 Galah, 0.0.3 Lilac-breasted roller, 0.0.1 Pygmy kingfisher (DNS), 0.0.3 Dhyal thrush, 0.0.1 Yellow-headed rock-fowl (DNS); Reptiles - 0.0.6 Amazon tree boa, 0.0.6 Dumeril's ground boa, 0.0.5 Albino corn snake, 0.0.2 Honduran milk snake, 0.0.6 Palestine viper; Aquarium - Peppermint shrimp, Sulphur-headed cichlid, Golden zebra cichlid, Kribensis, Brichardi cichlid and Tomatoe clownfish.

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

August 1984 B&H include: Mammals - 3.0 Sable antelope, 2.3 Greater kudu, 2.4 Grant's gazelle, 0.1 Soemmering's gazelle, 1.0 Nyala, 2.0 Kafue (Red) lechwe, 1.0 Gerenuk, 0.1 Scimitar-horned oryx; Birds - 2 Hahn's macaw, 10 Scarlet ibis, 2 Gray cockatiel, 4 Goldie's lorikeet, 8 Indian peafowl (Blue phase), 3 Fischer's lovebird, 1 Green-cheeked conure, 4 Sun conure, 6 Eyton's tree duck, 3 Severe macaw, 4 Ringed teal, 1 Comb duck, 2 Blue and gold macaw, 2 Black-masked lovebird, 3 Golden-capped conure, 2 Black-capped lory, 1 Chattering lory.

DALLAS ZOO.....Tami Jones

B&H for August 1984 include: Mammals - 0.1 East African bongo, 0.0.1 Celebes crested macaque, 1.0 Reticulated giraffe, 0.0.1 Hamadryas baboon; Birds - 0.0.4 Spur-winged lapwing, 0.0.2 Red-vented bulbul, 0.0.1 Pekin robin; Reptiles - 0.0.5 Grey-banded kingsnake (Lampropeltis alterna), 0.0.4 Cone-headed lizard (Laemanctus serratus), 5.3 Sinaloan kingsnake (Lampropeltis triangulum sinaloae), 0.0.14 Pueblan kingsnake (Lampropeltis triangulum campbelli).

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

July B&H include: Mammals - 1.0 Prezwalski's wild horse, 2.2 Barasingha deer, 1.1 Formosan sika deer, 2.0 Addra gazelle, 1.1 Arabian oryx, 0.1 Great Indian rhinoceros, 1.0 Red ruffed lemur, 1.0 White faced saki, 0.1 Diana guenon, 0.1 Sumatran orangutan, 0.2 Mhorr gazelle, 0.0.1 Queensland koala; Birds - 0.0.1 Andean condor, 0.0.2 Palawan peacock pheasant, 0.0.1 Temminck's tragopan, 0.0.1 Pesquet's parrot, 0.0.2 Dumont's mynah and 0.0.2 Red-breasted goose.

CHEYENNE MOUNTAIN ZOOLOGICAL PARK.....Steve Connors

May through July 1984 B&H include: Mammals - 0.0.1 Syke's guenon, 0.0.1 Mayotte Island brown lemur, 0.1.5 Alpine ibex, 1.0 Lowland gorilla (DNS), 1.4 Rocky Mountain goat, 2.0 Snow leopard, 1.0 Sumatran orangutan, 0.0.4 Addax, 0.0.1 Musk ox, 0.0.4 Himalayan tahr, 0.0.1 Patas monkey; Birds - 0.0.3 Blacksmith plover, 0.0.2 Superb starling, 0.0.4 Indian blue peafowl; Reptiles - 8.6 Burmese python, 1.1.5 Great Basin gopher snake and 2.3 Central Plains milk snake.



Coming Events

ANNUAL MEETING OF THE ASSOCIATION OF ZOO VETERINARY TECHNICIANS

October 12-14, 1984

Louisville, KY

FIFTH ANNUAL ELEPHANT MANAGEMENT SEMINAR

Nov. 29-Dec. 2, 1984

New Orleans, LA

For further information, contact: Carol Sullivan, Audubon Park and Zoological Garden, P.O. Box 4327, New Orleans, LA 70178, (504) 861-2537. See CALL FOR PAPERS on page 270 of September issue of AKF.

THE FOURTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 7-8, 1984

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information, contact: Thomas Meehan, DVM, Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.

1985 SCHOOL FOR PROFESSIONAL MANAGEMENT DEVELOPMENT FOR ZOO AND AQUARIUM PERSONNEL

February 3-7, 1985

Wheeling, WV

Held at Wilson Lodge, Oglebay Park. For further information, contact: Kelly Krump, North Carolina State University, Division of Continuing Education, P.O. Box 5125, Raleigh, NC 27650 (919) 737-2261.

1985 AAZPA CENTRAL REGIONAL CONFERENCE

March 3-5, 1985

Oklahoma City, OK

1985 AAZPA WESTERN REGIONAL CONFERENCE

March 17-19, 1985

Anchorage, AK

1985 AAZPA SOUTHERN REGIONAL CONFERENCE

March 31-April 2, 1985

Birmingham, AL

1985 AAZPA GREAT LAKES REGIONAL CONFERENCE

April 14-16, 1985

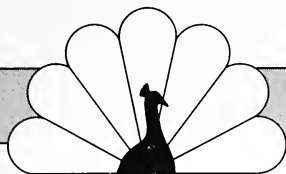
Cleveland, OH

1985 AAZPA NORTHEASTERN REGIONAL CONFERENCE

April 28-30, 1985

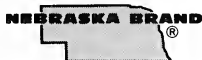
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HOUSING

(Dimensions, Contents, and Other Considerations)

By

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

In Part IV of this series, cage design and construction were discussed. In addition to those factors, the novice will want the keeper to offer more specific concepts in cage design such as suggested dimensions. While reptiles require relatively less living space than mammals and birds, adequate space must be provided for their basic physiological needs such as regulation of body temperature, territorial requirements, exercise, etc. Table I lists cage sizes that have proven appropriate for housing reptiles.

There is no single substrate that is totally acceptable. Some cage litters do not have good absorbent qualities, while others are so absorbent that dehydration has caused severe shedding problems. Furthermore, problems can be incurred by the animal ingesting the litter, causing gastrointestinal impaction. Some litters cause hygienic problems since they are excellent media for pathogens. The use of newspapers or towels will eliminate most health problems caused by substrates since they are the most hygienic. Furthermore, paper is the most suitable for arboreal and terrestrial reptiles. However, the reptile owner should not rule out the use of gravel for arboreal and terrestrial reptiles since this substrate can be disinfected, washed, dried and reused. Peat and sphagnum mosses are suitable substrate for fossorial animals since they allow these animals to burrow with ease. The depth of this litter should be about 1/4 of the fossorial animal's length. Reptile owners using mosses as a litter for fossorial animals should be reminded to stir the litter regularly to allow drying of moisture that may drain to the cage floor. Mulch and gravel substrates should be replaced with fresh material about every 3 months to prevent unpleasant odors and the proliferation of pathogens.

Ground corn cob (Sanicel), while frequently used as a substrate, can cause intestinal impaction if ingested by small snakes and large lizards. When trapped in the mouth, Sanicel may also irritate the oral mucosa and cause mouth rot (Ulcerative Stomatitis). Pure sand as a substrate is generally hazardous to the reptile's health; it can cause intestinal impaction, and eye and scale irritation and infection. The zoo keeper should emphasize to the inquiring reptile enthusiast that materials such as kitty-litter must NEVER be used because it is extremely dehydrating. Other materials that should be avoided as a substrate are wood chips and other aromatic material. These items can cause chemical pneumonia and death. It is generally wise to avoid the use of natural vegetation and soil since these may expose the captive reptile to parasites or toxins. If soil is to be used as a substrate, it should be heat-sterilized first. While this procedure may not eliminate the possibility of exposing the reptile to toxins, it will destroy parasites.

Water as a substrate for aquatic and semi-aquatic animals should be kept at a depth of about 1/4 of the animal's length. Marine or pelagic reptiles require sea water; Instant Ocean (Aquarium Systems) should be suggested to the inquiring public because it is convenient to use and relatively inexpensive. Also remind the inquirer that pH is an important consideration in the prevention of shell-rot. The recommended pH for all aquariums is 6.8 to 7.0 (Merhtens, J., Know Your Turtles; Pet Library, Ltd., New York, NY).

REPTILE CARE: RELATING TO THE INQUIRING NOVICE - PART 5, Continued

The zoo keeper should not overlook suggesting to the reptile novice that his animal will most probably need a hiding area. A variety of items such as cardboard boxes, flower pots, and crumpled newspaper are appropriate as hiding areas for terrestrial reptiles. Cork bark, or other appropriate objects that float, provide seclusion for semi-aquatic animals.

If the animal in question is an arboreal reptile, multiple basking areas must be provided by the use of non-resinous tree limbs. Limbs should be strong enough to support the animal's weight, and properly secured to prevent injuries or cage damage. Semi-aquatic species can be provided with basking areas with the use of cork bark, rocks, or a tilted aquarium or stock tank.

The keeper must also keep in mind that lizards and snakes must have something to shed against. Rocks for ground-dwelling snakes and lizards, and tree limbs for basking arboreal or scansorial animals provide shedding aid.

The reptile owner must avoid overcrowding animals. Housing two or more animals in the same cage may lead to competition for food. Timid animals often starve, and cage mates often devour each other while attempting to eat the same food item. Two or more feeding areas for several land chelonians housed in a single enclosure may insure that all will receive food. Young animals should be isolated from adults to prevent injuries, cannibalism, or competition.

TABLE I - Suggested Housing Dimensions for Reptiles

Reptile	Relative Dimensions
Chelonians	Length : 5X animal's length Width : 3X animal's length Height: Enough to be escape-proof, or use a cover
Crocodylians	Length: 5X animal's length Width: 2X animal's length Height: Enough to be escape-proof, or use a cover
Lizards	Length: 3X animal's length Width: 2X animal's length Height: Arboreal and semi-aquatic: 2X animal's length Terrestrial: minimum 1 ft.; maximum 6-8 ft.; use judgement Fossorial: 1-2X animal's length
Snakes	Length: 3/4 animal's length Width: 1/3 animal's length Height: Arboreal or scansorial: 3/4 animal's length All others: 1/2/ animal's length; minimum 1 ft.; maximum 8 ft.; use judgement



Viewpoint

(Editor's Note: The following poem is in response to the two opinions expressed by Victor S. Monroe in the August "Viewpoint" and Karen Salesmen-Basmay in the September "Viewpoint". The poem was written and submitted by Adrienne Miller, a keeper at the Roger Williams Park Zoo in Providence, R.I.)

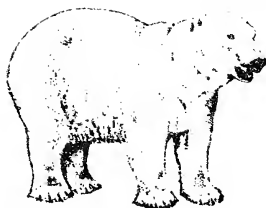
Let us respect each other's individual education.
It gives us all a particular qualification.

From textbooks and classrooms we get people with knowledge
Of Chemistry, Biology, and such, learned in college.

But years spent in labor can give the ability
To interpret an animal's fright or tranquility.

All zoos need a mixture from both of these schools
For to be a good keeper there's no strict set of rules.

We must learn from each other and never stop caring,
Because a zoo is its best when its keepers are sharing.



"KUNIK" TO HELP SCIENCE

The Metro Toronto Zoo in cooperation with the Canadian Wildlife Service, has launched an experiment to help understand more of the natural history of the Polar bear.

At the center of this understanding is "Kunik", a 270 kilogram male bear at the zoo. This former resident of the Northwest Territories has been outfitted with a prototype of a radio transmitter ear tag. This small device has been attached to his right ear by zoo veterinarians in an effort to determine the life span of this new transmitter.

The transmitter will eventually be used by the Canadian Wildlife Service to track bears in the Hudson Bay area to determine their population and to learn more about these large northern carnivores.

At the Polar bear exhibit, a radio receiver and speaker have been added so that the public can hear the device.

---Metro Toronto Zoo News Release



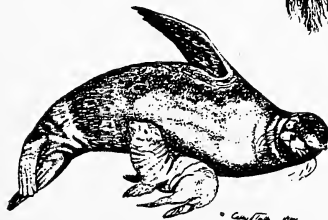
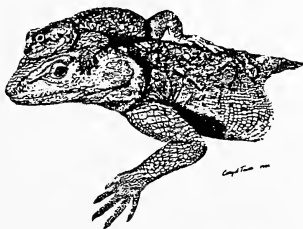
LIMITED EDITION PRINTS FOR SALE

Atlanta Zoo Keeper, Cathy Taibbi, is offering signed and numbered lithographs from her original pen and ink drawings. Five designs are available in editions of 200 each. Prints are shipped flat, unmatted and unframed. Please add \$1.50 per order for postage and handling. 10% of proceeds are being donated to the Atlanta Zoo Chapter of AAZK.

Prices for prints shown here are:

- *Spotted hyena with pups
Size: 11½ X 17½, Price: \$15
- *East African crowned crane with chick
Size: 11½ X 17½, Price \$15
- *Lion-tailed macaque with infant
Size: 11½ X 17½, Price \$15
- *Agamid lizard with hatchling
Size: 8 3/4 X 11 1/2, Price \$10
- *Galapagos sealion with pup
Size 8 3/4 X 11 1/2, Price \$10
- *Set of 5: \$60

Prints may be ordered by writing Cathy at the ATLANTA ZOOLOGICAL PARK, Dept. of Herpetology, 800 Cherokee Ave., SE, Atlanta, GA 30315, or by telephoning (404) 658-7994 between 9:30 a.m. and 5 p.m., Saturday through Wednesday.



Cathy Taibbi

Chapter

SAN ANTONIO ZOO AAZK CHAPTER

The San Antonio Zoo was fortunate to have "Puuya", a koala from San Diego Zoo on loan for the month of June. At a beer and tamale party for employees that the zoo sponsored for the arrival of the koala, the Chapter bought several different "koala items" at cost from the zoo's gift shop and gave them away in a special drawing for keeper's only.

At our June meeting, Jane Jacobson, the keeper who accompanied the koala gave an excellent talk about her work with the koala colony at the San Diego Zoo.

ROGER WILLIAMS PARK ZOO AAZK CHAPTER

We are pleased to announce that our first year as an AAZK Chapter has been a great success! During our first year we have had the following fund-raising activities:

1. A Holiday "Turkey Raffle" with prizes kindly donated by local business people.
2. Our own specially designed zoo poster sold through the zoo gift shop.
3. Sale of handmade sheep made with fleece shorn from our own farmyard sheep.

With some of the profits from our fund-raising activities, we were able to purchase a brooder and 25 Rhode Island Red hens. After the chicks left the brooder they went into our farmyard exhibit and the brooder continues to be used in our nursery.

Our Chapter, along with the Docent Council, sponsored a "Wool Fair" at the zoo. This fair included spinning, weaving and carding demonstrations as well as the main event, the public shearing of our farmyard sheep. We also took part in an "Animal Awareness" display coordinated by our zoo's education department at a local mall. Our exhibit was that of a working zookeeper and his tools.

Our Chapter meetings have involved a combination of guest speakers and field trips to nearby animal care facilities. We recently held elections for the fiscal year September 1984-September 1985. The new officers are:

President.....Liz MacLaughlin
Vice Pres.....Sarah Ballou
Secretary.....Adrienne Miller
Treasurer.....Rhonda Menard
Board Member at Large...
Russell Menard

We are looking forward to our second year with great expectations. We hope to improve our fund raising techniques as well as get more involved with the local community through public relations activities.

Our Chapter logo is of a female Golden Eagle and her three chicks, commemorating our zoo's successful parental rearing of three eaglets from one breeding pair in 1982. Our logo is "Alis Volat Propriis" which in English means "He Flies By His Own Wings".

---Adrienne Miller
Secretary

AUDUBON PARK ZOO AAZK CHAPTER

Yes, the AAZK Chapter at the New Orleans Audubon Zoological Garden is alive and well after a period of dormancy. Our meetings are held the first Tuesday of every month at 5:30 p.m. Our new officers were selected in May and they are:

President.....Teresa Barnett
Vice Pres/Sec....Sue Harries
Treasurer.....Dee Nelson

And yes, we have been busy. We recently contributed \$500.00 towards the Species Survival Plan Program and we would like to challenge other zoos to contribute something as well. We are also sponsoring an Advanced First Aid

CHAPTER NEWS, Continued

AUDUBON PARK CHAPTER (con't)

Course. This course is held twice a week with each session lasting about two hours. Any zoo employee is allowed to register for the course at no cost to them. It is paid for by the AAZK Chapter and the Audubon Zoo. As a First Responder in this course, you learn CRP, splinting and treatment for injuries external and internal, shock, childbirth and other medical emergencies. It is a great course and we would recommend any zoo to consider their employees participation. For more information write :

David Lawrence
EMS Instruction Coordinator
4137 Laurel St.
New Orleans, LA 70115

Our Chapter also assists zookeepers financially who wish to attend conferences and other animal-related educational programs. Our maximum limit is \$200.00 per individual per conference.

Most of the money raised for our Chapter comes from the coins collected weekly from the moats in the zoo and we also collect and recycle aluminum cans.

---Teresa C. Barnett
President

TOPEKA ZOO AAZK CHAPTER

The members of the Topeka Zoo AAZK Chapter recently participated in the Friends of the Zoo's annual fund-raising event "Animal Fair" which is held on the Sunday prior to Labor Day. At their booth, the Chapter sold jewelry made from molted feathers, feather quill pens, "Elephant Tea" (bolus complete with instructions for making solution for fertilizing house plants) and other animal artifact items. A popular seller were the limited edition Elephant Footprints made by the Zoo's 23-year-old female Asian "Sunda".

The Topeka Zoo Chapter is considering hosting a Great Apes Workshop

during 1985. It is hoped this event would be similar to the Tropical Habitats Exhibit Workshop, the Chapter held in May of 1982. The Chapter would be interested in knowing from those who might want to attend the following: (1) What time of year would you prefer; (2) What part of the week would you prefer; (3) How many days you feel would be adequate for a workshop of this type; and (4) If you would be interested in presenting a paper. All interested persons are asked to write to Alice Miser, c/o Topeka Zoo, 635 Gage Blvd., Topeka, KS 66606.

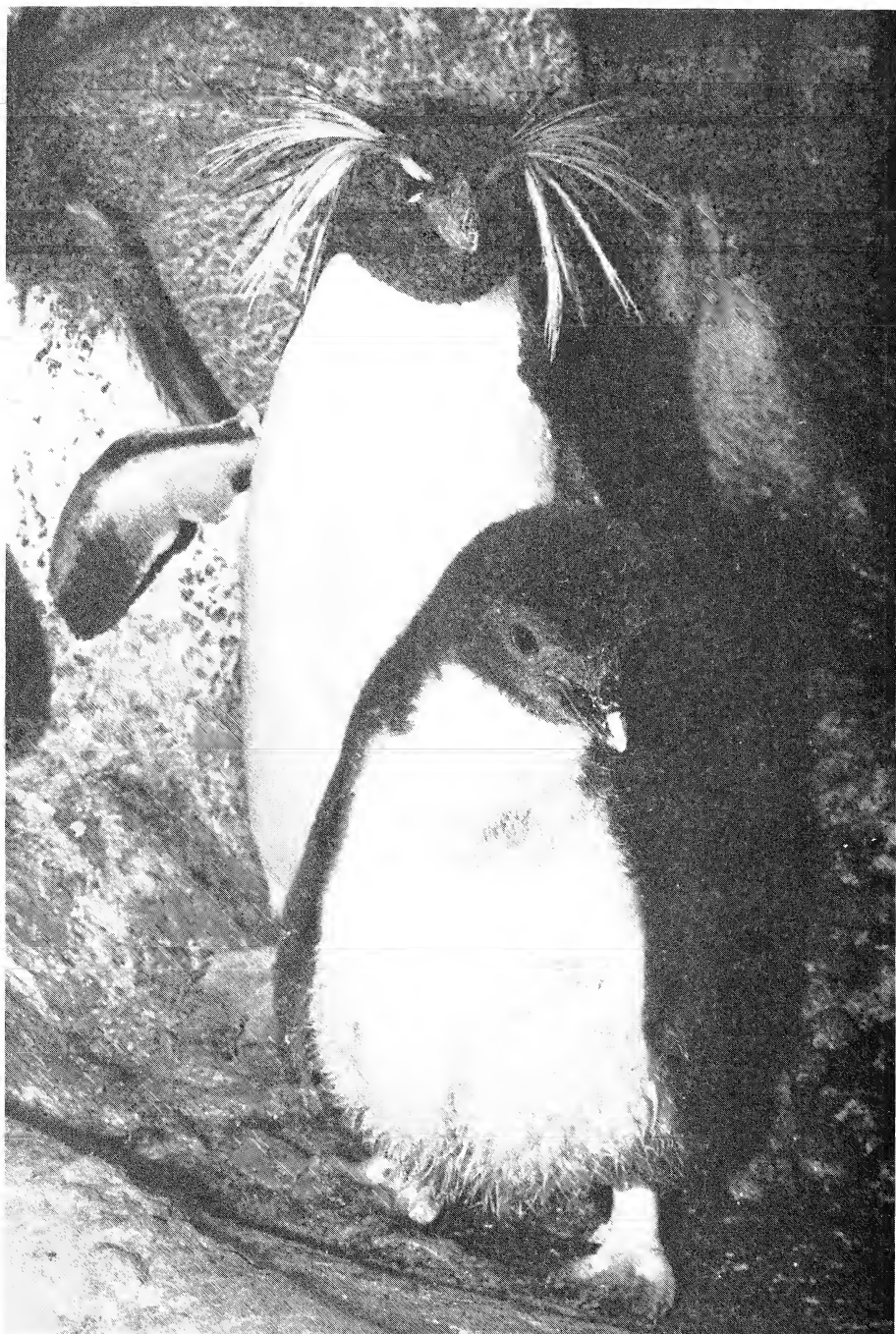
---Bernie Feldman
President

News



Please send Chapter News to Lee Payne, Chapter Affairs Coordinator, at the Detroit Zoo. Also send a copy to the AKF editorial offices, 635 Gage Blvd., Topeka, KS 66606.





Forty-day-old Rockhopper Penguin chick and parent. Photo by Gary Michael.

BREEDING THE ROCKHOPPER PENGUIN
(*Eudyptes crestatus*)
AT THE ST. LOUIS ZOOLOGICAL PARK

By
Gary A. Michael, Keeper
St. Louis Zoological Park
St. Louis, MO

Penguins in zoos are very popular avian exhibits. Many zoos display penguins, but only a few have been successful in their husbandry and reproduction.

The Rockhopper penguin, *Eudyptes crestatus*, is one of the penguin species exhibited at the St. Louis Zoo. The exhibit consists of nine adult birds, all of which were wild-caught. Two of the group were captured in the Falkland Islands in May, 1981. A five-year-old male (also from the Falklands, and the only sexed specimen) was received as a loan from the Baltimore Zoo in June, 1977. An additional six birds, collected from an island off the coast of South Africa, were received in February, 1981. In October of 1983, four rockhoppers formed two nesting pairs. Four eggs were laid; three eggs hatched; and two chicks were reared.

The rockhopper penguin exhibit is located in the Zoo's Aquatic House and is a fiber glass representation of Antarctic and sub-Antarctic island habitats. The smooth surface is terraced by a series of steps formed in the face of a slope which inclines from the pool to the rear of the exhibit. The pool is sufficiently large for the birds to exercise and benefits from an efficient water-handling system. The surface of the pool is approximately 72 square feet (6.7 meters), its depth is 4 feet (1.2 meters), and its capacity is 1,000 gallons (378.7 decaliters). The water-handling operation is a freshwater system which makes use of a skimmer and a high pressure sand filter. It is designed to both filter and cool. Gross contamination which settles to the pool floor and evade the filter are removed through periodic drainings of the pool. City tap-water is added constantly. This reduces chemical contamination caused by materials which accumulate between cleanings, and also acts as a skimmer by overflowing surface water into a sewer drain. Water is recirculated, at a rate of 32 gallons (121 liters) per minute, through a sand filter which removes some sediment and most small debris. The pool water is cooled to 44°F (6°C).

The Rockhopper enclosure has its own air-handling system. It consists of an air-moving unit that forces air through a screen, which nets large particles; through a charcoal filter, which traps small particles and gases; and finally through a cooling coil, which cools the air to 48°F (9°C). Since the air is recirculated through a closed system, there is no difference in the atmospheric pressures of the interior and the exterior areas of the exhibit.

Fluorescent lights illuminate the display. The photoperiod is regulated to match that of the austral seasons, according to the following schedule:

March 16	4:00 a.m. - 8:00 p.m.	16 hours of light
March 23	4:00 a.m. - 7:00 p.m.	15 hours of light
March 30	5:00 a.m. - 7:00 p.m.	14 hours of light
April 6	5:00 a.m. - 6:00 p.m.	13 hours of light
April 13	6:00 a.m. - 6:00 p.m.	12 hours of light
April 20	7:00 a.m. - 6:00 p.m.	11 hours of light
April 27	8:00 a.m. - 6:00 p.m.	10 hours of light

BREEDING THE ROCKHOPPER PENGUIN AT THE ST. LOUIS ZOO, *Continued*

May 4 *	8:00 a.m. - 5:00 p.m.	9 hours of light
May 11	9:00 a.m. - 5:00 p.m.	8 hours of light

* At this point, half of the light bulbs are removed to reduce light intensity.

August 17	9:00 a.m. - 6:00 p.m.	9 hours of light
August 24	9:00 a.m. - 8:00 p.m.	11 hours of light
August 31	7:00 a.m. - 8:00 p.m.	13 hours of light
September 7 **	7:00 a.m. - 10:00 p.m.	15 hours of light
September 14	5:00 a.m. - 10:00 p.m.	17 hours of light
September 21	5:00 a.m. - 12:00 p.m.	19 hours of light
September 28	3:00 a.m. - 12:00 p.m.	21 hours of light
October 4	12:00 a.m. - 12:00 p.m.	24 hours of light

** At this point, the light bulbs are returned to increase light intensity.

The natural diet of the rockhopper is almost exclusively crustaceans and squid. We substitute two species of marine fish: caplin, *Mallotus villosus* and American smelt, *Osmerus mordax*. Both fish are high in protein and in longchain highly unsaturated fatty acids. However, considerable nutrient loss occurs in the fish during storage and thawing; and we compensate by giving each bird one-half of a Sea Tab^[1] tablet daily. The birds are fed all they will consume in two hand-feedings per day.

A great deal of attention is paid to hygiene--in the routine maintenance of the exhibit and in the preparation and storage of fish. Once a week the entire exhibit is scrubbed with Roccal-D^[2], and the constant infusion of chlorinated tap-water helps control the growth of bacteria within the pool. Items such as trays, storage pans and buckets are also disinfected daily, and the use of separate cleaning equipment eliminates cage-to-cage contamination. Air-thawed fish are placed in clean pans and are stored in the refrigerator. Thawed until pliable, the fish are rinsed in cold water before delivery to the exhibit in clean "food only" buckets. Uneaten fish are removed from the exhibit to reduce bacterial growth.

On 16 October 1982 a single nesting pair (ages unknown) produced one egg, the first in the colony, but it was found three days later on the floor of the pool. On 3 October I had observed that one of the birds appeared attracted to and aggressively defended a particular site, a high plateau which sloped into the pool. On 4 October this individual was observed placing stones on that plateau, and two days later a cagemate joined in the activity. The first individual, unlike the second, remained at the site, refusing to move to the location to which the colony had been conditioned for hand-feeding. The pair's nest-building and the one bird's fasting and aggressive defense of the nest continued until the egg was laid. Incubating duties were shared. I concluded that the first individual was a male and the second a female, after comparing their behavior to Warham's (1963) description of pre-copulatory behavior of rockhoppers in the field. That conclusion was confirmed by observations made in 1983.

In October 1983 the pair mated again and reoccupied their former nest site. We had anticipated their doing so and had used silicon rubber to fasten stones to the fiber glass ledge to keep eggs from rolling into the pool.

A second pair formed, nesting approximately two feet away from the first, on the same plateau. Their choice of a high, flat nesting site is significant in that rockhoppers show the same preference in the wild. The pairs displayed the pre-copulatory behavior observed in 1982 and were also ob-

served copulating. Each pair produced a clutch of two eggs. Three of the four eggs were laid between 15 and 21 October; the date of the fourth is unknown. Beginning on 15 October, and continuing until the chicks were no longer being guarded by their parents, we reduced our amaintenance activities to approximately five minutes a day and avoided the nest site as much as possible. Following a period of shared incubation duties, three chicks hatched over a two-day period (21 and 22 November). The fourth egg was found displaced from the nest on 24 November, and examination revealed that the embryo was dead and virtually decomposed.

Based on their appearance and on Keith's (1956) report, the three precocial rockhopper hatchlings were estimated to weigh approximately 100 grams each. One chick died at eleven days of age. A necropsy was performed, and starvation was the suspected cause of death. Williams (1980) reported that when both eggs hatched at a rockhopper nest in the field, one chick died of starvation within twelve days. With that report in mind, we had begun offering the parents fish five times a day, as soon as the first chick emerged from the shell. The chick that died had appeared very active, relative to its siblings, and has competed successfully for food.

The surviving chicks, one from each brood, ceased to be guarded at the nest by their parents at 31 days, and the youngsters huddled together in a creche until 73 days of age. Their natal down was molted in 15 and 24 days respectively, and molt was completed at 83 and 87 days of age. The juvenal plumage of the rockhopper is a drab version of the adult's, without the yellow crest plumes, and only a faint yellow stripe on the side of the head is present. The chicks were observed swimming for the first time within 24 hours after completing their molt.

On day 114 we removed the chicks from the exhibit. They each weighed approximately three pounds (1.36 kg), or one-half adult weight. The adult rockhoppers has begun their annual molt, which normally follows the breeding season. In the pre-molt stage, the colony had sharply increased its food consumption, adding fat reserves to attain the proper weight for fasting. In the wild, when rockhopper parents begin to fast, they force independence upon the chicks (Warham 1963). Our adult birds appeared to reduce the number of chick feedings, but the chicks refused to be hand-fed; instead, they chased after their parents, begging for food. The chicks became a threat to their parent's health, interfering with the adult's proper weight gain and conditioning; and so the chicks were removed.

"Weaning" penguin chicks to hand-feeding is a difficult but necessary process. The rockhopper chicks were weaned in four and eight days. The general procedure is to isolate the chick from the parents, to maintain it in visual contact with the keepers, and to offer it a whole, hand-held fish at least once each hour during the working day. The fish is held near to or rubbed on the bird's mandibles. Until the chick accepts the fish, the youngster is force-fed, one fish per day containing one-half a Sea Tab tablet. Force-feeding is not concurrent with the offering of hand-held fish so that the chick does not associate hand-feeding with the restraint and handling involved in force-feeding. After learning to accept food from the hand, repetition is required to guarantee the chick's accepting it as routine. Our present plan is to reinforce this feeding method for thirty days. Following this period, and as soon as their parents have finished molting, the young rockhoppers will be reintroduced to the exhibit.

Acknowledgement

I am grateful to the following persons who assisted and advised me on this project: Stephen R. Wylie, General Curator and Curator of Birds; and Lee Jackson, keeper, who made observations in my absence.

Products mentioned:

[1] Sea Tabs, a vitamin and mineral supplement for marine mammals. Pacific Research Labs., P.O. Box 1877, El Cajon, CA 92022.

[2] Roccal-D, virucidal and bactericidal disinfectant. Sterling Animal Health Products, Sterling Drug Inc., New York, NY 10016.

Literature cited:

Warham, J. 1963. The Rockhopper Penguin, *Eudyptes chrysocome*, at Macquarie Island, AUK 80: 229-256

Williams, A.J. 1980. Offspring Reduction in Macaroni and Rockhopper Penguins. AUK 97: 754-759.



Six-day-old Rockhopper Penguin chick and parent. Drawing by Gary Michael.



Education Alternatives...

Environmental Institution Management Internships Offered

The Delaware Nature Education Society is offering internships in Environmental Institution Management. Internships provide an intensive 5-week, full-time combination of instruction and practicum each January at the Ashland Nature Center near Hockessin. Launched in 1983 in cooperation with the University of Delaware, the program is believed to be the first of its kind in the nation. It was designed to fill an educational void for potential managers of environmental centers well-schooled in related science disciplines but without training in administrative subject areas.

In seminar sessions with DNES staff and guest lecturers, including attorneys, investment counselors, and advertising professionals, students study all aspects of the founding and operation of an environmental center. The array of topics covered includes budgeting and financial development, goal definition and long-range planning, programming and public relations, staffing and personnel policies, building and grounds management, the conservation and preservation roles, and legal considerations. Individual and group projects allow participants to both integrate the knowledge gained in a summary manual and to apply it specifically to a simulated center of their creation.

Students are exposed to an assortment of environmental institutions in the Greater Delaware area and gain insights into their administration by in-depth, on-site interviews with staff members. Places visited include the Philadelphia Academy of Natural Science, the Brandywine Conservancy, and the Philadelphia Zoological Gardens.

A certificate and letter of evaluation are furnished upon successful completion of the program. Graduate credit can be arranged independently. The internships are open to graduate students and post-graduate science professionals only. The fee is \$500 payable in two installments. Four \$500 Ashland Prize Scholarships are available including a waiver of the course fee.

The program is limited to six students on a competitive basis. Applicants are required to submit a statement of purpose, transcripts, and references. Applications are due by November 18 for the following January's internship. Selection Committee decisions are announced in early December.

For more information and internship applications contact:

Environmental Institution Management
Internship Coordinator
Delaware Nature Education Society
P.O. Box 700
Hockessin, DE 19707
(302) 239-2334



THINK Safety!

Jill Grade
Safety Column Coordinator

The following are excerpts from a safety handout used at the Woodland Park Zoo. It is provided by the Seattle Parks and Recreation Department as a reminder to THINK SAFETY. If your facility uses similar literature, I would like to reprint it in this column.

The safety message cartoons appearing in many issues of the AKF were provided by Lynn Ash from Busch Gardens. I would like to thank Lynn and Judie Steenberg of Woodland Park Zoo for their participation in this column. Without their contributions, there would be no safety column.

Safety is a subject we are often uninterested in until an accident affects us personally. We just don't think much about it as we go through our daily routines. Much of our work is repetitious, and we assume that we will automatically follow safe procedures. We are not generally sensitive to safety requirements in the many little jobs that make up our work routines.

The purpose of this column is to provide an awareness of safety hazards and their remedies - to keep "safe keeping" on our minds as we go about our daily tasks. We need contributions to this column. A button and bumper sticker campaign would also be helpful in constantly reminding us to THINK SAFETY. We need volunteers to produce and distribute this material. Contributions should be sent to: Jill Grade, Station Manager, International Bird House, 956 W. Huron St., Chicago, IL 60622.

Let's get involved before we get hurt.

SAFETY - Your Responsibility

"The Seattle Department of Parks and Recreation is committed to providing safe and healthful working conditions for its employees. In turn, each employee must accept personal responsibility for working safely. Your willingness and ability to work safely is a condition of employment with our Department."

Walter R. Hundley
Superintendent

LEARN the safe way to do your job before you start. Follow instructions. If you do not know the rule or the proper procedure ASK.

THINK safety, and act safety at all times. Work in accordance with safe working practices.

OBEY safety rules and regulations, they are for your protection.

WEAR proper clothing and protective equipment. Check with your supervisor regarding safe clothing and prescribed protective equipment.

CONDUCT yourself properly at all times, horseplay is prohibited.

OPERATE only the equipment you are authorized to use. Use, adjust and repair equipment only when authorized.

INSPECT tools and equipment for safe condition before starting work. Use the right tool for the job. Use it correctly and safely.

THINK SAFETY!, *Continued*

ADVISE your supervisor promptly of any unsafe conditions or practice.

HELP keep everything clean. Keep work areas clean and orderly at all times.

LIFT and handle material properly. When lifting, bend your knees. Know your limitations and get help with heavy and awkward loads.

REPORT all accidents to your supervisor immediately. Get first aid promptly. Know emergency telephone numbers and emergency procedures.

SUPPORT the Department safety program. Make safety suggestions. Serve on the safety committee.

REMEMBER - Efficiency on the job means
the job was done safely.



SURVIVAL OF THE FITTEST

*The look of life is in their eyes,
but they get bored, you can tell from their sighs.
They have good food and security,
they get lots of love, but they're not free.*

*It would be great if they could roam,
but we humans have destroyed their homes.
Some folks think the Zoo is sad,
but thanks to humans, it's all they have.*

*When will we ever realize,
without animals the earth will die.
If we're to survive, they must too;
it's part of human nature's rule.*

*Yes years ago when life began,
all animals had the run of the land.
Then came along intelligent beings,
and slowly took away their means.*

*On goes the struggle to survive,
Animals and Humans, will we live or die?*

*by Alyce Orr
Central Florida AAZK Chapter*

Wildlife Research.....

Columbus Zoo's 1981 Bald Eaglet Returns to Wild and Reproduces



In 1981 the Columbus Zoo's bald eaglet that hatched was sent to Land Between the Lakes in Golden Pond, KY to be released into the wild via hacking. We recently received word from the Tennessee Valley Authority that our eaglet "Freedom" had returned to the valley with a mate, nested and reproduced one offspring.

According to the TVA NEWS, our eaglet has set three records for the Tennessee Valley's reintroduction program. They are as follows:

- 1) In 21 years it has been the first successful eagle nest, second in the state since 1961.
- 2) First return and nesting of a captively-hatched and raised eagle in the Southeast, fourth in the nation.
- 3) Finally, and most importantly, it is the youngest bald eagle (3 yrs) believed to reproduce successfully. Prior to this biologists assumed eagles did not reach sexual maturity until the age of four or five.

The above information was taken from the Tennessee Valley Authority Newsletter by Scott Seiber.

Since the first successful breeding of bald eagles at the Columbus Zoo in 1978, we have hatched and raised four eaglets. 1978's eaglet was sent to the Detroit Zoo to pair with a lone male. 1980's eaglet was sent to the Montezuma National Wildlife Refuge in Seneca Falls, NY to be released via hacking. 1981's eaglet was removed from the nest and placed in an unproductive nest of wild bald eagles on the Great Lakes Region of Ohio. The last effort was what our staff and the Ohio Department of Natural Resources staff had been striving for during the past five years. The nesting behavior finally coincided and the program was successful.

Hopefully with the result of our 1981 eaglet's reproducing in the wild, it will encourage other states that are not presently involved in the reintroduction of bald eagles back to the wild by way of captive propagation to become active in this most worthwhile project.

*submitted by Yvonne Clippinger
Head Keeper/Birds
Columbus Zoo, Powell, OH*



Legislative News

Compiled by Kevin Conway
Legislative Coordinator

SUCCESSFUL EMBRYO TRANSPLANTS BRING NEW HOPE FOR ENDANGERED

Successful births of interspecies embryo transfers have elated scientists and raised the possibility of increased reproduction among rare and endangered species without transporting the animals from the wilds to controlled mating locations. Recently, in Kentucky, a horse gave birth to a zebra; at the Bronx Zoo in New York, a dairy cow gave birth to a member of an Asian species of cattle (gaur); and within the past few months, two rare African bongo antelopes were born at the Cincinnati Zoo -- one to a surrogate bongo and one to an African eland. In the case of the bongos, the embryos were obtained from an animal at the Los Angeles Zoo and transplanted with a hypodermic-like device so the risk of surgery was eliminated.

---Ecology USA
June 1984

INTERNATIONAL WHALING COMMISSION MEETING

In June, Edward Asper attended the International Whaling Commission (IWC) meeting as an official delegate of the U.S. The meeting was held in Buenos Aires, Argentina. AAZPA, which qualified this year as a non-governmental organization, is allowed representation at each IWC meeting. A topic of particular interest to AAZPA was the discussion of the Non-Consumptive Use of Cetaceans. A Working Group, established specifically to address that topic, discussed the Whales Alive report - a product of a conference held in Boston in June 1983. That conference was sponsored by the IWC and several conservation groups.

The Working Group did not accept any of the recommendations of the Whales Alive report. In fact, both the USSR and Japan challenged that the IWC lacked the competence to discuss the non-consumptive use of whales. The Japanese representative referring to the Convention for the regulation of whaling said, "It is quite clear from the title, preamble and the provisions themselves of the Convention, that the Convention is for the consumptive use of whales."

The AAZPA report "Animals on Display: Educational and Scientific Impact" the product of a special meeting in Chicago last February, had been made available to the Working Group as resource material.

---AAZPA Newsletter
September 1984

WOOD STORK LISTED AS ENDANGERED SPECIES

The U.S. breeding population of wood stork (*Mycteria americana*) has decreased over 75 percent from its 1930 levels, leading the USFWS to list this large bird as an Endangered species. It is the only true species of stork breeding in this country. Without a change in current trends, the wood stork population could become extirpated by the turn of the century. Destruction and alteration of feeding habitat are the main reasons for its decline in range and numbers.

Wood storks are large, long-legged white wading birds with an unfeathered gray head and a thick, dark bill. They frequent freshwater and brackish wetlands, feeding primarily on small fish that they locate by groping in shallow water with their long beaks. Wood stork nests are constructed in cypress and mangrove swamps, habitat types that have been steadily reduced in acreage over recent decades. The U.S. breeding population of the wood stork has declined from an estimated 20,000 pairs in the 1930's to fewer than 5,000 pairs each year since 1978. Artificial manipulation of natural water regimes, particularly in the important south Florida area, has decreased prey fish numbers and availability. Losses of nesting habitat also may be affecting storks in central Florida. Disturbances by humans during the nesting season at some rookeries has caused adult birds to leave their nests, exposing the eggs to predators and the elements.

Breeding wood storks in the U.S. are now restricted to parts of Florida, southeastern Georgia, and South Carolina. (Formerly, nesting occurred also in Texas, Louisiana, Mississippi, and Alabama.)

As an Endangered species, the U.S. breeding population of the wood stork receives all of the protection authorized under the Act. Taking, possessing, transporting, and engaging in interstate or international trade in this species are among the activities prohibited. Other benefits to the wood stork of the listing are a wider public knowledge of its reduced status, possible Federal funding of State conservation programs for the species, and the development of a recovery plan.

---Endangered Species Technical Bulletin
Volume 1X, Number 3

RECENT ACTIONS UNDER ENDANGERED SPECIES ACT

In recent actions under the Endangered Species Act of 1973, as amended, Department of Interior's Fish and Wildlife Service has:

(1) Issued a final ruling designating Endangered Species and Critical Habitat Status for the Clay-loving wild-buckwheat (*Eriogonum pelinophilum*) found only on 120 acres of private land in Delta County, CO, effective August 13, 1984; (2) Issued a final ruling designating Endangered Status for (a) Ashy dogweed (*Dyssodia tephroleuca*) and (b) Key tree-cactus (*Cereus robinii*), both effective August 20, 1984; (3) proposed Endangered Status for Lakela's mint (*Dicerandra immaculata*); (4) Proposed Threatened Status for Blue Ridge Goldenrod (*Solidago spithamea*).

In further action, the USFWS issued notice of finding on petitions as follows:

(a) April 12, 1973, petition from the Desert Fishes Council to list 17 desert fishes -- FWS found listing warranted for 16. Proposal for listing of the 17th, Little Colorado spinedace (*Lepidomeda vittata*) is expected to be published in the near future. The 16 to be listed now are: Desert dace, Hutton Spring tui chub, Fish Creek Springs tui chub, Owens tui chub, Yaqui chub, White River spinedace, Big Springs spinedace, Pecos bluntnose shiner, Foskett Spring speckled dace, Modoc sucker, Warner sucker, June sucker, White River springfish, Hiko White River springfish, Railroad Valley springfish and Desert pupfish.

(b) April 30, 1984, petition from Ms. Marie C. Peromme of Clarence, NY, requesting Endangered Status for the grass owl (*Tyto longinembriis*) and the long-legged bustard (*Sypheotides indica*), and Threatened Status for

for the white-stemmed evening-star (Mentzelia albicaulis), and the peach-leaved willow (Salix amygdaloides), and three milkworts (Polygala alba, p. paucifolia, and P. verticillata)-- FWS found no data indicating threats to any of the species and rejected the petition.

(c) March 16, 1984, petition from Dr. Jeffrey A. Cox of the Florida State Museum requesting Threatened Status for the Florida scrub jay (Aphelocoma coerulescens coerulescens)-- FWS found listing warranted.

(d) February 3, 1984, petition from the Pacific Legal Foundation, Save Our Shellfish, and the Greater Los Angeles Council of Divers, requesting the delisting of the southern sea otter (Enhydra lutris nereis), currently classified as Threatened-- FWS rejected the petition.

(e) May 1, 1983, petition from Friends of the Sea Otter, requesting the reclassification of the southern sea otter from Threatened to Endangered: FWS found listing as Endangered not warranted at this time because the danger of extinction does not appear to be immediate and because a recovery plan for the sea otter is currently being implemented.

(f) March 17, 1984 petition from M. Alan Herndon of Florida International University requesting that two Florida plants, Fabaceae (Amorpha crenulata) and Fabaceae (Galactia smallii) be listed as Endangered--FWS found action may be warranted and placed the plants in category 1 of the notice of review on candidates.

FWS would appreciate any additional data, comments or suggestions, from the public, other concerned governmental agencies, the scientific community, industry or other interested party concerning the Florida scrub jay, and the two Fabaceae.

---ECOLOGY USA
August 13, 1984



HUSBANDRY HINTS

AN EASILY-CONSTRUCTED SEAL RESTRAINT NET

By
Linda Gottschalk
Fort Worth Zoo, Fort Worth, TX

The harbor seals (Phoca vitulina) at our aquarium are occasionally in need of veterinary attention, and the problem of how to restrain them for examination and treatment was vexing. Our pools have a limited amount of above-water-level rock work, but no way to trap them there. The pool sides are steeply sloped, and even when dry are tricky to maneuver. We needed a strong but lightweight trap that could be lifted up over the guard rail while keeping the seal securely supported but unable to escape.

We solved this problem by constructing a 102" X 93" (259 X 236 cm) rectangular net with support poles on the long sides, and a gathering rope woven into each short side. The pool was drained, and the desired seal was isolated on the inner pool floor. With one person holding the two pole ends up and a foot or so apart (net slightly gathered), another person encourages the seal to waddle into the lowered and wide-open other end of the net. Using a broom or pole is helpful in keeping a safe distance. When the seal is approximately at the center of the net, one or

AN EASILY-CONSTRUCTED SEAL RESTRAINT NET, Continued

two persons grab the lower pole ends, lifting them up and together. With the poles held tightly together, begin rolling them down toward the seal, taking up slack net and quickly having the seal snugly wrapped like a sausage. Pull the gathering ropes tight at the ends so the animal can't wriggle out. Be sure to keep your hands out of biting range! Offering a bite stick (broom stick with rubber hose over it) may help while the vet is attending the animal.



The netting used was 2" (5 cm) mesh opening creosote-treated cotton knotted net. If the vet needs a larger area exposed, just snip the netting. It can be repaired later. Nylon net would probably work as well -- just be sure it's heavy-duty. 3/4" (1.9 cm) steel fence pipe make lightweight but strong support poles. The net was securely lashed to the poles with nylon twine (60 lb. break test). The gathering ropes were 1/2" (1.3 cm) diameter nylon rope.

All the compounds were readily available and inexpensive. The construction is simple. If a portable squeeze cage is too bulky or expensive for your seal-catching needs, this restraint net may be an effective way to allow hands-on veterinary care.



AAZK Accessories Available

Pins And Charms: Enameled three-quarter inch pins and charms with the official AAZK logo are now available. They are done in the same colors as the AAZK Patch and the charms are suitable for necklaces (you provide the chain). The price per pin or charm is \$3.50 which includes postage. To order send your name, complete mailing address, number of pins or charms desired to: AAZK National, 635 Mage Blvd., Topeka, Ks 66606. Make check or money order payable to AAZK National.

Buttons: For a "Keepers Care" Button, send the coupon and 50¢ to: Larry Sammarco, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.



Decals: The official AAZK decal is available through the Memphis Zoo Chapter. The decal is a black and white reproduction of the AAZK rhino logo, suitable for any smooth, hard surface, especially a car window. Cost is \$1.50 complete, prepaid. Make checks payable to the Memphis Chapter, AAZK and send directly to Mike Maybry, Decal Project Coordinator, 1887 Crump Ave., Memphis, TN 38107.

AAZK T-shirts with the official emblem are now available from the Phoenix Chapter. The price is \$6.75 including postage and handling. Sizes Small, Medium, Large, and Extra-Large are available in two colors: Tan with dark brown logo and Dark Brown with white logo. To order, complete coupon below, copy information and send with check or money order to: Mike Carpenter, 16 N. Hayden, #3, Scottsdale, AZ 85257. Make checks payable to "Phoenix AAZK Chapter". Shirts will be returned by 1st Class mail.

AAZK T-Shirt Order Form

Please send _____ T-shirts at \$6.75 each. COLOR: TAN _____ BROWN _____

SIZE: _____ Small _____ Medium _____ Large _____ Extra-Large

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

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 listing. Please include closing dates for position available.

ELEPHANT HANDLER...to assist trainer and participate in African elephant husbandry program/exotic hoofstock management. One year elephant experience is mandatory. Salary \$995-\$1330/mo., benefits. Send resume by 1 November 1984 to Mike Blakely, Curator/Mammals, Kansas City Zoo, Swope Park, Kansas City, MO 64132.

PARK OPERATOR...couple wanted to operate Park in N.E. New England specializing in hoofed animals. Modern apartment plus generous salary. Send resume to "Animal Parks", 240 San Lorenzo, Coral Gables, FL 33146.

KEEPER...requires experience working with diverse collection of birds and mammals. Salary \$6.72/hr. Contact Gary Harwell, Arizona-Sonora Desert Museum, Rt. 9, Box 900, Tucson, AZ 85743 (602) 883-1380, extension 260.

ZOOKEEPER...requires paid experience in husbandry skills with birds or mammals. Background in hoofed stock or cats preferred. Salary \$10,250-\$12,500 plus benefits.

APPRENTICE ZOOKEEPER...will learn all phases of care/maintenance of animals. Salary \$4.20/hr.

For either position, send a resume to Ronald Young, General Curator, Greater Baton Rouge Zoo, P.O. Box 60, Baker, LA 70704.

STUDENT INTERNSHIP...available at the Animal Rehabilitation Center within the Conservancy Nature Center in Naples, FL. Involves wildlife as well as educational programs and special projects. Interested applicants must be available for up to five months. Housing and \$55/week stipend provided. Internships available year round. To apply send resume, statement of goals and three references to: Julie Wasserman, Supervisor, Animal Rehabilitation Center, Conservancy of Nature, 1450 Merrihue Drive, Naples, FL 33942. Phone: (813) 262-2273.

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MOVING????

Please send change of address as soon as possible to:

*Dolly Clark, Administrative Secretary
American Association of Zoo Keepers, Inc.
635 Gage Blvd., Topeka, KS 66606*



AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

_____ \$20.00 Professional
Full-time Keepers

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with an animal care facility

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All members outside the
U.S. and Canada

_____ \$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 _____

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

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PROJECT HEADS

<u>Staff Exchange</u> Elandra Aum, Woodland Park <u>Program Library</u> Anne M. Payne, Detroit Zoo <u>Exhibit Design</u> Diane Forsyth, Akron Zoo <u>Keeper Accomodations List</u> Oliver Claffey, Metro Toronto <u>Keeper Training Videotapes</u> Wayne Buchanan, Woodland Park	<u>Animal Data Transfer Forms</u> Bernie Feldman, Topeka Zoo <u>Membership Directory</u> Pat Sammarco, Lincoln Park Zoo <u>Diet Notebook</u> South Florida AAZK Chapter <u>Biological Values/Gestation</u> Mary Mure, San Francisco Zoo <u>Keeper Data Survey</u> Mary Slaybaugh, San Antonio Zoo
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Reference Search

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

REGIONAL COORDINATORS

Mike Carpenter, Phoenix Zoo, AZ, Director

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
Vacancy		AR, MS, LA
Candy Kroft	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

This month's cover art is by Rose Palazzo, an associate member of AAZK who works as a switchboard operator at the Bronx Zoo in New York. Thanks, Rose!

Scoops and Scuttlebutt

MEMBERS ASKED TO COMPLETE AND RETURN AKF SURVEY

During the recent 10th National AAZK Conference in Seattle, the AKF editorial staff passed out a survey to the delegates on Animal Keepers' Forum. We received quite a few in return but would also like to hear from the many members who were unable to attend the conference. The survey is printed in this issue of AKF as a tear-out. Please take a few minutes to fill it out and return it to us. We need members input to know what you like and don't like about the Forum, what changes you feel need to be made and what direction you would like the publication to take in the future. Please return the survey to: AKF/Survey, 635 Gage Blvd., Topeka, KS 66606 no later than January 15, 1985. We hope to be able to publish the results in either the February or March 1985 issues. Thanks for your help.

ADDRESS CHANGE FOR ORDERING AAZK T-SHIRTS

Members wishing to order AAZK T-shirts are reminded that orders should be sent to Mike Carpenter at the following address: 4409 E. Palm Lane, Phoenix, AZ 85008. Details on prices, colors and sizes may be found on the accessories listing page of this issue.

DECEMBER ISSUE TO AGAIN CONTAIN AAZK CONFERENCE PROCEEDINGS

The December 1984 issue of Animal Keepers' Forum will again be expanded to include the proceedings and the papers presented at the 10th National AAZK Conference held in Seattle Sept. 30-Oct 4. All members who are current as of November 26th will receive a copy. Those members who are delinquent or new members may purchase a copy for \$6.00. A limited number of extra copies will be ordered for the press run. Members are also reminded to PLEASE notify National Headquarters when you have a change of address. Notify National DIRECTLY even if you have filed a change of address form with the post office. Each form we receive from the P.O. costs us 25¢ plus the costs of 20¢ per change order to enter or delete information on the computer. Your cooperation is greatly appreciated.

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.



FROM THE PRESIDENT

The Tenth National AAZK Conference concluded on Thursday, the fourth of October and now becomes part of AAZK history. For the benefit of those members unable to attend the conference, Animal Keepers' Forum's December issue will be devoted to the papers presented in Seattle.

The conference was very well attended. Seattle conference coordinators report that 195 delegates registered either for the full conference or on a day basis. The conference delegates represented twenty-one states and four Canadian provinces. This year we also had delegates attending from England, Israel and Japan.

Papers presented at the conference, along with workshops conducted at Woodland Park Zoo and the Point Defiance Zoo and Aquarium certainly added to our knowledge of how to care for and handle exotic wildlife. As you will see in the December AKF, papers dealt with husbandry and management of wildlife. Also discussed were zoo horticulture, exhibit design, graphics and the role of the zookeeper in all of the previously mentioned areas. Informal interactions of delegates during the week, at the zoos visited, and the conference hotel, added to the overall opinion that today's zookeepers can and should be included in all the various aspects of running and maintaining a zoological facility. It is heartening today to see an increased acceptance by zoo managers of suggestions made by their zookeepers about their individual facilities.

All of the scheduled workshops were well received and they provided an excellent forum for the exchange of information and ideas. At Woodland Park Zoo four concurrent workshops were held dealing with Night Keeping/Security, Small Felids in Captivity, Animals in Education and Gorilla Management in Woodland Park Zoo. Additionally, there were AAZK workshops on the Research Grants Committee and the Continuing Keeper Education Committee. At Point Defiance Zoo and Aquarium there were four more workshops; these dealing with Marine Mammals, Adaptations, Aquarium Maintenance and Elephant Training. At Northwest Trek Wildlife Park the staff gave an in-depth explanation and tour of their stock restraint system.

As part of the standard conference proceedings, the AAZK Board of Directors held its board meeting on Sunday, September 30th. In reviewing all of the current AAZK projects and committees there were several vacancies created for project/committee coordination. If any member is currently interested in becoming a coordinator for Library Resources, the Infant Development notebook or Legislative Information, please contact me. Additionally, we are asking for volunteers to serve on the Nominations and Election Committee. Former coordinator Lynne Villers has accepted reappointment to this committee but there are still four committee positions to be filled. Both professional and affiliate AAZK members can hold appointed positions so if you desire to volunteer your time to the organization here are some good opportunities.

The list of people to be thanked for all their hard work in making this conference possible is a long one. On behalf of the Board of Directors and those delegates in attendance I would like to thank conference co-coordinators Debbie Stecher, Phil Pennock and Harmony Frazier-Taylor. Thanks also to the staff at Woodland Park Zoological Garden, Point Defiance Zoo and Aquarium, Seattle Aquarium and Northwest Trek Wildlife Park. Also thanks to the docents and volunteers at Woodland Park Zoo and Point Defiance Zoo and Aquarium for touring and feeding us at your facilities. Finally, a thank-you to the Puget Sound AAZK Chapter for a national conference that will always be remembered fondly.

Sincerely,

Kevin Conway



Births & Hatchings

MIAMI METROZOO.....Lori Bruckheim

August and September 1984 B&H include: Mammals - 0.1 Blackbuck antelope, 0.1 Orangutan, 1.1 Sambar deer, 1.0 Greater kudu, 2.0 Thomson's gazelle, 0.1 Baird's tapir, 1.0 Eld's deer, 0.0.1 Red kangaroo, 1.1 Dama gazelle, 2.0 Nilgai, 0.1 Forest buffalo, 0.1 Malayan sun bear; Birds - 0.0.3 Stanley crane, 0.0.8 Ostrich and 0.0.1 Green junglefowl.

BROOKFIELD ZOO.....John S. Stoddard

B&H for August and September 1984 include: Mammals - 0.0.10 Harvest mouse, 0.0.2 California deer mouse, 0.0.2 Spiny mouse, 0.0.16 White-toothed shrew, 0.0.1 Cui, 0.0.1 Fruit bat; Birds - 0.0.1 Blue-shouldered robin chat, 0.0.3 Scarlet crowned barbet, 0.0.2 Red-crested cardinal, 0.0.2 Violet touraco, 0.0.1 Red and white crane; Reptiles - 0.0.15 Red Hispanolan boa and 0.0.9 Yellow rat snake.

ROGER WILLIAMS PARK ZOO.....Adrienne Miller

January through August 1984 B&H include: Mammals - 4.2 Barbados sheep, 0.1 Domestic nubian goat, 1.0 Ring-tailed lemur, 1.1 Domestic sheep, 0.0.2 Saddleback tamarin, 0.0.4 Aoudad, 1.1 Eland, 0.1 Bison, 1.1 Reeve's muntjac, 0.0.3 White-tail deer, 0.1 Sika deer, 1.0 Grant's zebra and 0.1.3 Parma wallaby; Birds - 0.0.2 Golden eagles, 0.0.8 Guinea fowl, 0.0.30 Canada goose; Reptiles - 0.0.6 Corn snake.

BRONX ZOO.....Margaret Price

August and September 1984 B&H include: Mammals - 2.0 Lesser galago, 12 Pen-tailed bettong, 1.0 South American tapir, 9.0 Minnie Down's mouse, 0.1 Maxwell duiker, 3.0 Wisent, 1.0 Himalayan tahr, 3.3 Guanaco, 2.0 Collared peccary, 1.0 Pere David's deer, 1.0 Common tree shrew, 0.1 Black-backed duiker, 1.0 Lesser spear-nosed bat, 1.0 Douroucouli, 1.0 American bison, 5.0 African spotted grass mouse, 3.0 Egyptian fruit bat, 3.0 Cotton top marmoset, 1.0 Mongolian wild horse, 1.0 Acouchi, 1.0 Yak, 0.1 Gaur, 1.0 Axis deer, 3.0 Brown-antlered deer, 1.0 Blackbuck, 2.0 Formosan sika deer, 1.0 Mouflon, 2.0 Hammer-headed bat, 3.0 Capybara; Birds - 2 Chilean flamingo, 1 Mandarin duck, 4 Patagonian conure, 6 White-quilled black bustard, 4 Red-crested touraco, 1 Carribean flamingo, 6 Panama boat billed heron, 3 Malayan fairy bluebird, 4 Crested tinamou, 3 Greater rhea, 1 Red-crested cardinal, 2 White-browed robin chat, 2 Silver gull, 1 White-cheeked touraco, 1 Melba finch, 4 Common rhea, 1 Green wood hoopoe, 2 Malayan peacock pheasant, 8 Guinea fowl, 1 Palawan peacock pheasant, 2 Edward's lorikeet, 2 Purple gallinule, 2 Striped crane, 4 Crested guinea-fowl, 1 Scarlet ibis, 1 Mauritius pink pigeon; Reptiles - 1 Brazilian rainbow boa, 6 Cuban crocodile, 2 Travancore, 11 Black-lipped cobra, 4 Chinese alligator and 12 Forest cobra.

DALLAS ZOO.....Tami Jones

B&H for September 1984 include: Mammals - 0.1 Cape buffalo, 0.0.1 Hamadrayas baboon, 0.0.1 Kikuyu colobus, 1.0 Reticulated giraffe, 1.0 Suni, 0.1 Kirk's dik dik, 0.1 Klipspringer; Birds - 0.0.1 Society finch, 0.0.2 African crowned crane, 0.0.1 Sacred ibis, 0.0.1 Nicobar pigeon; Reptiles - 0.0.4 Honduran kingsnake (*Lampropeltis triangulum hondurensis*).

BIRTHS AND HATCHINGS, Continued

SAN ANTONIO ZOO.....Debi Reed

September 1984 B&H include: Mammals - 1.3 Dama gazelle, 2.0 Javelina, 0.0.1 Colobus monkey, 0.0.1 Gelada, 1.0 Impala, 1.0 Dorcas gazelle (DNS), 0.1 Lesser kudu, 1.0 Mouflon (DNS), 0.1 Topi (DNS), 0.1 Beisa oryx, 0.1 Thomson's gazelle; Birds - 0.0.4 East African crowned crane, 0.0.2 Yellow-backed lory, 0.0.1 Diamond dove; Reptiles - 1 Honduran milk snake, 1 Urutu, 1 Sinaloa milk snake, 3 Pueblan milk snake (1st time in collection); Aquarium Peppermint shrimp (DNS) and Seahorses (DNS). In other news, the Education Center has been completed. The additional space will help us better handle school groups and increase our educational efforts.

COLUMBUS ZOO.....Stacy Katz

May through July 1984 B&H include: Mammals - 1.2 Barbados sheep, 3.2 Silk deer, 1.0 Thomson's gazelle, 1.0.1 Damara zebra (DNS), 1.2 Snow leopard, 1.0 Squirrel monkey, 2.3.1 Cheetah (DNS); Reptile/Amphibian (approx.) - 300 Rhacophorus leucomystax, 7 Heosemy grandis (2 DNS), 9 Graptemys flavimaculata, 3 Melanochelys trijuga thermalis, 6 Elaphe bairdi, 6 Hemitheconyx caudicictus (1 DNS), 3 Lampropeltis t. polyzona, 2 Leioheterodon madagascariensis, 1 Oxybelis fulgidus, 10 Agkistrodon b. bilineatus, 1 Crotalus adamanteus, and 11 Crotalus d. durissus.

PHILADELPHIA ZOO.....Beth Bahner

January through June 1984 B&H include: Mammals - 2 Brush-tailed phalanger (1 DNS), 0.1 Vampire bat (DNS), 1.0 Red-fronted lemur, 1 Ring-tailed lemur, 1.2 Geoffroy's marmoset (DNS), 0.1 Drill, 1 White-handed gibbon, 0.1 Indian rhinoceros (DNS), 0.1 Guanaco, 1 Reeve's muntjac, 1.0 Gunther's dik dik, 1.0 Eland, 2.1 Himalayan tahr, 2.0 Chamois (1.0 DNS); Birds - 2 Humboldt penguin, 1 Scarlet ibis, 3 Hermit ibis, 5 Trumpeter swan (3 DNS), 3 Aleutian goose (1 DNS), 4 Cape Barren goose, 7 Hooded merganser (3 DNS), 3 American merganser (DNS), 2 Palawan peacock pheasant (DNS), 4 White-breasted pitta (3 DNS), 3 Scarlet tanager, 1 Blue-necked tanager, 1 Emerald starling; Reptiles - 1 Water monitor, 4 Madagascan hognose snake (1 DNS), 7 Sidewinder rattlesnake, and 25 Uracoan rattlesnake.

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

B&H for September 1984 include: Mammals - 0.1 Mandrill (DNS), 1.0 Thomson's gazelle (DNS), 0.0.1 Indian fruit bat, 0.0.2 Mountain fruit bat (Stenonycteris lanosus), possibly the first captive births; Birds - 0.0.2 Mourning dove.

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

September 1984 B&H include: Mammals - 1.1 Nyala, 1.0 Muntjac deer, 1.1 Thomson's gazelle, 0.1 Dorcas gazelle, 1.0 Dama gazelle, 1.0 Impala, 2.3 Greater kudu, 0.2 Grant's gazelle, 0.1 Guinea (Western) baboon, 0.1 Soemmering's gazelle; Birds - 1 Scarlet ibis, 6 Jandaya conure, 1 Forsten's lorikeet, 2 Sun conure, 4 Scarlet ibis, 1 Black-necked stilt, 1 Indian peafowl (Blue Phase), 5 Fischer's lovebird, 1 Lear's macaw, 2 Violet-crested touraco; Reptiles - 0.0.32 American alligator.

BIRTHS AND HATCHINGS, Continued

BUFFALO ZOO.....Elizabeth Suleski

July through September 1984 B&H include: Mammals - 2.0 Elk, 1.0 Bennet's wallaby, 0.1 Potoroo, 0.0.1 Tree porcupine, 0.1 Gemsbok, 1.0 Bison, 7 Tenrec (4 DNS), 1.0 Clouded leopard, 0.1.5 Cotton top tamarin (4 DNS), 0.1 Axis deer, 0.1.1 Geoffroy's tamarin, 0.0.3 Common marmoset (1 DNS), 0.0.4 Capybara, 1.0 Brazilian tapir, 2.2 Pygmy goat, 0.1 Mandrill, 1.0 Debrazza monkey, 0.0.7 Cuis (1 DNS); Birds - 0.0.7 Wood duck (1 DNS), 0.0.3 Blackheaded ibis (1 DNS), 0.0.1 Black swan, 0.0.2 Ross touraco; Herptiles - 0.0.2 Poison arrow frog, 2 Tokay gecko, 5 Indigo snake, 2 Puerto Rican toad, and multiple Mexican tree frogs.

LINCOLN PARK.....Susan Moy

August and September 1984 B&H include: Mammals - 0.0.1 Chimpanzee (DNS), 0.0.3 Patagonian cavy, 0.0.1 Afghanistan leopard, 2.0 Grevy's zebra, 0.0.1 Squirrel monkey, 0.0.3 Pygmy marmoset, 0.0.3 Jerboa (3 DNS), 1.1 Addra gazelle; Birds - 0.0.1 Nicobar pigeon, 0.0.1 Fairy bluebird, 0.0.1 Double-striped thicknee, 0.0.3 Jackson hornbill, 0.0.2 Superb starling (1 DNS); Reptiles - 0.0.1 Basilisk lizard, 0.0.5 Texas x Western long-nose snake, 0.0.1 Florida kingsnake, 0.0.5 Corn snake, 0.0.1 Boa constrictor and 0.0.6 Water moccasin.



Coming Events

FIFTH ANNUAL ELEPHANT MANAGEMENT SEMINAR

Nov. 29-Dec. 2, 1984

New Orleans, LA

Headquarters for the Workshop will be the New Orleans Airport Sheraton. Participation by registration only. Registration fee is \$20 per person which includes admittance to all sessions and coffee breaks; the Ice Breaker Cocktail Party; tour of Audubon Zoo (including transportation to and from); lunch on Friday and on Saturday; and the Hospitality Room. For further information contact: Carol Sullivan, Audubon Park and Zoological Garden, P.O. Box 4327, New Orleans, LA 70178, (504) 861-2537.

THE FOURTH ANNUAL DR. SCHOLL CONFERENCE ON THE NUTRITION OF CAPTIVE WILD ANIMALS

December 7-8, 1984

Chicago, IL

Held at the Lincoln Park Zoological Gardens. For further information, contact: Thomas Meehan, DVM, Staff Veterinarian, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.

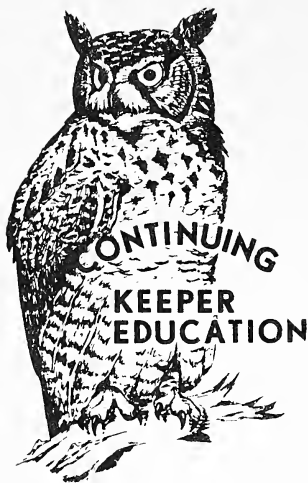
THE 8TH INTERNATIONAL WILDLIFE FILM FESTIVAL

April 1-7, 1985

Missoula, MT

Sponsored by the University of Montana Chapter of the Wildlife Society. Held at the Missoula campus of the University of Montana. For more information contact: Wildlife Film Festival, Wildlife Biology Program, University of Montana, Missoula, MT 59812.





AAZK Conference Offers Ideas, Info Exchange

By
Pat Sammarco, Coordinator
AAZK Education Committee

The Conference was, as always, a wonderful exchange of ideas and an opportunity for all of us to share information on our professional concerns and about the activity within our professional association. From the viewpoint of Continuing Keeper Education, the Conference's formal

presentations, workshops, tours and waterholes are the most direct means of educating each other in husbandry techniques and concepts. As we return home, we have the responsibility to share what we have learned with our partners in zoo animal care, and to apply what we have learned to improving our routines and even beyond routine care.

Those who could not attend will appreciate the reports of those returning, what is printed in the conference issue of AKF, and may borrow presentations from the Program Library or purchase the newest Keeper Training video tape. Since the Conference delegates, representing approximately 20% of our professional members, had the opportunity for direct input to each other, the 80% that were left home to fill in and cover our runs will need input through correspondence and response to surveys. We all know the importance of continuing our education, of seeking new ways of improving the care we give our animals, and of increasing our contributions to our zoos. AAZK gives us many ways to gain and give information.

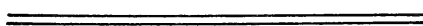
A synopsis of project activities and board decisions is part of the conference report. You will all see that increased response to and from members is a priority. Especially in the activities of the Continuing Keeper Education committee, all members are encouraged to share information, ideas, and sources with the rest of the Association. Watch carefully for your chance to contribute as various keepers coordinate the sharing of our collective knowledge.

- * Elandra Aum will be looking for new entries for her Staff Exchange list.
- * Liz McLaughlin and Jenny Rentfrow will be looking for our additions to their bibliography of captive care resources and are ready to answer our requests for leads to information.
- * Beth Poff is seeking additional keeper training manuals and materials and will be advising us on the availability of these.
- * Douglas Richardson will help us provide a testing site for those keepers who are enrolled in the Animal Management Correspondence Course and who are ready to be certified. He needs to identify who will be ready and when.
- * Pat Sammarco is seeking to list universities and colleges teaching courses or classes related directly to exotic animal care, and has a partial list available.

CONTINUING KEEPER EDUCATION, Continued

* With the coordination of Pat Sammarco and Jim Ellis and a team of associate editors, we will be producing a book on the basics of zoo keeping.

* Other projects and other keepers will be asking for help.



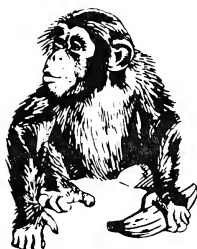
DIET NOTEBOOK

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



Viewpoint

WRITING ZOOKEEPER BLUES

*By Oliver Claffey, Senior Keeper
Metro Toronto Zoo*

It's Monday, October 1st. This morning I got up early on my day off to watch "Good Morning America". Debbera Stecher and Phil Pennock said hello from the AAZK National Conference in Seattle.

I didn't go!

There were several reasons why I decided not to attend this year; new furniture, a summer vacation with my family and a recently purchased synthesizer ate up time and money, but now that Conference time is here, it sure is a bitter pill to swallow.

As I went to bed last night, I thought of the Icebreaker in full swing. As I write this, it's lunchtime between paper sessions.

I'm going to miss those friends I've made at the last three Conferences, and the new friends I would have made at Seattle. I'm going to miss the workshops and papers, the discussions and information trades with colleagues, the thrill I always get when visiting other zoos, the volleyball and soccer games, the banquet, the pleasant and frivolous after-hours in the hospitality suite, and I'm going to miss the camaraderie, the glow within, the professional pride I feel surrounded by so many like-minded zookeepers.

I hope there is a Regional Conference in the Spring. And next October? A herd of Yak bulls couldn't keep me away from Miami!

MAKE THE MIAMI AAZK CONFERENCE A GOAL FOR 1985!!!



Information Please

The Audubon Park Zoo recently experienced an incident involving the death of a infant capybara and would like anyone having experienced a similar event to contact them with details. The infant, who was housed with its mother and siblings, was attacked and killed by a second female. Anyone having any information on such occurrences is asked to contact Jan Pruitt, Audubon Park Zoo, P.O. Box 4327, New Orleans, LA 70178 or call (504) 861-2537.

REQUEST FOR INFORMATION - Information is being gathered on the post-release behavior and survival of captive-reared and rehabilitated birds and mammals. The objectives of this study are to assess the amount and type of work that has already been done, to summarize the available data and evaluate techniques, and define the reasons for the survival or mortality of released animals. Published and unpublished reports and raw data would be appreciated. For additional information, individuals willing to cooperate please contact: Daniel R. Ludwig, PhD, Willowbrook Wildlife Haven, Forest Preserve District of DuPage County, P.O. Box 2339, Glen Ellyn, IL 60138.





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Reptile Amphibian Potpourri

Reptile Care: Relating To The Inquiring Novice - Part 6

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

ENVIRONMENT (Temperature)

The reptile keeper will be asked to consult on a variety of reptilian problems. I have found that most novices' problems with their ectothermic pets are the consequence of improper environment. Some lizards and snakes readily bask after feeding and will often discontinue basking after defecating; at this time they will seek a cooler area until their next meal. Cooler cage areas are also sought while the animal is preparing to shed. Some reptiles may not display heat-avoidance behavior when exposed to heating devices that permit direct contact. To prevent burns or hypothermia these animals should not be exposed to hot spots where direct contact to heating devices can occur, or where temperatures would rise above their preferred temperature (Table 1). Tropical reptiles have less tolerance for low temperatures than those from temperate regions. Generally, snakes tend to maintain lower body temperatures than do lizards from the same geographic area.

Reptiles must always be given voluntary access to their preferred temperature. Generally, the range for most reptiles is between 20° to 39° C (68° to 103° F). The preferred temperature is sometimes close to lethal temperatures (Table 1), so cool retreats must be provided. Unlike endothermic animals, reptiles require ambient warmth for physiological processes such as digestion, defecation, reproduction and perhaps antibody production. Failure to provide preferred temperatures during digestion can result in decomposition of food in an animal's alimentary tract.

Nocturnal heat sources help to maintain reptiles within their thermal gradient (Table 1), allowing the animal to become cooler in the evenings but at the same time, preventing temperatures from dropping below their active range. These include red lightbulbs, either 25 watt (Colortone, Westinghouse) or 250 watt infrared, heating cables (avoid for burrowing animals since these animals burrow to cool themselves), hot rocks, and heating pads (Warning: heating pad thermostats have been known to fail, and fluid soaked heating pads with holes have been known to shock animals). All heating devices should be kept on the cage exterior to prevent accidental burns. These same precautions apply to daytime heating devices.

Environmental lighting will be discussed in Part 7.

REFERENCE

Wallach, J.D.: "Environmental and nutritional diseases of captive reptiles." J. Am. Vet. Med. Assoc., 159: 1632-1633. 1971.

TABLE 1. Cloacal Temperatures of Some Reptiles (Wallach 1971)

Species	Range of Active Reptiles (*)	Preferred Temperature (**)	Critical High (***)
American Alligator	26.0-37.0C (78.0-98.0F)	32.0-35.0C (89.6-95.0F)	38.0-39.0C (100.4-102.2F)
American Chameleon (<i>Anolis</i> lizard)		22.6-30.4C (72.3-86.0F)	41.8C (107.0F)
Boa		24.8-34.0C (78.0-93.0F)	
Desert Tortoise	19.0-37.8C (66.2-100.4F)	26.7-29.4C (80.6-85.1F)	39.5-43.0C (103.1-109.0F)
Five-lined Skink	13.5-37.0C (56.3-98.6F)	28.0-36.0C (82.4-96.8F)	41.0C (105.8F)
Garter Snake	16.0-35.0C (60.8-95.0F)	20.0-35.0C (68.0-95.0F)	38.5-41.0C (101.3-105.0F)
Gopher Snake	16.0-34.6C (60.8-94.0F)	22.0-31.0C (71.6-87.8F)	45.5C (104.9F)
Green Iguana	26.7-42.4C (79.7-108.5F)	29.5-39.5C (85.1-103.1F)	46.1C (114.8F)
Painted Turtle	8.0-30.2C (46.4-86.0F)		39.0-41.0C (102.2-105.8F)
Racer		24.8-36.0C (76.0-96.9F)	42.5C (108.0F)

* Thermal gradient temperature is the ambient temperature where reptiles remain active. This includes the preferred temperature, but below the thermal gradient temperature, the reptile becomes dormant.

** Preferred temperature is the temperature that reptiles voluntarily establish when a range of temperatures is available.

*** Critical high temperature is near lethal temperature.



THERMOSTAT-CONTROLLED HEAT LAMP SYSTEM
FOR ZOO ANIMALS

By
Brack Barker
Biological Parks Staff
Santa Fe Community College
Gainesville, FL

In the past, zoos have had to rely on numerous ways of keeping animals warm and protected from the winter's cold. Whether it has been from bringing animals indoors or letting them slowly acclimate, these methods have not been without their problems.

A method that we have used the last four years here at the Teaching Zoo works quite well. Through the use of thermostat-controlled heat lamps, we have been able to acclimate sub-tropical species and allow them to remain outdoors all winter.

True, the winters here in Florida are not as harsh as the ones experienced in the northern climes, but we do get temperature drops down towards the zero mark. This coupled with the humidity can make for some miserable periods of cold.

For our primates and reptiles, the use of the heat lamps are coupled with the existing night boxes and extra hay. For our birds, we provide the added protection of a wind-rain barrier of visqueen and parachute material or plywood.

Construction of the heat lamp system is fairly simple and low in cost when you take into consideration the replacement value of the animals involved. Also the exhibit value is maintained, for the zoo visitor can still enjoy the zoo and not look at alot of empty enclosures. Indoor captivity stress is also avoided both on the animal and the keeper.

The names and types of materials used may vary for your location, but the design is simple enough that you can improvise if necessary. First you need to take into consideration the type of animal, night box or enclosure to be served by the heatlamp. The number of heat lamps used are determined by the number of animals and whether they will get along together socially in one area. Generally, we provide one infrared heat lamp per night box (36"x24"x18") for our primates and one or two lamps for birds and reptiles.

Plastic five-gallon buckets are used for mounting on our primate night boxes and metal reflecting light fixtures are used for the birds and reptiles. The buckets can be obtained from restaurants or paint shops.

Construction is as follows: drill two holes in the bottom and center of the bucket. Using $1\frac{1}{2}$ " x $1\frac{1}{4}$ " bolts and appropriate washers and nuts, attach the metal electric mounting box on the inside of the bucket. Next, drill another hole on the side of the bucket $\frac{1}{2}$ " from the bottom edge. This is where your electrical wire will pass through. Wire and attach your porcelain ceiling lamp fixture to the mounting box. Next, attach a male electrical plug to the other end of the wire. The length of the wire used is determined by how far away you want the thermostat box from the heat lamp. After inserting an infrared heat lamp bulb, the bucket is ready to use as is or with an attached thermostat. The thermostats used are the liquid-filled double wafer copper type. Solid state transistorized thermostats are available at a higher cost, but these have not been used at this zoo.

Thermostat controlled heatlamp system

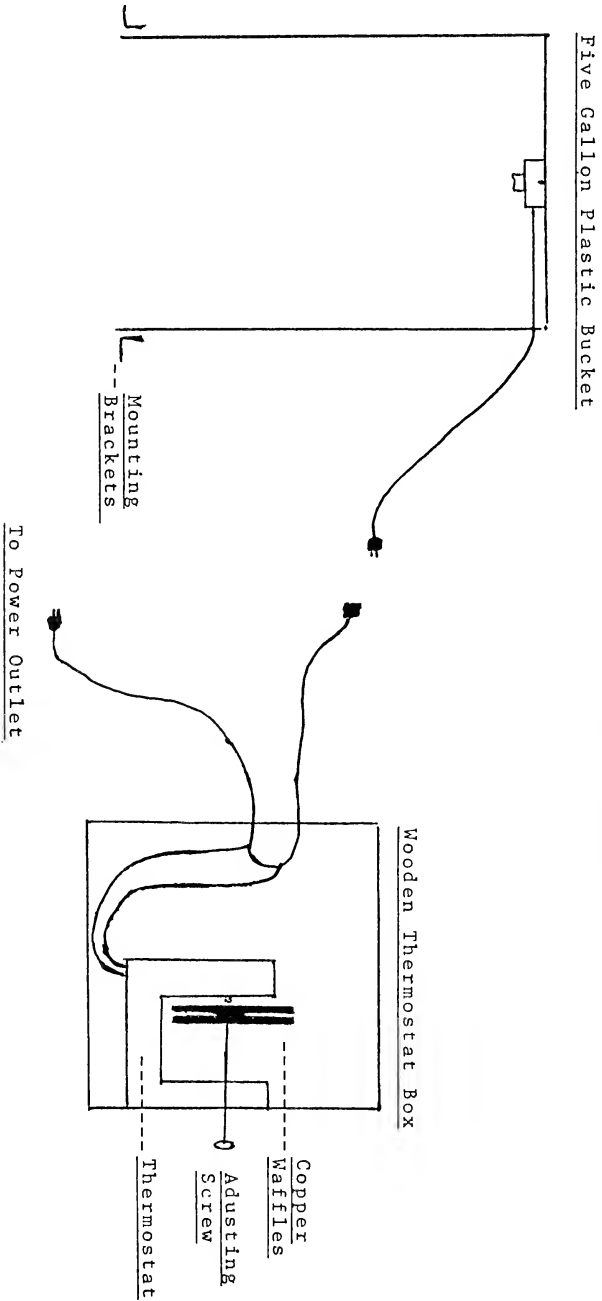


DIAGRAM
NOT TO SCALE

THERMOSTAT-CONTROLLED HEAT LAMP SYSTEM FOR ZOO ANIMALS, Continued

The thermostat is mounted in a wooden box of 1"x6"s. Dimensions are (6½" x 6½" x 5"). A hole must be drilled in the side of the box to accommodate the threaded adjusting screw. Two more holes are drilled, one for the wire with the female plug and one for the wire with the male plug. After the wiring is complete, tape the bare ends with electrician's tape and attach the cover.

What you have now is a heat bucket or metal reflecting light fixture that can be plugged into a thermostat box. Mounting of the bucket and thermostat can be accompanied by the use of metal 90 degree angles. Metal light reflectors can be attached using tying wire.

Safety is of prime importance when using electrical objects around animals. The wooden night boxes for our primates have 10" holes cut in them so the buckets can be mounted on the outside. Access to the light, by the primates, is prevented by sandwiching weldwire and porch screen between two pieces of plywood and the night box itself. Access to the wires must be prevented as primates may use their tails to grasp the wires or birds may chew into them. The metal light fixture openings are covered by porch screen material, not only to prevent access but in case a bulb shatters, the fragments will be contained. Another word of caution is that if water splashes onto the infrared bulb when it is on, it will shatter.

Conclusion

This heat lamp system has proven very effective for our zoo. Zoos in northern climes may not be able to utilize this system all winter due to factors such as snow and extended periods of freezing weather. However, it may allow them to extend the period of time certain animals can stay out before being brought in for the winter.

Most of the materials can be bought at hardware stores or local suppliers of farm equipment. The only problem encountered is that after long term continued use, some of the parts wear out - specifically the metal wafers of the thermostats, the porcelain lamp holders and, of course, the heat lamp bulbs themselves.

During non-use months, the systems are removed, serviced and put in storage to maintain longevity.

Products mentioned in text:

Thermostats - Marshfarms
P.O. Box 7
Garden Grove, CA 92642

Valentine Equipment Co.
P.O. Box 53
Hinsdale, IL 60521

Heat lamp bulbs - General Electric
Infra-red Heat, Reflector bulb
250W 115-125V



For All You Do..This One's For You

Dear Editor,

I have been an animal keeper for seven years and a carpenter for thirteen. I have frequently be appalled by the elementary design flaws I find at most zoos--flaws that get keepers and animals hurt, and flaws that waste the keeper's time. I hope you can use these simple nuts and bolts contributions.

Tom Rudolph, Senior Animal Keeper
Greensboro Natural Sceince Center
Greensboro, North Carolina

Don't Just Shake Your Fist At the Sky

Our favorite brand of nationally advertised lock, the one that can't be opened with a cannon, has a few problems that most locks share. In wet locations, such as feed tray slots and areas where rain splash reaches the lock, I have seen them rust out completely in as little as two years. In dry locations the same locks last as much as twenty years.

A solution is to hood the locks in various ways to prevent water from entering the locks. In some places a sheetmetal hood can be attached above the hasp. On our guillotine doors, we place a soft plastic medicine bottle over the lock and retain the cover with cord so it will not become a toy for the animal.

Preventing water from entering the locks also saves a lot of time and frustration when freezing weather arrives. I wish I had back a tenth of the time I have wasted standing in the freezing wind thawing out locks with my bare hands.

In bad weather I now carry both a butane lighter and a screw-top cosmetic bottle full of automatic transmission fluid. ATF is thin enough to penetrate between the multiple plates of the locks and drive out residual moisture. You can watch the beads of water roll out of the bottom of the lock as the oil displaces it. ATF also does not thicken and become sticky in extreme cold. The cosmetic bottle allows me to carry the oil in an inner pocket to keep it warm. I take care to wipe off any excess oil because most lubricants are mildly toxic.

Safe Inspection

Due to design problems in our bobcat's den, we were unable to monitor the progress of our three new kittens in their den box. To avoid the trauma, either to the keepers or to the cats, of forcibly removing the mother for inspection; we lashed a 10 x 8 inch pickup truck mirror to a push broom handle with electric fence wire. Standing behind a protective wall of welded wire, we can now satisfy our parental concern by poking the mirror into the box and shining a strong flashlight into the face of the mirror. The light reflects on whatever the mirror is pointed at.

Gradients and Drainage in Zoo Exhibits

An old plumber once told me that, "Po po does not flow uphill". This is the essential law of hydraulics, but it is understood by very few maintenance men and contractors. Continued dampness in animal enclosures is, in my opinion, one of the most common health hazards in the animal business.

Everything from thrush to unsightly algae and infectious diseases is supported by damp conditions. I also wonder what the stress and discomfort of wet conditions does to promote secondary health problems.

Regrading concrete is not as difficult as it seems, and can frequently be as simple as pouring a skim, sloped toward the drain, on top of the old stuff. Gradients in zoo exhibits need to be more radical than those in regular construction. A gradient of 3/4 inch in 4 feet will assure good runoff on concrete; but in a household basement radical gradients cause tables to sit out of level and chairs to rock. Earth gradients often need to be very radical and may require special drain tiles, ditches, etc.

Most contractors actually understand gradient, but don't take it seriously. If the importance of good drainage could be emphatically explained and enforced with contract penalties; perhaps fewer zookeepers would spend their mornings squeegeeing water uphill towards the drain.

Temporary Quarters

I can't count the number of times I have ripped my clothes or my skin on sloppy work that was done by zookeepers. Usually under the auspices of "This is only temporary", or "We are in a hurry", some incredibly poor work gets done. Things like jagged edges of wire left unclipped, projecting bolts standing out, splinters unsanded, and nails hanging out are common hazards in the back holding areas of many zoos.

A friend of mine, who was inducted into the army in 1969, told me about the temporary barracks he stayed in. They constructed these barracks as temporaries during World War I and are probably still using them. I have decided that nothing we repair or build should be considered temporary; and I have noticed that messy patchwork stays around like a monument. Folk wisdom says "If you can't find the time to do it right, when will you find the time to do it over?"

The only standards I relax on "quick work" are those of fine finish. No one cares what a cage in the holding area looks like as long as it will safely hold the animal. As a habit I cut, smooth or bend back the exposed edges of wire, cut off projecting bolts and extract exposed nails. When I work I bear in mind the times I have seen an excited animal snag itself and I try not to leave traps for future keepers, especially me.



Keeper's Alert

The Society for the Study of Amphibians and Reptiles has announced that proposals are now being accepted for the 1985 Grants-in-Herpetology Program. The program is designed to provide financial assistance to individuals or organizations involved in research and/or conservation of amphibians and reptiles. Applicants or their advisor or sponsor must be a member of SSAR. Grant proposals will be considered in five areas and each proposal must include specific information and meet certain criteria. Proposals must be postmarked no later than 12 April 1985. For additional information, contact: Dr. James Bacon, Department of Herpetology, Zoological Society of San Diego, P.O. Box 551, San Diego, CA 92112.

Research.....

HABITAT PREFERENCE IN HOUSE CRICKETS (*Acheta domesticus*)

By
Brenda Cunningham
Former Summer Intern
National Zoo, Washington, D.C.

House crickets (*Acheta domesticus*) are a commonly used food source for many reptiles and mammals in zoological parks. Some animals eat crickets exclusively, for example, at the National Zoological Park in Washington, D.C., crickets are the primary food source for tarsiers, leopard geckos and oriental firebellied toads. Although crickets alone are not a nutritionally balanced diet, it has been found that through supplying the crickets with a special food, their nutritional value may be increased (Allen and Oftedal, 1983).

The location and behavior of the crickets was found to influence the foraging behavior of the tarsiers (Roberts and Cunningham, in prep.). In an effort to identify factors controlling foraging behavior and habitat use of the tarsiers, cricket behavior was experimentally examined.

Materials and Methods

Four factors that seemed to be important in cricket location were substrate color, texture, height and light intensity. Unless stated otherwise, each of these variables was tested in a plastic lined wooden cage 80cm long x 60cm wide x 45cm high. A 7.5 watt bulb was suspended above the cage. For each experiment 10 trials were conducted, each using 20 fresh crickets tossed into the cage. Numbers of crickets on each substrate were recorded 5, 10 and 15 minutes after initiation.

Experiment 1: Substrate color

To determine if the crickets had a preference for light or dark colored substrates, half of the floor of the cage was covered with brown pine bark chips and the other half with light colored pine shavings.

Experiment 2: Substrate illumination

To determine the effect of illumination on substrate preference, the floor of the cage was covered entirely with brown pine bark chips and a piece of cardboard was placed across half of the top of the cage to provide shade in that half.

Experiment 3: Substrate texture (perching)

To determine if the crickets preferred perching on smooth or rough surfaces, half of the floor of the cage was covered with brown contact paper and half with brown pine bark chips.

Experiment 4: Substrate texture (perching)

To determine if the crickets preferred perching on a smooth surface or on one providing protective cover, half of the floor of the cage was covered with brown contact paper and half with dry leaves.

16. Of the numerous regular and semi-regular sections in AKF, how do you rate the frequency with which you read the following: (Please circle response)

	<u>ALWAYS</u>	<u>SOMETIMES</u>	<u>NEVER</u>
Scoops and Scuttlebutt	1	2	3
Births and Hatchings	1	2	3
Coming Events	1	2	3
Continuing Keeper Education	1	2	3
Chapter News	1	2	3
Opportunity Knocks	1	2	3
Legislative News	1	2	3
Elephant Set	1	2	3
Bird Calls	1	2	3
Great Ape Pandemonium	1	2	3
Reptile Amphibian Potpourri	1	2	3
Education Alternatives	1	2	3
Feed Bag	1	2	3
Exhibit Options	1	2	3
Book Reviews	1	2	3

ANIMAL KEEPRERS' FORUM SURVEY

To help the AKF editorial staff better plan for our second decade, we would appreciate your filling out the following questionnaire. Your responses will help us to determine both content and format changes and/or additions to better serve the AAZK membership.

- | | | | |
|--|----------------|--------------------|--------------|
| 1. Are you satisfied with the present front cover drawings of <u>AKF</u> ? | YES | NO | |
| 2. Are you satisfied with the present front inside cover layout of Editors, Board of Directors, Project Heads, Coordinators and Chairmen? | YES | NO | |
| 3. Are you satisfied with the present inside back cover format for membership application/information? | YES | NO | |
| 4. Every effort is made to have the <u>AKF</u> in the mails the first Friday of each month. On the average, when during the month do you usually receive your <u>AKF</u> ? | | | |
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10. Have you ever put in a request for "Information Please"? YES NO
 If so, did you receive any response to this request? YES NO
11. Have you ever responded to a Survey Request published in AKF? YES NO
 if so, which one(s) _____

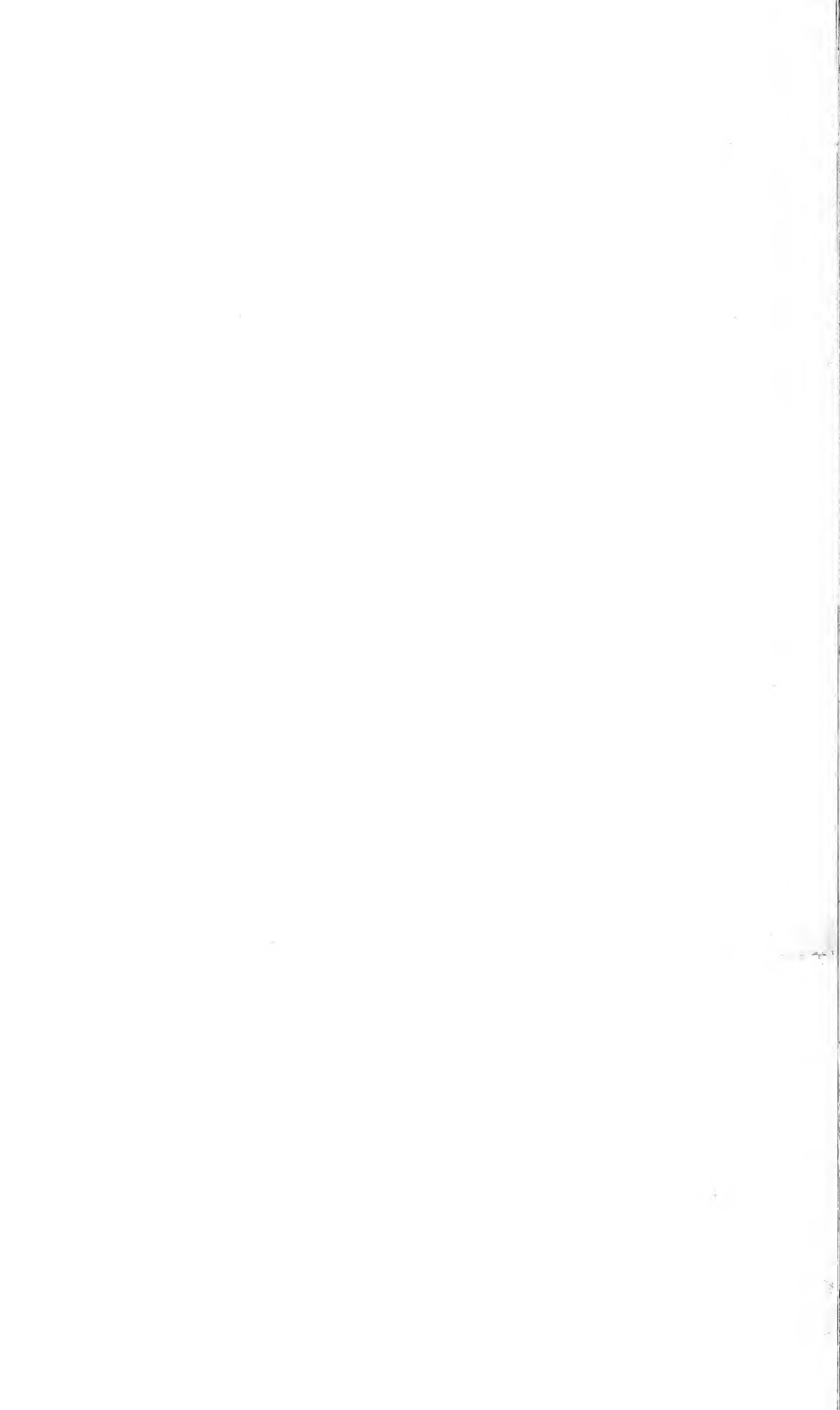
12. Have you ever applied for a job which was listed in "Opportunity Knocks"? YES NO
 If so, were you successful in obtaining this job? YES NO

13. Do you like having the proceedings of various workshops, conferences (i.e. Tropical Habitat, Elephant Workshop, etc.) included in special issues of AKF? YES NO

14. Do you like having the expanded December issue including the proceedings of the AAZK National Conference as opposed to having these proceedings published separately? YES NO

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 <u>AKF</u>	EXCELLENT	GOOD	FAIR	POOR
Contents of <u>AKF</u>	EXCELLENT	GOOD	FAIR	POOR



Keeper's Alert	1	2	3
Think Safety!	1	2	3
Struggle for Survival	1	2	3
Other _____	1	2	3

17. If you could change any part of AKF, what would you change and why?

18. Please add any further comments about the present state and future possibilities for

AKF:

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 TOPEKA, KS 66606 NO LATER THAN JANUARY 15, 1985.

ABITAT PREFERENCE IN HOUSE CRICKETS, Continued

Experiment 5: Substrate texture (perching)

To determine if the crickets preferred perching on a rough surface or on one providing protective cover, half of the floor of the cage was covered with brown pine bark chips and half with dry leaves.

Experiment 6: Substrate texture (climbing)

The cage was not used to test for a texture preference when climbing. Three tree branches were arranged in a circular pattern in a small plastic bucket of 16 inches diameter. This arrangement was to encourage the crickets to climb. The tree branches were of the same color, but varying textures, the roughest branch having convoluted bark and the smoothest being lightly sanded. One intermediate form was also used. To prevent pre-ature orientation the crickets were dropped one at a time down a PVC tube placed in the middle of the bucket. After 10 seconds the tube was removed and the cricket was given 3 minutes to climb one of the three ranches to the height of 18cm. If the cricket failed to climb to 18cm in the allotted time, it was removed and nothing was recorded, however this only occurred twice. Sixty trials were conducted, each using a different cricket.

Experiment 7: Substrate height

Height preference was examined in two enclosures, each containing one pair of tarsiers (*Tarsier bancanus*). These enclosures were 5.1m long, .6m wide and 4.5m high. They contained numerous tree branches, bamboo poles and dowel rods of varying diameters and angles of orientation (Roberts and Cunningham, in prep). Crickets were always present in the enclosure as they were the primary food source of the captive tarsiers, however 50 to 60 fresh crickets were added in each cage every day at 3 p.m. Cricket location was measured at 1 ft. intervals on two vertically oriented tree branches in each room. Tree branches were chosen for this experiment as the crickets were found more commonly climbing on the trees than on either the bamboo poles or the dowel rods. Measurements were taken at 3:30 p.m. each day for 10 days.

Experiment 8: Cricket density on walls and floor

It must be noted that although the crickets were found on the trees, they were found in the greatest abundance on the walls of the enclosures, specifically on unpainted patches near the floor. These patches were of rough texture and the crickets could always be found clustering on these. Cricket density in each room was measured on these patches and on the floor by chalking out measured squares and counting the crickets every day for 5 days.

These experiments were analyzed using t-tests and chi-square testing according to Lehner (1979).

Results

- Experiment 1 : Crickets showed a significant preference for pine bark chips, the darker material (t 12.65, p .05).
- Experiment 2 : A significant preference was shown for the shaded substrate as opposed to that which was illuminated (t 7.8, p .05).
- Experiment 3 : A significant preference was shown for the rough textured pine bark (t 8.2, p .05).
- Experiment 4 : A significant preference was shown for the dry leaves (t 8.2, p .05).

HABITAT PREFERENCE IN HOUSE CRICKETS, *Continued*

- Experiment 5 : The crickets showed no preference for either pine bark or dry leaves (t 1.4, p .05).
- Experiment 6 : There was a significant preference for the branch with the roughest bark, the crickets choosing it in 46 out of 60 trials (X^2 50.8, p .05).
- Experiment 7 : Crickets were found as high as 9ft in both enclosures. Higher than expected numbers were found at 5ft in room 1 and at 6 and 7ft in both rooms (X^2 24.26 in room 1 and 87.95 in room 2, p .05).
- Experiment 8 : The floors had an average of 3.5 crickets/m² and the rough patches on the walls had an average of 270 crickets/m².

Summary

Crickets were found to prefer perching on a dark colored substrate over a light colored substrate. They were also found to prefer perching on a shaded surface over a lighted one, however, they did not show a preference for the shade provided by the dry leaves over the dark color of the pine bark chips. This is surprising as the leaves created a protective cover, however this must be weighed against the possible absorbing effect the leaves have on the cricket song.

When climbing, crickets chose the roughest surface over two smoother ones. This was expected as crickets have an inherent tendency to climb (T. Hagama, personal communication) and have the least trouble on the roughest surface. During the trials several crickets tried to climb the smoothest branch, but slipped down and went on to choose one of the other two.

The crickets studied here preferred heights from 5 to 7 ft on tree branches. The crickets were also found to climb on rough surfaces on the walls of the enclosures. It is not known why these ground-dwelling crickets have a tendency to climb. It is possible that males can broadcast their songs more effectively at certain heights (B. Simpson, personal communication), however, I often found females on patches and at heights where no males were present.

Both feeding behavior of the predator and habitat preference of the prey should be taken into account when designing enclosures for animals that feed on live prey. For animals feeding on crickets, smooth walls and floor will encourage the crickets to perch on natural substrates, thereby inducing predators to exhibit more naturalistic foraging behavior. Crickets are an important food source for some captive animals and may be utilized to manipulate predator behavior to enhance exhibit potential.

Acknowledgements

I wish to take this opportunity to thank Mr. Miles Roberts for his invaluable advice and supervision. I would also like to thank the Friends of the National Zoo for the opportunity to work at the National Zoological Park in Washington, D.C.

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Missing LYNX

NZP VOLUNTEERS SERVE VARIED AREAS OF ZOO EDUCATION AND RESEARCH

By
Angela D. Wessel
Volunteer
National Zoo, Washington, D.C.

Volunteer members of the Friends of the National Zoo (FONZ) at the National Zoological Park in Washington, D.C. perform tasks in many varied areas. We conduct tours, teach pre-school and grammar school courses, direct activities in the 'discovery rooms' called ZOOlab, BIRLab, and HERFlab, assist keepers and gardeners, operate the Hand-Rearing Facility, and serve as behavior observers/data recorders for many of the Zoo's research projects.

This spring and summer we again participated in the 24-hour-a-day Giant Panda Pregnancy Watch. Many of the volunteers have been involved with various Panda Watch programs since 1972, when Hsing Hsing, our male and Ling Ling, our female, Giant Pandas arrived from the People's Republic of China.

After many years of breeding attempts, Ling Ling gave birth to a 4.7 oz. male cub on 21 July, 1983; it died three hours after its birth of pre-natal bronchopneumonia.

This year the watch ran from 18 June to 13 August and 104 volunteers donated 1605 hours of round-the-clock 'watching' and recording of data. Ling gave birth to a stillborn 5 oz. male cub at 22:34 on 5 August, 1984. The cub was born about two hours and 15 minutes after the mother began having regular contractions. Her delivery took place in a nest of bamboo that she built in one corner of the den. The cub never moved or made the loud cries that were expected from a baby panda, but Ling licked and held the infant as she did in 1983, once more she was a terrific mother.

The volunteers, the National Zoo staff, the Washington community and panda enthusiasts worldwide were disappointed and grieved by the loss of the cub. But Ling Ling is healthy, we learned a lot, and we will still be volunteering for duty next year.



(Editor's Note: This column is dedicated to those many individuals--docents, volunteers and educators--who play such an important role in today's zoos. Those involved in such activities are encouraged to submit material for the "Missing Lynx" section.)



SURVEY OF HIND LIMB PARALYSIS
IN CAPTIVE OPOSSUMS

By
Jay Jasan, Animal Keeper, Zoo Instructional Program
Education Center, Turtle Back Zoo
West Orange, NJ

1. Introduction

A common problem seen at Turtle Back Zoo is the occurrence of hind limb paralysis in the opossum (*Didelphis virginiana*). It is known that the opossum is quite susceptible to a number of naturally occurring diseases as well as experimentally induced ones and is a host to numerous parasites (Pořkay, 1970). A successful breeding colony was established by Farris (1950) who suggested that ample exercise space should be provided. Outdoor cages measuring 15 x 12 x 6 feet were recommended. McManus (1971) provided smaller outdoor enclosures and found that peak activity levels usually occurred between 10:00 p.m. and 1:00 a.m. Exercise space available to the animal at night is therefore more important than available space during the day.

Forced exercise may be necessary to maintain the animal's health. Due to the opossum's capacity to store enormous quantities of fat, obesity may become a problem if adequate exercise is not allowed (Fritz, 1971). An ascending paralysis was observed by Fritz (1971) and it was postulated that the paralysis could be avoided by allowing ample exercise. Stout branches, horizontal and vertical logs were recommended to be included in opossum enclosures by Collins (1973) to facilitate exercise and other natural behaviors.

2. Survey Methods and Results

A survey was sent to one hundred-eleven zoological parks selected from the American Association of Zoological Parks and Aquariums 1982-83 directory of member institutions (Boyd, 1982). Since the opossum is often used in educational programs, zoos selected for the survey offered outreach type programs, and housed a variety of terrestrial animals.

Questions included in the survey referred to infant and adult diets, enclosure size and lighting conditions as well as occurrence and possible diagnosis of the paralysis. Also included was a specific reference to white muscle disease in the opossum, and if any effective changes were made in diets or enclosures to treat the paralysis.

A summary of data obtained from the returned surveys is shown in Table 1. Raw data and percentages are listed.

Table 1. Frequency of Paralysis

Category	Number of Responses	Percent of Total
Zoos without paralyzed opossums	46	85
Zoos housing paralyzed opossums	8	15

SURVEY OF HIND LIMB PARALYSIS IN CAPTIVE OPOSSUMS, Continued

Three of the eight zoos housing paralyzed opossums have diagnosed the problem as white muscle disease. The remaining five did not indicate a diagnosis. Most opossums in zoos are kept in indirect or artificial light (fluorescent light in most cases) and are housed in relatively small cages (2 x 3 x 4 feet or smaller) during their activity period. Virtually all of these animals were born in the wild and arrived at a zoo when relatively young (a few days to one or two months). The captive diets varied but all contained a variety of plant and animal material. A significant relationship could not be made between any of these variables and occurrence of the paralysis. Some paralyzed opossums were treated with dietary supplements such as vitamin D, and with increased amounts of exercise. There were no positive results with either treatment.

3. Discussion

A markedly higher incidence of hind limb paralysis has been seen in the Rottneest quokka (*Setonix brachyurus*, another marsupial) when held in small pens as opposed to those housed in larger enclosures (Kakulas, 1963). In the opossum, available exercise space may be important in controlling obesity, but does not seem to contribute to the incidence of hind limb paralysis on the basis of this survey. Although it is true that most paralyzed opossums were housed in small cages, most healthy opossums were kept in cages of about the same size.

Perhaps the low incidence of paralysis in the opossum is related to its life span. According to Collins (1973), three to four years is a lengthy longevity for captive opossums. Since the paralysis is more common in older animals, it is possible that death occurs due to other causes before the animal reaches the age at which the paralysis is usually seen. Another possibility is that zoos may release their specimens at a relatively young age. This information was indicated by a few zoos but was not requested on the survey.

Treatment with massive doses of vitamin E has been effective in treating hind limb paralysis due to white muscle disease in other marsupials. MacKenzie and Fletcher (1980) have seen a reversal of the disease when Goodfellow's tree kangaroos were treated in this manner. They also suggest that the minimal daily requirements of certain nutrients for captive wild animals should be reevaluated. Kakulas (1961) indicated that preliminary findings suggested that vitamin E deprivation may induce this myopathy in the quokka. The diet of wild opossums in New York state is made up of mostly insects and fruit (Hamilton, 1951). It is possible that the wild diet includes nutrients that the captive diet does not. The stress involved with captivity may also play a significant role in nutritional requirements. Further research on the nutritional requirement change when an animal is brought into captivity and its relationship to disease seems necessary.

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SURVEY OF HIND LIMB PARALYSIS IN CAPTIVE OPOSSUMS, Continued

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By Kathleen Rude

*Endangered Species Technical Bulletin Reprint
Vol. 1, No. 9*

The stork delivers babies, or so folklore would have us believe; but for the endangered bongo, scientists have taken over the role and rewritten the rules. The bongo's offspring are flown cross-continent before they are even born. The mothers that give birth to them are not the same ones that conceive them. And what's more, these surrogate moms aren't necessarily of the same species.

Far-fetched as this story sounds, the Cincinnati Wildlife Research Federation hopes such practices will save exotic endangered species from extinction. Presently Federation researchers are working with nonsurgical embryo transfer techniques to increase the birth rate and genetic diversity of captive populations of bongo, a rare and endangered African antelope.

This summer, Dr. Betsy Dresser, Director of the Federation, announced the first two successful transcontinental transfers of fresh embryos from this exotic species of antelope. Two healthy bongo calves are the result. The first calf born was appropriately named "E.T. - for embryo transfer.

Both calves are full siblings to each other, and yet their birthdays are a month apart and they have two different mothers, one a bongo and the other an eland, the world's largest antelope. Without the use of surgery, Dr. Dresser extracted fresh embryos from the calves' natural dam at the Los Angeles Zoo and flew them to the Cincinnati Zoo. That same day scientists implanted the embryos in five potential surrogate mothers, four elands and one bongo. Only one eland and the bongo became pregnant and gave birth.

Embryo transfers can increase the number of young born to any one female. A female's capacity to produce embryos exceeds her capacity to bear young. When embryos of an individual bongo are implanted into surrogate mothers of a more numerous species, this female actually produces more young than if she was allowed to reproduce solely on her own.

Embryo transfers have another special implication. "Parkay", the surrogate bongo mother, "had been considered useless in the breeding program because of three years of unsuccessful attempts at natural breeding," said Dr. Dresser. "But today's birth signifies the tremendous value of embryo transfers. Parkay is now a vital part of this important breeding program."

But even with healthy birth rates, captive populations still may not survive if they continue to breed only with members of their own population. Restricting genes that can be introduced into the population leads to inbreeding, which eventually reduces the birth rates and increases mortality rates. Embryo transfers between zoos allows zoo personnel to increase genetic diversity without the serious risk and high cost of transporting live animals for breeding purposes.

With this technique, scientists will also be able to collect embryos of wild populations without permanently removing the animals from their habitat. Dr. Dresser hopes to visit Africa later this year to obtain embryos from female bongos in a wild herd discovered last fall. These embryos will be frozen for transport back to Cincinnati. The Cincinnati Zoo, one of the organizations that sponsor the Federation, maintains a Frozen Zoo that contains eland embryos and semen samples from approximately 50 exotic species. The Federation is now experimenting with these frozen embryos. In December 1983, a full-term, normal eland calf was born, after being implanted into a surrogate eland mother as a frozen embryo. Although the calf was stillborn, it was the first exotic animal ever produced with a frozen embryo.



A RECORD SYSTEM FOR THE SMALL ZOO

By
Donna Mason Smith
Birmingham, AL

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I became interested in record systems early in my career as an Animal Keeper in the Birmingham Zoo. After a few frustrating experiences, I began to realize that the system in use was inadequate, poorly maintained, and basically useless particularly as far as the keepers' needs were concerned. Keepers kept their thoughts to themselves while the facts submitted on the daily reports disappeared inside the office never to be heard from again. I found working an area in the absence of the regular keeper hectic as I tried to find animals that had been relocated and prepared new diets in an area I hadn't worked in a long while. At worst, it became dangerous as I discovered upon entering their pen that the hippo was in estrous or the once-docile orang no longer tolerated humans. This hit and miss approach was unnecessary and I began to look for alternatives. As I gained experience with exotic animals and the problems related to their care, I defined four reasons that justified the use of a keepers' record system.

1. Continuity: The very nature of a zoo and its inhabitants means constant flux. A lot can happen in a short span of time and any absence of the keeper, whether one year, one week, or one work shift, necessitates reacquaintance with on-going situations. A quick, reliable way was needed to evaluate the state of the area before the keeper ever begins the primary survey so that she/he can be alert to specific problems and conditions. This would increase efficiency and reduce the possibility of overlooking something of importance.

2. Animal welfare: Proper care of an animal requires knowledge of its past history as well as its condition at last observation. For instance, trying to distinguish between an old injury previously reported and one that recently occurred can be crucial to an animal's health. Uncertainty can result in unnecessary handling of an animal already under stress and will greatly increase the chances for further complications. Accurate records will eliminate confusion and indicate what procedures are called for.

3. Keeper welfare: "Reading" an animal's mood before approaching is a skill most keepers develop for their own survival. However, environmental or biological changes are constantly influencing animal behavior. Outside pressures or inexperience can hinder a person's ability to accurately judge a situation. Failure to recognize subtle cues can result in serious personal injury. The more information available the better. Knowing in advance the elk is in full rut or the vultures are protecting an egg will help avoid potentially dangerous situations.

4. Reference: With the hindsight afforded by reviewing past experiences valuable information is obtained. Such information is useful in making sound decisions concerning an individual animal or an entire department. Flaws in routines or facilities can be detected and corrected. The possible reoccurrence of situations such as the rejection of an infant by its mother or the cyclical behavior of particular individuals can be predicted. The ability to look over past reactions of a specimen can prove valuable for future moves or shipments, allowing preparations to be made for anticipated difficulties. Ideas for further research projects can be suggested thus leading to improved breeding and care techniques.

RECORD SYSTEM FOR THE SMALL ZOO, Continued

In developing the new record system emphasis was placed on methods that could fulfill these needs. With the input and support of fellow keepers in the Pachyderm/Deer Corral, a system was devised and put into effect. One of this system over time proved certain aspects valuable while other ideas became burdensome and were discarded. Later, this system was tailored for service in the Bird & Reptile Building with alterations to suit the particular needs of the animals and enclosures of that area. The components of the resulting system support one another as shown by the following descriptions.

DAILY JOURNAL

Information regarding the activities in an area is recorded on a daily basis. Notes on behavior, animal moves, identifications numbers, unusual weather conditions, or anything that may pertain to the animals are logged chronologically in a loose leaf notebook. (A spiral notebook can be used but the loose leaf binder allows copies of maintenance request sheets, supply order forms, etc. to be included.) An entry is made each day even if it reads only "typical day". Frequently the ritual itself will remind the writer of notable occurrences that would otherwise have been lost in the last minute hustle to complete the day's work.

It is imperative that the journal belong to the building or department and be accessible to anyone interested. No one has exclusive rights to the material nor should it be edited. Entries are restricted to animal-related facts and to data that may influence their lives in some manner. Personal comments are excluded to avoid misinterpretation and clutter.

CALENDAR

To make the detailed information in the daily journal readily accessible a calendar is used. A calendar sheet that can accommodate a full month is sufficient for the Pachyderm/Deer Corral. However, with the greater number of specimens and frequent rearrangement of displays at Birds & Reptiles, a weekly sheet is used to allow for the greater volume of notes per day.

Each day has space for abbreviated comments which give an idea of that day's development. If more detail is needed it is a simple matter to look up the particular day in the daily journal. Four headings are listed in the margin of each calendar sheet: births/hatchings, deaths, in, and out (referring to animals shipped in or out or moved to another department within the zoo). Appropriate data written here in addition to being on the proper date makes it easier to look back over several months for a particular date of interest. Color coding these headings and entries make back-tracking easier still.

It takes very little time each day to keep these two components up to date and they are surprisingly efficient.

The calendar is posted on a clipboard in the service area. At the end of the year they are stored in the front of the three-ring binder holding the daily journal for that year. The back of the binder is clearly marked for easy identification. Finally, the information in the margin of each calendar sheet is tabulated for a year-end report so that a rough outline of the year's successes and failures is created. The current calendar neatly solves the problem of continuity while the old journals and calendars form the basis for reference vital to planning future programs.

A RECORD SYSTEM FOR THE SMALL ZOO, Continued

BULLETIN BOARD

To bring attention to specific situations a bulletin board or chalk board in a prominent place is used. This is handy when passing messages between shifts or when people need to be alerted to particular problems or new situations. A baboon due to deliver at any moment may call for special attention or a bear may have a dose of medication prescribed for midnight. A chalk board or grease pencil board where messages can be written and erased over and over is the best for the job.

MAP

The map is useful in two ways. First, a rough sketch of the animal's enclosure is drawn and posted on the wall of the service area. Each cage or pen is assigned a number so that notes referring to the area are more easily understood. For instance, "deer moved from lot #1 to lot #3" is clear and more concise than verbal descriptions of the location of the lot involved. When major display renovations necessitate new maps, a copy of the old map is filed with the records that refer to its layout. Otherwise the older records lose some of their clarity.

The map is also useful during the waterfowl nesting season. A general sketch of the three large duck ponds in the center of our zoo is made showing the nesting facilities' locations and identification numbers. A list of these nest sites is used during the daily inspections. Included is space for notes on each site for species nesting there, number of eggs found, etc. In this way a permanent, easily understood survey of the daily activities on the ponds is created.

SPECIMEN RECORD

Individual identification of the animals is needed to keep accurate medical histories and behavior and breeding records. The methods used are as varied as the animals themselves and range from ear tags and leg bands to photographs and drawings. Whatever method is decided upon, each specimen is clearly described. It is not enough that a particular keeper know her/his animals by sight. To others they may all look alike so each creature must be recognized for those times when the regular caretaker is not around.

Individual records in the Bird & Reptile Building were filed in a three-ring binder alphabetically by the species' common name. ISIS number, technical name, familiar name, sex, and date of birth or arrival is written across the top of a particular animal's sheet. In some cases a display record is maintained such as when a breeding pair is isolated or when a large, mixed-species display makes individual ID very difficult. Anything pertaining to these animals is then dated and listed.

A useful tool is the general information sheet filed for each species. Habitat, natural foods, pairing behavior, etc. is collected and updated when new data is made available through professional publications and gatherings.

EGG RECORDS

As we do daily nest checks, eggs are given ID numbers as they are collected. The number itself is in two parts: the first part represents the nest number and the second part reflects the number of the egg in that clutch.

RECORD SYSTEM FOR THE SMALL ZOO, Continued

If more than one clutch is laid in that nest site in the same season, a letter follows the number to denote that fact. Thus, an egg numbered 12-7B would be from site 12, the seventh egg laid in the second clutch. These numbers are assigned and recorded on the nest list described under APS.

When the eggs are set in the incubator the date, species, ID number, and due date are written on the incubator record sheet. Space is made available for future notes on anything that may befall the egg all the way through successful hatching. Incubator records are posted on a clipboard next to the incubator.

GENERAL

Whenever possible post charts, lists, calendars, etc. on separate clipboards hung where they are easily available and visually obvious. A large clipboard is useful in this endeavor as well as helpful in keeping the data centralized.

Set a specific time to make entries into the record system. The last five minutes of the day is a good time to update the daily journals and the calendar. Schedule time on the first of the month or on an ordinarily quiet day to transfer data to specimen records, tabulate information, or investigate new ideas. Set the schedule and stick to it.

Number tab old calendar sheets by the month after they are filed in the binder. Make sure the binder is well marked so that it can be quickly retrieved from the shelf when it is needed.

Initial all entries in case something needs clarification in the future.

Involve as many people as possible. The more heads the more ideas. Support from fellow professionals is priceless.

Publications Available

The North Jersey AAZK Chapter has developed a Keeper's Guide to informing the public on caring for wild infant birds. Although much of the information contained within the manual is specific to the state of New Jersey, the concept and format may be useful in the development of similar versions specific to other localities.

To obtain a copy, send a self-addressed, stamped legal size envelope to:

Jay Jasan
North Jersey AAZK
Turtle Back Zoo
560 Northfield Ave.
West Orange, NJ 07052

On 4 April, the Turtle Back Zoo hosted a symposium on the captive breeding techniques used on the bald eagle. Transcripts are now available for a nominal fee to cover printing and postage costs. Included in the transcript is information from the National Zoological Park, the Cincinnati Zoo, the Cleveland Museum of Natural History and the U.S. Fish and Wildlife Service's Endangered Species Breeding Program at Patauxent, MD. For further information, contact: Dr. P. Zauber, President, New Jersey Zoological Society, 560 Northfield Ave., West Orange, NJ 07052 or call (201) 325-7878.

Legislative News

Compiled by Kevin Conway
Legislative Coordinator

RECENT ACTIONS UNDER THE ENDANGERED SPECIES ACT

In recent actions under the Endangered Species Act of 1973, as amended, Department of Interior's Fish and Wildlife Service has issued the following final rules:

- (1) Determined Endangered Status and Critical Habitat for the Yaqui chub (*Gila purpurea*) on the San Bernadino National Wildlife Refuge, effective 1 October, 1984.
- (2) Determined immediate Endangered Status for:
 - (a) Guam broadbill (*Myiagra freycineti*) effective 27 August 1984.
 - (b) Mariana crow (*Corvus kubaryi*), effective 27 August 1984.
 - (c) Mariana gallinule (*Gallinula chloropus guami*), Effective 21 August 1984.
 - (d) Micronesian kingfisher (*Halcyon cinnamomina cinnamomina*), effective 27 August 1984.
 - (e) Guam rail (*Rallus owstoni*), effective 27 August 1984.
 - (f) Vanikoro swiftlet (*Aerodramus vanikorensis bartschi*), effective 27 August 1984.
 - (g) Bridled white-eye (*Zosterops conspicillata conspicillata*), effective 27 August 1984.
 - (h) Little Mariana fruit bat (*Pteropus tokudae*), effective 27 August 1984.
 - (i) Mariana fruit bat (*Pteropus mariannus mariannus*), effective 27 August 1984.
 - (j) Key Largo woodrat (*Neotoma floridana smalli*), effective 31 August 1984.
 - (k) Key Largo cotton mouse (*Peromyscus gossypinus allapaticola*), effective 31 August 1984.

FWS waived the normal 30-day period between the expiration of the emergency rule and implementation of the final rule on all of the above species because of threats facing them.

- (3) Determined Endangered Status for:
 - (a) Slender-petaled mustard (*Thelypodium stenopetalum*), effective 1 October 1984.
 - (b) Pedate checker-mallow (*Sidalcea pedata*), effective 1 Oct. 1984.
- (4) Determined Threatened Status and Critical Habitat for:
 - (a) Beautiful shiner (*Notropis formosus*);
 - (b) Yaqui catfish (*Ictalurus pricei*)

Both are found on the San Bernadino National Wildlife Refuge, and the effective date for both rulings is 1 October 1984.

- (5) Reclassified from Threatened to Endangered Status the Schaus swallowtail butterfly (*Heracles (Papilio) aristodemus ponceanus*), effective 1 October 1984.
- (6) Removed from the U.S. List of Endangered and Threatened Wildlife the Bahama swallowtail butterfly (*Heracles (Papilio) andraemon bonhoti*) effective 1 October 1984.

Also in a final ruling, FWS has amended Part 17 of Title 50 of the Code of Federal Regulations in order to comply with certain changes made in the Endangered Species Act of 1973 by the Endangered Species Act Amendments of 1982. Part 17 is hereby amended to establish procedures for:

- (1) The establishment and/or designation of certain populations of species otherwise listed as endangered or threatened as experimental populations
- (2) the determination of such populations as "essential" or "nonessential" and
- (3) the promulgation of appropriate protective regulatory measures for such populations.

----*ECOLOGY USA/Sept. 24, 1984*

PROPOSALS MADE FOR UPCOMING CITES MEETING

On 29 August, the Fish and Wildlife Service (FWS) held a public meeting to discuss the provisional agenda of the next meeting of the Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This was the first of a series of meetings which will be held before the April Conference.

Two of the agenda items are of particular interest to AAZPA: A CITES Register of Traders in Live Specimens and a Definition of "Primarily Commercial Purposes." The idea of a registry has been discussed for the past few years and is being advocated by Paraguay, Israel and Columbia. The registry would include all persons buying, selling, trading or exchanging live wildlife in international trade. Zoos, medical research facilities, entertainment groups and commercial dealers would be listed.

The second proposal is to define "primarily commercial purposes". One of the requirements for the issuance of an Appendix I import permit is that the specimen "is not to be used for primarily commercial purposes". Denmark is seeking to define those terms because there is no specific definition in CITES.

This raises numerous questions including, for example, whether the import of an Appendix I specimen for display at a public zoo would satisfy the noncommercial requirement if the zoo purchases the specimen. The Danes imply that there should be a difference between profit and nonprofit zoological institutions. They also question the status of commercial animal dealers.

This Danish concept was discussed in June at the Technical Committee meeting of CITES in Brussels. At that time, a subcommittee was appointed to draft a resolution and a chairman appointed. The chairman was a representative of the Department of the Interior. To date, there is a very limited amount of information about what the subcommittee intends to do.

We will monitor the development of these two proposals and actively participate in the development of the U.S. negotiating positions for the meeting.

---K. Vehrs in
AAZPA Newsletter, October 1984

U.S. PROPOSES MEASURES TO REDUCE LEAD POISONING RISK IN BALD EAGLES

The U.S. Fish and Wildlife Service director Robert Jantzen has announced proposed new conservation measures designed to reduce the risk to bald eagles from lead poisoning. Jantzen noted that the number of bald eagles has been increasing in recent years, but that the species is not fully recovered from earlier declines caused primarily by the effects of pesticides and loss of habitat. Examinations of bald eagles that have been found dead indicate that some have died of lead poisoning.

"We have carefully examined available scientific data concerning lead poisoning in bald eagles," Jantzen said. "Although this examination indicated the need for additional scientific data to better identify the cause of and cure for this problem, we believe our unique responsibility to protect our national bird requires action now to alleviate the risk of lead poisoning in eagles. Therefore, we are proposing a comprehensive program we believe to be both responsible and scientifically appropriate. We plan

to work closely with the States in this effort, and we hope the public will comment on the proposal and work with us in developing and carrying out this conservation plan."

The FWS has been studying lead poisoning in bald eagles for some time, but a recent petition from the National Wildlife Federation served to intensify the Service's efforts, Jantzen added. Citing potential threats to eagles, NWF on 1 August petitioned the Service to immediately impose emergency nontoxic (steel) shot zones for waterfowl hunting in six counties in five states or else close waterfowl hunting in those areas this fall. NWF also identified 89 counties in 30 states where it said the Service should establish nontoxic shot zones for the 1985-86 waterfowl season in order to protect bald eagles.

Jantzen said the FWS shares the Federation's concern for bald eagles, but agency biologists question the scientific validity of some of the assumptions NWF made in its petition. Based upon the continued recovery of the bald eagle, the Service has found no "emergency" warranting the immediate imposition of nontoxic shot zones or the closure of waterfowl hunting, he said.

However, Jantzen said, the FWS agrees additional measures are needed to lessen the potential threat to eagles from lead poisoning. Therefore, the Service proposed, in the September 14 Federal Register, a comprehensive conservation program including the following elements:

- (1) Establishment of three categories of areas where there is evidence that bald eagles have either died from lead poisoning or could potentially be affected by lead poisoning. While these areas are now identified on a countywide basis, the Service may refine them to more specific ecological units, such as river basins.
- (2) Announcement of the Service's decision to propose regulations by mid-December banning the use of lead shot for the 1985-86 waterfowl season in the areas of greatest concern unless additional study and public comment demonstrate this regulation would be inappropriate. These areas known as "Category I", are Siskiyou and Modoc Counties (CA); Klamath and Jackson Counties (OR); and Holt County (MO). The Service will make a final decision on this regulatory option in mid-November, after a review of public comments and any further data acquired by that time.
- (3) Accelerated acquisition and review of data concerning lead poisoning in eagles in 14 counties in 11 states--"Category II"--with the possibility that some Category II areas ultimately may be added to the Category I list after the public comment period. The Service is seeking all available data and requesting public comments on whether any of the Category II areas should be designated as nontoxic shot zones for the 1985-86 waterfowl season. Counties listed as Category II areas are: Thurston and Clallam (WA); Lassen and Butte (CA); Weber (UT); Canyon (ID); Coconino (AZ); Churchill (NV); Jefferson (AR); Madison (IL); Terrebonne (LA); Dorchester (MD); Washington and Hancock (ME).
- (4) Accelerated acquisition and review of data for an additional 10 counties in 7 states. For these "Category III" areas, the Service will review whatever additional data becomes available during the public comment period and will reassess its current decision to focus on further research, instead of regulatory action in these areas. Category III counties are: Whatcom, Pierce, and Spokane (WA); Duchesne (UT); Mississippi (AR); St. Charles (MO); Mason and Henderson (IL); Ballard (KY); and Sagadahoc (ME).
- (5) Development of short term and long term research strategies to provide

additional scientific data on lead poisoning in bald eagles.

2) Development of an objective public information program on the topic of lead poisoning in bald eagles. Public comments are also actively solicited on both the research and education aspects of the proposed program.

Lead poisoning in bald eagles has been related to waterfowl hunting because bald eagles sometimes prey on waterfowl, particularly in winter. Fish and Wildlife Service biologists believe eagles get lead poisoning primarily from swallowing lead pellets embedded in the tissue of birds that have been shot, but not retrieved, rather than from eating waterfowl that have themselves died of lead poisoning. Although eagles may obtain lead from other sources, the extent of this exposure is currently unknown.

The bald eagle is listed as an "endangered" species in 43 states and as a "threatened" species in 5 states; the population in Alaska is considered healthy and has not been listed under the Endangered Species Act. In recent years the number of bald eagles in the lower 48 states has been steadily increasing in response to declining levels of pesticides in the environment and to Federal and State restoration efforts. The National Wildlife Federation, which sponsors an annual mid-winter count of bald eagles, reported a population of 11,819 eagles in 1984, compared with 10,903 sighted in 1983. This count includes many eagles that migrate south from Canada for the winter. USFWS biologists say that the number of eagles residing in the lower 48 states throughout the year has also increased and now numbers between 3,000 and 6,000 birds, including 1,500 to 1,600 nesting pairs.

---Dept. of Interior News Release
September 14, 1984

SECRETARY CLARK HONORS TENNECO OIL CO. FOR WETLANDS CONSERVATION EFFORTS

Secretary of the Interior William Clark recently presented the Department's Conservation Service Award to Tenneco Oil Exploration and Production for an innovative wetlands protection project the firm has initiated in Louisiana's coastal marshes.

Clark said Tenneco approached the USFWS more than a year ago with a proposal to intensively manage for wildlife a 5,000-acre marshland tract the company owns in the Louisiana Delta. The program involves installation and operation of a series of water control structures to prevent saltwater intrusion and preserve the marsh.

Recent studies by FWS indicate Louisiana loses approximately 40 sq. mi. of coastal marsh to saltwater intrusion and erosion each year. Under this new project, the Service will allow management of this area by Tenneco as mitigation or compensation for environmental impacts accompanying future projects undertaken by the firm in the Delta region.

In 1982, knowing that a submerged oil platform would make an excellent artificial reef to attract marine life, Tenneco removed one of its old 10,000-ton platforms from the Gulf of Mexico and towed it nearly 300 miles to coastal Florida, where it was submerged to benefit fishing. This action helped stimulate widespread interest in what has come to be known as the "rigs to reefs" program. Among its other environmental activities, Tenneco is currently working with the State Dept. in providing technical assistance on environmental issues to less developed countries.

---Dept. of Interior News Release
Sept. 12, 1984

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EXTENT AND NATURE OF CIRCULATION

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I certify that the statements made by me above are correct and complete.

Signature and title of Editor

Susan D. Chan
 Managing Editor



AAZK Accessories Available

Pins And Charms: Enameled three-quarter inch pins and charms with the official AAZK logo are now available. They are done in the same colors as the AAZK Patch and the charms are suitable for necklaces (you provide the chain). The price per pin or charm is \$3.50 which includes postage. To order send your name, complete mailing address, number of pins or charms desired to: AAZK National, 635 Gage Blvd., Topeka, Ks 66606. Make check or money order payable to AAZK National.

Buttons: For a "Keepers Care" Button, send the coupon and 50¢ to: Larry Sammarco, Lincoln Park Zoo, 2200 N. Cannon Drive, Chicago, IL 60614.



Stickers: The official AAZK sticker is available through the Memphis Zoo Chapter. The sticker is a black and white reproduction of the AAZK rhino logo, suitable for any smooth, hard surface, especially a car window. Cost is \$1.50 complete, prepaid. Make checks payable to the Memphis Chapter, AAZK and send directly to Mike Maybry, Sticker Project Coordinator, 1887 Crump Ave., Memphis, TN 38107.

AAZK T-shirts with the official emblem are now available from the Phoenix Chapter. The price is \$6.75 including postage and handling. Sizes Small, Medium, Large, and Extra-Large are available in two colors: Tan with dark brown logo and Dark Brown with white logo. To order, complete coupon below or copy information and send with check or money order to: Mike Carpenter, 4409 E. Palm Lane, Phoenix, AZ 85008. Make checks payable to "Phoenix AAZK Chapter". Shirts will be returned by 1st Class mail.

AAZK T-Shirt Order Form

Please send _____ T-shirts at \$6.75 each. COLOR: TAN _____ BROWN _____

SIZE: _____ Small _____ Medium _____ Large _____ Extra-Large

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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. There is no charge for such listing. Please include closing date for position available.

REPTILE KEEPER...requires a B.S. in biological sciences and a demonstrated knowledge of reptile husbandry along with amphibian culture experience. Ability to prepare data for publication, public speaking skills and mechanical, carpentry, artistic and photography skills helpful. Send resume to: Angelo Monaco, New York Zoological Society, 185th Street and Southern Blvd., Bronx, NY 10460.

ADVERTISING REPRESENTATIVE...responsible for obtaining leads; helpful to know animal/veterinary field; permissible to represent more than one publication/book. Experience preferred but not necessary. For more information call Ronald S. Lippert, AHT at (415) 664-3469 or write P.O. Box 22605, San Francisco, CA 94122.

ASSISTANT CURATOR...\$13,644 - \$16,931. Directs, assists and participates in the care, feeding and handling of animals, and maintenance of grounds, pens and equipment at Chehaw Wild Animal Park. Assists in construction projects. Requires five years' relevant education and experience with wild animals normally found in a zoo. Possess considerable knowledge of animal behavior and care; of regulations for keeping captive wildlife; and of equipment associated with animal handling and care and the ability to use such equipment. APPLY TO: Personnel Office, City of Albany, P.O. Box 447, Albany, GA 31703 or call (912) 883-2414. Apply by 11-26-84. EOE/AA/M/F/H.

CURATORIAL TRAINEE...requires master's degree in biological or related animal sciences. Will work with long-term captive propagation of endangered species. Animal management, data management and computer operations experience are preferred. Send resume and salary requirements to: Angelo Monaco, New York Zoological Society, 185th St. and Southern Blvd., Bronx, NY 10460.

HERPETARIUM/AQUARIUM CURATOR...requires college degree with one year of supervisory experience; technical proficiency in husbandry, care/management of captive reptiles and fish. Will help design, staff and oversee facility exhibiting reptiles and aquatic life. Salary \$18,581 - \$24,920.
KEEPER II...requires background in biological sciences, one year experience as a zoo aquarist, and experience with water analysis, zoo aquarium equipment and exotic fish. Responsible for care/maintenance of aquatic animals and exhibits. Salary \$11,440.

For either position, send resume to City of Louisville Personnel Office, 609 W. Jefferson St., Louisville, KY 40202.

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MOVING???

Please send change of address as soon as possible to:

Dolly Clark, Administrative Secretary
American Association of Zoo Keepers, Inc.
635 Gage Blvd., Topeka, KS 66606



AAZK MEMBERSHIP APPLICATION

Name _____ Check here if renewal []

Address _____

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U.S. and Canada_____ \$15.00 Affiliate
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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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SPECIAL EDITION

December 1984

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Animal Keepers' Forum



**10th National
AAZK Conference
1984**

Dedicated to Professional Animal Care



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

DECEMBER 1984
 VOLUME ELEVEN
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<u>Exhibit Design</u> Diane Forsyth, Akron Zoo	<u>Diet Notebook</u> South Florida AAZK Chapter
<u>Keeper Accomodations List</u> Oliver Claffey, Metro Toronto	<u>Biological Values/Gestation</u> Mary Mure, San Francisco Zoo
<u>Keeper Training Videotapes</u> Wayne Buchanan, Woodland Park	<u>Keeper Data Survey</u> Mary Slaybaugh, San Antonio Zoo

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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. It contains not only some of our regular features, but also the proceedings and papers from the 1984 National AAZK Conference held this past October in Seattle, WA. An overview of the annual meeting of the AAZK Board of Directors is also included and will help to update you on the Association's activities during the past year.

We would like to take this opportunity to thank all of you who have contributed material to AKF during 1984. Without your support and willingness to share your knowledge, the Forum cannot grow and mature. During this 10th anniversary year for AKF, the staff has given a lot of thought to improvements and changes which will help us better serve the needs of the AAZK membership. We hope you have all taken the time to fill in and return the questionnaire which was included as a tear-out in the November issue. We need your input and suggestions to chart a course for AKF's second decade. If you haven't already sent your completed questionnaire in, please do so soon.

This Special Edition will be sent to all members whose membership was current as of 26 November, 1984. A limited number of extra copies have been ordered and may be purchased from National Headquarters for \$6.00 each.

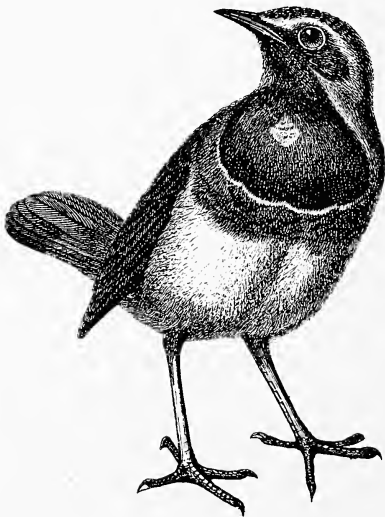
Once again, our sincere thanks for your participation, encouragement and support. We wish to you all a wonderful holiday season and a New Year filled with peace and contentment.

Sincerely,

Susan D. Chan
Managing Editor

Alice Miser
Executive Editor

Bernie Feldman
Associate Editor





Final Thoughts from Seattle

Zookeepers must have friends in high places. Seattle returned to normal (RAIN!) as soon as the Conference was over and everyone had left. But for five days, over 200 people enjoyed GREAT weather while swapping stories, visiting zoos, exchanging information, hearing papers, meeting old and new friends and just basically having an outrageously good time.

Final count was 205 delegates - 130 registered for the full five days; 75 registered for individual days or events during the week. Sixty-one institutions were represented. Delegates from Canada, England, Israel, Japan and Australia were in attendance. Our Conference is definitely growing every year, with a greater variety of people (and knowledge) showing up at each one. If you've never been to a Conference, do everything you can to get to Miami. It will be worth all your efforts.

Was it worth all the hard work? ABSOLUTELY!!! The three of us are still speaking to each other and to everyone else involved in putting it together. We can't give enough thanks to the Conference Committee for all their hard work. With planning and cooperation, it CAN be an event that everyone can enjoy; not a headache that you hope will end soon. So future Conference Hosts ('85 & beyond) take heart; it will be worth it! Of course, in many ways, a Conference is only as good as the people who attend. Without a doubt, zoo and aquarium folks are some of the nicest around. We're very grateful for all the cooperation and help from everyone before and during the Conference. By following the rules, staying on schedule, not complaining when things didn't go quite right, and pitching in when needed, you made our jobs much easier. We can't thank you enough for being such great people.

One of the best things about putting a Conference together is the contacts made during the planning. We now have much stronger relations with the local zoo and aquariums that took part. The folks at Point Defiance in Tacoma got so active they decided to start their own chapter to better serve their needs. We would like to welcome the Mount Tahoma (Indian name for Mt. Ranier) Chapter and wish it success in the coming years.

Our one regret is that we didn't get a group picture of all the delegates. The plan was to take it the day we visited Pt. Defiance and Northwest Trek. Unfortunately two of the buses missed a turnoff, got on the road to Tijuana, and by the time they got to Trek it was too late for the picture. Soo...everyone has to come to Miami so we can try again.

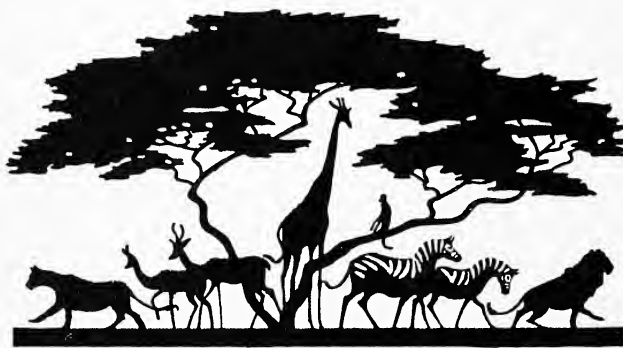
Thanks to everyone that filled out the questionnaire about the Seattle Conference. The information obtained (what people liked, disliked, what they would do to improve it) will help make future AAZK Conferences even better. It's input like this, from the members, that makes AAZK the excellent organization it is. The three of us were lucky to be able to contribute to it. Miami will be your chance to do the same. We will be there and expect to see all of you there too.

Co-chairpersons

Harmony Hazine Taylor
Harmony Hazine-Taylor

Phil Pennock
Phil Pennock

Debbiera Stecher
Debbiera Stecher



Births & Hatchings



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

October 1984 B&H include: Mammals - 1.1 Greater kudu, 1.0 Kafue (Red) lechwe, 1.0 Grant's gazelle, 0.1 Sitatunga, 0.1 Dorcas gazelle, 0.1 Topi, 3.0 Scimitar-horned oryx, 1.0 Gemsbok, 0.1 Hunter's hartebeest, 0.1 Nyala, 0.0.2 Common marmoset, 0.0.5 African pygmy goat; Birds - 0.0.2 Jandaya conure, 0.0.3 Red-crested touraco, 0.0.2 Forsten's lorikeet, 0.0.2 Superb starling, 0.0.2 Chattering lory and 0.0.1 Cockatiel.

PHILADELPHIA ZOO.....Beth Bahner

B&H for June through October 1984 include: Mammals - 8 Gray short-tailed opossum, 1 Red kangaroo, 5 Pygmy hedgehog tenrec, 0.1 Vampire bat (DNS), 1 Ring-tailed lemur, 3 Geoffroy's marmoset (1 DNS), 1.0 Western lowland gorilla, 2 Acouchi, 1 Kinkajou, 0.1 Ardvark, 1.0 Llama (DNS), 0.2 Guanaco (0.1 DNS), 1 Reeve's muntjac, 1.0 Barasingha (DNS), 2.0 Springbok (1.0 DNS); Birds - 3 Hermit ibis, 1 Caribbean flamingo, 5 Trumpeter swan (DNS), 3 Aleutian Canada goose (1 DNS), 3 Hooded merganser (2 DNS), 3 American merganser (DNS), 6 North American ruddy duck (3 DNS), 1 Palawan peacock pheasant, 3 Red and white crane, 5 Renault's ground cuckoo (1 DNS), 10 Hooded pitta (3 DNS), 2 Orange-bellied euphonia (DNS), 2 Scarlet tanager (DNS), 3 Gouldian finch, 2 Emerald starling; Reptiles - 2 Paraguay caiman, 1 Water monitor, 25 Uracoan rattlesnake and 1 Eyelash viper.

NORTH CAROLINA MUSEUM OF LIFE & SCIENCES.....John Roxby

During August and September of 1984, the Museum hatched 17 Corn snakes and 9 Northern pine snakes.

SAN ANTONIO ZOO.....Debi Reed

October 1984 B&H include: Mammals - 1.0 Grant's gazelle, 1 Grizzled tree kangaroo, 1.1 Aoudad, 1.1 Lady Grey's waterbuck (1.0 DNS), 2.0 Lesser kudu (1.0 DNS), 1.1 Sable (1.0 DNS), 0.2 Dama gazelle, 0.1 Beisa oryx (DNS), 0.1 Kirk's dik dik; Birds - 1 Sun conure, 4 Diamond dove, 2 Diamond Fire-tail finch, 2 Picathartes; Reptiles - 2 Sinaloan milksnake; Aquarium - Seahorses.

DALLAS ZOO.....Tamara Jones

B&H for October 1984 include: Mammals - 1.0 Dusky leaf monkey, 0.1 Klip-springer, 1.0 East African oryx, 0.1 Speke's gazelle; Birds - 0.0.2 Gouldian finch; Reptiles - 0.0.1 Poison arrow frog (*Dendrobates tinctorius*), 0.0.8 Urutu (*Bothrops alternatus*).

BROOKFIELD ZOO.....John S. Stoddard

October 1984 births included: 0.0.2 White-toothed shrew, 0.0.1 Spiny mouse, 0.0.1 Green acouchi and 0.0.3 Degu.



Coming Events

SCHOOL FOR PROFESSIONAL MANAGEMENT DEVELOPMENT FOR ZOO AND AQUARIUM PERSONNEL

February 3-7, 1985

Wheeling, WV

AAZPA CENTRAL REGIONAL CONFERENCE

March 3-5, 1985

Oklahoma City, OK

AAZPA WESTERN REGIONAL CONFERENCE

March 17-19, 1985

Anchorage, AK

AAZPA SOUTHERN REGIONAL CONFERENCE

March 31-April 2, 1985

Birmingham, AL

THE 8TH INTERNATIONAL WILDLIFE FILM FESTIVAL

April 1-7, 1985

Missoula, MT

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

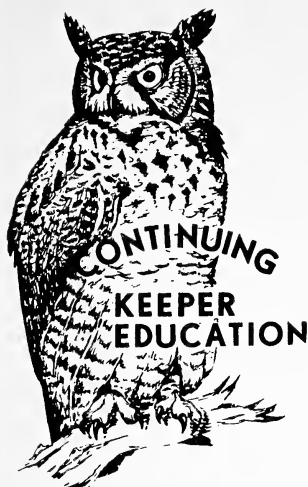
11TH NATIONAL AAZK CONFERENCE

October 20-24, 1985

Miami, FL



Universities Provide Courses, Training for Zookeeping Careers



By
Patricia E. Sammarco
Coordinator, AAZK Education Committee

Zookeeping is becoming an increasingly more technical profession, and universities are responding with the development of courses and classes designed to the specific needs of captive animal care in zoological facilities. The American Association of Zookeepers is attempting to establish a list of educational institutions with curriculum that includes courses related to our profession as a guide to those wishing to pursue careers in zoological parks and aquaria, or for others to enhance working knowledge through continuing education.

Thanks to contributions from our membership the list of educational facilities providing courses and classes pertinent to our profession is growing. If you know of an additional class or course which provides training specifically for exotic animal care in zoological institutions, please contact Pat Sammarco, Lincoln Park Zoo, 2200 N. Cannon Dr., Chicago, IL 60614.

Note that some of these listed classes are taught at universities by Zookeepers and other zoo professionals. The list will be updated as new information is added. The new listings will be published in the AKF. The entire list will be available from National Headquarters as part of a packet of information that is sent on request to those who want information on being zoo keepers.

Included are lists of current and proposed classes and programs compiled to date.

Biological Parks Training Program and Teaching Zoo
Santa Fe Community College
P.O. Box 1530
3000 N.W. 83rd St.
Gainesville, FL 32602

2-year Associate in Science
Degree or full 4-year program
in conjunction with State University of New York at Oswego.

State University of New York
Oswego, NY 13126
attn: Sigurd Nelson Jr., Chairman
Department of Zoology

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

CONTINUING KEEPER EDUCATION, *Continued*

Seminars in Ornithology
Laboratory of Ornithology
Cornell University
159 Sapsucker Woods Road
Ithaca, NY 14853

Bird biology correspondence course.

Animal Management Correspondence Course
National Extension College
Dept. Z, 18 Brooklands Ave.
Cambridge CB 2 2HN
England

Community College of Baltimore
2901 Liberty Heights Ave.
Baltimore, MD 21215

AA Degree in Science Tech-
nology with emphasis on
Aquariology and Zookeeping.

New Orleans local universities
through Jeffery Swift
Research Coordinator
Audubon Park and Zoological Gardens
P.O. Box 4327
New Orleans, LA 70178

Zoo research courses in anthro-
pology, biology and psychology.

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

Biology of Zoological Gardens
Animal Behavior

State University of New York
Agricultural and Technical College
Delhi, NY 137-1190
attn: Dean Thomas H. Pettit, DVM
Division of Agriculture and Life Science

Introduction to Animal Care
and Preceptorship Experience
Introductory Research Animal
Techniques
Farm Animal Nursing

State University of New York
Agricultural and Technical College
Cobeskill, NY 12043

Fisheries and Wildlife

State University of New York
Agricultural and Technical College
Farmingdale, NY 11735

Animal Science

CONTINUING KEEPER EDUCATION, Continued

University of Western Ontario
c/o Ministry of Education
Mr. John Lesseck
Planning and Development Dept.
(416) 965-265

Animal Health Technology
Animal Handling

Houston Community College System
22 Waugh Drive
Houston, TX 77007
(713) 869-5021

Animal Health Management
Pets & Lab Animals
Ranch & Exotic Animals
Practicum

Proposed Programs

Niagra County Community College
3111 Saunders Settlement Road
attn: Catherine Hall
Life Science Division

Animal Management



Conference.....84

OVERVIEW OF THE 1984 AAZK BOARD OF DIRECTOR'S ANNUAL MEETING

Submitted by
Dolly Clark, Administrative Secretary
and
Kevin Conway, AAZK President

The meeting was called to order on 30 September 1984 by President Kevin Conway. Board members present were Pat Sammarco, Verona Barr, Jean Hromadka and Mike Carpenter. An additional wrap-up meeting was held on Thursday, 4 October 1984 with all members present.

KEEPER EDUCATION COMMITTEE: Report submitted by chairman, Pat Sammarco.

AAZK/AAZPA Liaison - Brandy Pound and Jim Ellis will act as liaisons between the organizations' Education Committees. One of their first projects will be to send requests to gather information on staff training. President Conway will write to incoming AAZPA President Elvie Turner to formally request his approval of these liaisons. Brandy will work on zoo education departments to become more involved in keeper training. Jim will use outlines on Keeper Training and expand upon those so that zoo education departments can utilize the information for staff training.

Manual Review - Beth Poff reports receiving 10 manuals from various zoos. Beth will work with the education liaisons on identifying zoos who are actively involved in staff training with or without manuals.

Staff Training - Judie Steenberg reported on participating in staff training session at the Miami AAZPA conference in September 1984. She showed the AAZK Keeper Safety Tape at that conference and received much support from AAZPA delegates. Nineteen zoos were represented in the special session on staff training in Miami. President Conway suggested that sessions on staff training should be held at each AAZPA conference with participation from AAZK. Liaisons will begin working now on procuring a time slot for sessions at the next AAZPA conference which will be held in Columbus next fall.

Judith White, Curator of Education at the National Zoo, wishes to establish a formal liaison with AAZK from International Zoo Educators. She proposed Laura Eisen. Pat Sammarco would prefer not to have a formal liaison, but just information flow between the two organizations.

Keeper Education Column in AKF - Pat Sammarco will be responsible for submitting regular updates for publication.

Exhibit Design Form - Diane Forsyth, Chairman, submitted a written report which was accepted by the Board. At the moment, the only hold-up is re-writing of a release form which is being worked on by Vernon Jarboe, attorney. The committee is no longer part of the Education Committee and will be under Mike Carpenter's oversight.

AAZK Information Brochure - Beth Poff reports that the brochure is nearing completion. Copies were given to Board members and National Headquarters to look over and make any corrections or suggestions. Beth will

OVERVIEW OF 1984 AAZK BOARD OF DIRECTOR'S MEETING, Continued

then take those into consideration and send revised mock-ups to the Board and National. Board approval for printing 2,000 copies was given.

Reference Search - A written report submitted by Liz MacLaughlin was accepted by the Board. There are now over 1,000 entries made by Liz and Jenny Rentfrow. A request was made to purchase a printer for this project. It was suggested that Jenny look into the costs of renting one if it is necessary. President Conway instructed Jenny and Liz to keep track of the utilization of this project and report in Miami in 1985.

Library Resources Project - Pat Sammarco will write Kay Kenyon at the National Zoo to see what her committee is doing. Perhaps it will fit in with the Library Resources Program and could be coordinated.

Book Review Project - President Conway wants the book reviews continued on a monthly basis. He will discuss the future of this project with Ellen Leach.

Keeper Training Video Tape Project - Wayne Buchanan reported that this project is now self-supporting and needs no funding from National. Twenty-eight copies of the first tape (Keeper Safety) have been sold. One hundred dollars will be given to the Metro Toronto Zoo Chapter for a production of a tape on feeding. That tape was available at the conference and was approved for distribution after viewing by the Board. Frank Kohn suggested that National Zoo prepare a tape on Management of Small Mammals.

Wayne will work on the possibility of producing a tape on "How to make a video tape". The feeling is that more people would consider becoming involved in producing tapes if they had some idea of how to begin. Judie Steenberg suggested showing the "how to" tape at AAZPA regionals. Mike Carpenter will check into getting time allotted on the programs to do that. No budget requested.

Wayne also reported that due to the review process, we are missing presentations at AAZPA Annual conferences. Wayne would like to have a committee appointed to review new tapes with the power to approve. The Board would like to retain final approval. A system will be set up so that tapes can be mailed to Board members for approval. This project will no longer be under the Education Committee, but will stand alone.

Judie Steenberg suggested that zoo administrations be thanked for allowing staff to make tapes and that a gratis copy of the tape be given to the cooperating institution, and/or tape be given to participants at cost. It was decided that one copy of the finished tape would go to the production staff to do with as they wished with a letter of appreciation being sent to the cooperating zoo.

Staff Exchange - There are now 50 institutions registered reports Elandra Lum. There was a large response to staff exchange proposed by the NZP Conservation & Research Center. A master list is available and forms were to be passed out at the conference for those who are interested in registering. Exchanges seem to pose problems in the areas of insurance, salary, he thought that some zoos seem to feel that their keepers won't return to their zoo after an exchange, etc. Pat Sammarco suggested that those items could be good topics for discussion at AAZPA conferences.

Zoo Husbandry Fundamentals - Pat Sammarco reports that this project is going well. Associate editors have been assigned and instructed to search for information that is already available to avoid duplication. When

OVERVIEW OF 1984 AAZK BOARD OF DIRECTOR'S MEETING, Continued

material is found that should be included, copyright information will have to be checked into. The next step will be to assign writers. Pat felt that Gary Clarke and Ken Kawata would be the best persons for history of zoos and keepers, and they will be approached. This will be an actual textbook on zookeeping and by next conference the committee should have a concept of the actual size and expected cost of printing.

Public Education Committee - Eileen Gerity submitted a written report which was approved and accepted by the Board. The Committee is also working with the North Jersey AAZK Chapter on the project of a Wild Bird Care Booklet. Future projects include a display, possibly at National Headquarters, demonstrating daily activities of the zoo keeper.

Zoo/University Project - Pat Sammarco will send a mailing to universities before the end of 1984 to identify those schools with curricula pertinent to zookeeping. Funds for the initial mailing were approved. Pat will periodically update the list of such universities.

Program Library - Anne Payne (Detroit Zoo) has recently taken over this project. She will work on increasing the six programs in the library. She and Wayne Buchanan will communicate ideas and problems in getting programs and in distributing them.

Zoonoses Notebook - Frank Kohn reported for Bruce Clark. The notebook is nearing completion. A research grant of \$250.00 was approved and budgeted in 1983 for production. Bruce will be checking into various costs of typing/typesetting and printing. A sample page and introduction will be printed in AKF to see what interest is generated from the membership. A decision on the initial number of booklets printed will be determined by the number of pre-publication requests received.

Research Grants - A proposal was made by Harmony Frazier-Taylor for a research grant for the purchase of a centrifuge and field binoculars for use at the field station in Indonesia run by Dr. Birute Galdikas. Harmony will be there for three months to work and study the parasite levels in wild oranges as compared to captive oranges. The proposal was approved.

The major activity aside from processing of research grants was the revision of the guidelines for research grant proposals. The quarterly system of awarding grants has been replaced by a floating grant award system to avoid unnecessary delays in starting granted projects. The status of previously granted projects were reviewed and discussed. New research grant project proposals were presented to the Board.

The Committee has reviewed the video tape made by Washington Park Zoo and Minnesota Zoological Gardens. This tape will prove invaluable to zoos and students desiring research projects and training. The Keepers Guide to Research in Zoos has been started. Information on AAZK research grants has been requested by two grant register organizations which will help to publicize AAZK.

The remainder of Frank's report as found in the Board book was accepted. Research Grants Committee budget request of \$1,050.00 was approved.

Awards Committee - Mike Crocker (Dickinson Park Zoo) will remain chairman of this committee. There were a few changes made in award guidelines this year which are as follows: 1) The Certificate of Merit for Zoo Keeper Education is no longer limited to one recipient per year. The number is now unlimited. 2) The Certificate of Merit for Zoo Keeper Education award

OVERVIEW OF 1984 AAZK BOARD OF DIRECTOR'S MEETING, Continued

is now broken into the categories of institution (zoo or aquarium), individual and other organization.

Professional Standards Committee - Jan McCoy reported that she had a 49% return on the survey. She will keep the information she has compiled and will take care of any additional requests for information. She will also send the results of the survey to those who answered it.

Keeper Data Survey - A report was submitted by Mary Slaybaugh along with the results of the first survey. A survey was passed out at the paper session and will eventually be redone with a wider diversity of questions.

Legislation/Conservation - Report submitted by Kevin Conway. Detailed report in Board Book accepted by the Board. Approval was given to continue the Endangered Species Technical Bulletin subscription and to purchase the National Wildlife Directory, total cost for both \$22.00. Kevin will be resigning as chairman of this Committee at the end of the year. It was agreed that Alice Miser would review and coordinate information for publication in AKF.

Diet Notebook - Debbie Burch, South Florida Chapter, submitted a report. At this time, it is hoped that responses will pick up and that the notebook will be ready for distribution in the spring of 1985. Notices will be placed in AKF monthly along with a facsimile to encourage more participation. When printing is warranted, a proposal will be submitted for funding.

Membership Directory - Chairman Pat Sammarco will aim for a late November cut-off date for information with an early spring printing proposed. Funds will come out of the Publications budget.

International Affairs - Connie Cloak has mailed one letter to International members. She proposed a drop in fee for memberships which was not approved by the Board. Connie feels that the fee is too high for most international members due to the exchange rates. She is going to check on ways to help--possibly encourage keepers to pool their funds and purchase one membership, so they can share the information in AKF. After checking into the Keeling proposition for a Keeper Quiz on an international scale, she recommended that the Board not pursue or encourage participation by our members.

Marilyn Cole Proposal - Marilyn Cole of Toronto proposed that the name of the Association be changed to reflect and recognize Canadian members. After discussion by the Board, it was decided not to act on this proposal at this time. Marilyn agreed to conduct research through AKF this coming year to determine the feeling of the membership and to make a report in Miami.

National Headquarters - An increase of 50¢ per hour in wages was approved by the Board for Susan Chan and Dolly Clark. This brings hourly wages from \$5.00 to \$5.50. Also approved was the purchase of an insurance policy to cover loss of equipment at National. This step was taken because of several recent break-ins at the Topeka Zoo.

Chapter Affairs - The report submitted by Lee Payne was accepted by the Board. The following zoos have renewed their AAZK Chapter charters: Audubon Park, Los Angeles, Topeka, Sedgwick County, Kansas City and Milwaukee. New Chapters are: The North Jersey Chapter, Rocky Mountain Chapter (Denver), Honolulu Zoo Chapter and Detroit Zoo Chapter.

OVERVIEW OF 1984 AAZK BOARD OF DIRECTOR'S MEETING, *Continued*

Regional Coordinator - It was proposed that Diane Krug be named Regional Coordinator director east of the Mississippi and Mike Carpenter remain director for those states west of the Mississippi. Primary concern for RC Directors will be to have a representative at each AAZPA regional conference.

Infant Development Notebook - Steve Taylor has been in charge of this project and there has been no activity. Verona Barr will write to Steve and an effort will be made to appoint some other person to take over the project.

Biological Values Booklet - This booklet has been very popular and of the original 1,000 copies printed, only about 25 remain. The San Francisco group who originally researched the BV booklet is working on a revised second edition at present. We have no publication date as yet.

Keeper Care Buttons - Larry Sammarco reports that he has approximately 600 buttons left. In 1984 only 38 buttons were sold. Larry will send National its share of the profits.

AAZK Stickers - They are no longer decals, but now are stickers. National was sent \$55.25 as its 50% share of sticker sales. They will still be available in 1985.

T-Shirts - Sales are still being handled by the Phoenix Chapter through Mike Carpenter. So far 112 have been sold with one half of the profits going to National. Members should note the new address for mailing shirt orders. It is: Mike Carpenter, 4409 E. Palm Lane, Phoenix, AZ 85008.

ADT Forms - Bernie Feldman submitted a detailed report of distribution of ADT forms for 1984. This was accepted by the Board. Bernie noted that there has been a good response to the forms from zoos and that there are currently approximately 117 zoos and other animal-related institutions which have requested and are presumably using the ADT forms.

KAL (Keeper Accommodations List) - This is the 5th consecutive year that KAL has been in operation and, as in previous years, the list continues to grow. The list currently contains 49 contacts in 25 states and four Canadian provinces. The KAL is a project of the Metro Toronto Zoo AAZK Chapter. More promos will be run in AKF to stimulate use of and more active participation in the KAL by AAZK members.

Conference Bids - It was decided that the bid presentations should be made on the Monday or Tuesday of each Conference due to lack of participants by Thursday. The Board approved that this suggestion should be made to the 1985 Conference hosts.

Proposals - The Board approved increasing the fee for Associate members from \$10.00 to \$15.00 due to the cost of processing and postage. This will be done by the Administrative Secretary as new forms are needed. No time limit was set for this change.

Mark DeDenus of Winnipeg proposed that the Board approve and possibly fund a game he has designed on the order of "Trivial Pursuit", called "Zoo Keeper". The Board decided not to provide any funding, but will check into the feasibility of endorsing the game. It was decided that the Administrative Secretary would check with the AAZK attorney, Vernon Jarboe, on the possible problems of providing such an endorsement. Pres. Conway will then get in touch with Mr. DeDenus.

OVERVIEW OF 1984 AAZK BOARD OF DIRECTOR'S MEETING, Continued

Proposals (cont'd)

Proposal by President Conway that registration and 50% of travel expenses to National Conference be paid by the Association for the Administrative Secretary and Managing Editor of AKF was approved by the Board.

Proposal by President Conway that the current AAZK President be funded for registration, travel, and per diem expenses to attend AAZPA National Conference was approved by the Board subject to the availability of funds.

Proposal by the President that \$2,000 be budgeted for attorney's fees was not approved by the Board. The Administrative Secretary was instructed to check into alternatives. Board member Verona Barr suggested the possibility that her husband, who is an attorney, might be willing to provide services to the Association *pro bono*.

Proposal by the President to have AAZK letterhead stationary redesigned was approved, subject to final approval of the new design by the Board. Administrative Secretary will obtain estimates and samples of designs and colors and get back to the Board.

Proposal by the President to switch the format of the Animal Keepers' Forum to a glossy stock, using photos instead of drawings was tabled by the Board due to the excessive cost of such a venture. Managing Editor Susan Chan provided estimates of such a change-over and noted that at the present time, it was probably more important to get the information out to the membership in the present affordable form, but that it was hoped that AKF could be reformatted at some point in the future.

Proposal by the President to change the logo from the Rhino to one incorporating a wider variety of animals was dismissed. It was the feeling of the Board that our logo has been around for quite some time and has instant recognition.

Proposal by the President to establish a project or committee to contact Friends of Zoos organizations to provide information about AAZK in order to promote new memberships was accepted by the Board. Jean Hromadka volunteered to get the project started.

Minutes of the General Membership Meeting held 4 October, 1984.

Meeting was called to order by President Conway. Committee chairmen made brief reports to membership and asked for volunteers as needed. Milwaukee and Winnipeg representatives made their presentations for 1986 Conference bids. The membership voted to have the 1986 Conference in Winnipeg.



ANIMAL KEEPERS' FORUM:
A Decade of Growth and a Future of Challenge

By
Susan D. Chan, Managing Editor
AAZK National Headquarters
Topeka Zoo, Topeka, KS



It's been said that from a tiny acorn, a mighty oak will grow, and while Animal Keepers' Forum may not as yet become that prophetic oak, we're well past the sapling stage and movin' on. AKF is celebrating its 10th birthday this year and in researching back issues for material for this presentation, I have continually been both amazed and impressed by the tremendous strides the publication has taken as well as by the dedication and perseverance of those individuals who believed in its worth and in its future.

The AKF was born at a time in AAZK's history that was troubled and uncertain. Like a child struggling to go from crawling to walking, the Association was having trouble rising from its knees to its feet. The historical legacy of the Zookeeper as nothing more than a manual laborer was making it difficult for AAZK to be taken seriously as a "professional" group. Lack of acceptance by and confidence in the infant organization by other zoological groups made the early days that much harder. This situation was further compounded by internal problems within the Association - namely, a fair amount of apathy on the part of the then-400 members; a feeling of "What's AAZK doing for me?"; and charges and countercharges of unresponsiveness on the part of the AAZK administration. There were many who thought AAZK was in its death throes.

When such a situation exists, it often takes a rather radical happening to help rectify the problem and to chart a more productive course of action. This radical happening appeared in August 1972 in the form of a small tornado out of Topeka, KS known as "The Ruptured Rhino". Not an official AAZK publication like the AAZK Newsletter, AAZK Bulletin and The Keeper which had preceded it, "The Ruptured Rhino" was an attempt by a group of concerned AAZK members to set the Association back on that seemingly elusive "productive course of action". "RR" editors Ron Kaufman, Chris LaRue, Brad May and Dave Ruhter took a great deal of "heat" for their efforts and were even accused of trying to rupture AAZK. But, "RR" managed to do something that past efforts by AAZK had failed to do -- it got the membership involved and thinking positively and creatively about the future of AAZK.

As time passed, the "RR" editors and other interested in AAZK's future, realized that something constructive had to be done to ensure that the potential for a broad-based keeper organization did not slip away. There was a recognized need for a regular, continuous publication for the membership - a vehicle whereby keepers could share their knowledge and feelings about their chosen profession. Up until then, the AAZK's various newsletters had been irregular in issue, often due to the precarious nature of the young Association's finances.

The idea for Animal Keepers' Forum grew out of informal bull sessions held in the fall of 1974 in the Education Room at the Topeka Zoo. Besides the original "RR" staff, those involved in the birth of AKF included Rick and Judie Steenberg, Vicky Norwood-Brown and Linda Weiss. The first issue of AKF, a scant 3½ pages, was published in November 1974. The goals of the infant publication were:

ANIMAL KEEPERS'S FORUM: A Decade of Growth and a Future of Challenge, Cont'd

1. To disseminate information between keepers and zoos.
2. To promote the image of zookeeping as a profession, not just a job.
3. To bring some logic and order into a tremendously complex field.
4. To help bolster AAZK into a position of stability and upward movement.

After the first two issues (which were sent gratis to generate interest) the Forum was sold on a subscription basis for \$5.00 per year. From the first issue through 1977, AKF carried the symbol of the "Zebra and Foal in Caring Hand". This original design was done by Perry LaBelle, a Neighborhood Youth Corps employee at the Como Zoo in St. Paul and a student at that city's art institute. Perry is now a keeper at the Minnesota Zoological Gardens. From the beginning, AKF carried the by-words "Dedicated to Professional Animal Care".

In those early days of AKF's existence, just producing the newsletter and getting it mailed was an interstate operation. The editing and initial paste-up were done in Topeka. Rick and Judy Steenberg were involved in the Minnesota Zoological Society and had access to printing equipment not available in Topeka. So the edited copy was sent to them and they would complete the final paste-up, cut stencils, print, collate, fold, staple and get the AKF into the mail. Rick, Judie and Linda Weiss often made weekend trips to Topeka for editorial conferences. According to Rick, the AKF group was a mainstay at the local Denny's restaurant where gallons of coffee were consumed during marathon editorial sessions. Early issues contained brief zoo news articles, items on legislation and guest editorials. While the early AKF did not experience the good fortune of receiving a steady flow of material submitted by members as we do today, they managed by use of reprint articles, long-distance telephone interviews and much cross-country correspondence to fill the pages of AKF with items of interest to zookeepers. At this time, the Forum was still an independent publication and not officially recognized by AAZK.

In January 1975, when AKF had expanded to 5½ pages, the staff proposed a joint use agreement between AKF and AAZK whereby the Association would utilize the Forum in its then-present format as AAZK's official newsletter. AAZK's newsletter, The Keeper, would no longer be published in its then-current format, but would be expanded into an annual, more technically-oriented journal.

In March of 1975, this partnership was launched with a 5½ page AKF which was mailed to 880 individuals and institutions. The multi-animal logo, also by Perry LaBelle, which had appeared along with the original AKF zebra logo was dropped and the AAZK rhino logo was used for the first time in the Association's new, official communications vehicle.

Fifteen-seventy-five brought many innovations in the AKF. The first "Veterinarians and Keepers" column appeared as did a nutrition column written by Dr. Richard S. Payton, then Director of Research for Theracon, Inc. of Topeka. Much of the non-reprint material was either editorial or subjective in nature.

In June of 1975, AKF came out with a "monster" 13-page issue, its largest to date. Word was getting around and members were beginning to submit material on a larger scale. By this time, Rick and Judie had moved to jobs at the Topeka Zoo and cross-country editing was a thing of the past. In October 1975, the National AAZK Headquarters moved from the San Diego Zoo to Topeka and AKF co-purchased with the Friends of the Zoo, a stencil cutter and printing machine. AKF was still produced by volunteers and by hand. During that year, these dedicated individuals handled some 37,000

pieces of paper to put out 7,200 newsletters. In November 1975, AKF was one year old and put out its first anniversary issue. Others in Topeka who were involved in getting the issues together each month were Ron Kaufman's wife, Jane, Linda Rounds, Sandy Horvat and Susan Love.

In January 1976, AKF underwent a format change to a booklet-style publication. In February of that year, the one and only issue of The Keeper was published. Thereafter, AKF expanded to incorporate the material previously destined for that annual journal. Nineteen-seventy-six also saw the conception and publication of the Reptile/Amphibian Potpourri column coordinated by the NZP Herpetology staff.

In August 1976, National Headquarters moved again - this time to the National Zoo when Bela Demeter became AAZK president. Through the generosity of a grant from the NZP Zoological Society, AAZK set up headquarters in Washington and employed its first paid staff member, Lee Glasco, the Association's first Administrative Secretary. AKF remained at its original home in Topeka and has never been published anywhere else.

In January 1977, the format for AKF was changed again to the size that you are familiar with but each month's cover was a different color. It also began to be printed commercially. Ron Kaufman was then serving as Editor and Mike Coker had come aboard as Associate Editor. During that year more innovations were made in editorial content including the establishment of the Births and Hatchings column, Chapter News, Scoops and Scuttlebutt, Struggle for Survival, Great Ape Pandemonium and Opportunity Knocks. It's interesting to note that the average salary per month in those early job listings was \$425 a month!

AKF took on its first paid employee in 1977 when Cecila Sauer, a Topeka Zoo docent, became the typist for the expanding newsletter. The Forum averaged 12 pages per issue in those days and was sent to about 1000 members. By that time, AKF was no longer sold on a subscription basis, but was included as a membership benefit in AAZK.

The year 1978 brought further format changes in AKF. The color covers were dropped in favor of a buff-colored cover and original artwork by members replaced the zebra logo. This was the first year AKF was indexed and its contents had expanded to an average of 16 pages per issue. Lois Bogia, also a Topeka Zoo docent, took over for Cecila as secretary for AKF. Ron and Mike continued to do layout and paste-up before each issue was printed at Hawley Printing Service in Topeka.

The first awards for Excellence in Journalism were presented in 1979. At that time only two awards were given--for Best Narrative Article and Best Technical/Scientific Article.

With sounder financing for the publication and the increasing rise in memberships, the staff was able to go to a mailing service for distribution of AKF. Prior to this, each month's issue had to be sorted, bundled by zip codes, bagged and taken over to the Post Office Permit Section by the staff - usually on somebody's lunch hour. The expansion of the journal to an average of 20 pages led to the institution of Lois Bogia as Managing Editor. Ron Kaufman continued to offer his long-standing service as Editor-in-Chief and Mike Coker assumed the position of Executive Editor.

June 1979 saw the first use of the AKF symbol mark, designed by Elaine Shea who did the paste-up. This symbol has continued to be used to denote the ending of each article that appears in AKF. The first extended series,

ANIMAL KEEPERS' FORUM: A Decade of Growth and a Future of Challenge, Cont'd

"The Role of Keepers in Zoo Animal Health" by Judie Steenberg appeared that year along with "Alternatives...Education and P.R." Diane Brey, then Topeka Zoo secretary, served as proofreader. That year the Keeper Accommodations List (KAL) was established by the Metro Toronto Zoo and promoted through the pages of AKF.

In January 1980, AKF had expanded to 24 pages and consistently contained articles on animal husbandry and research as well as AAZK, zoo and chapter news. My first involvement with the Forum began in February 1980 when I was asked to write an article on "Why Docents?" I had been a docent at the Topeka Zoo for a couple of years and was then editor of their docent newsletter "Cowabunga News". Nineteen-eighty also saw another move for National Headquarters--this time back to Topeka where I think it has found a permanent home. Brenda Jarboe was hired as Administrative Secretary for AAZK in charge of memberships and correspondence. Kevin Conway began his Legislative News column that year and our first international contributions came in the form of "Zoo News from Japan" penned by Yoshi. Yonetani. That year the Conference Proceedings were published over a number of issues of AKF rather than as a separate publication.

In December 1981, Ron Kaufman resigned as Editor-in-Chief to devote more time to his position as Education Coordinator at the Topeka Zoo. Ron deserves a special "thank you" from us all for he was one of those who believed in AKF and worked so long and hard to get it established. Thanks, Ron.

Nineteen-eighty-one saw further growth in AKF--now averaging 24 pages per issue. The Book Review project was begun and the first Cover Art award was presented. Connie Cloak came on board as Associate Editor. The first ever Special Edition issue of AKF (36 pages) was published in February and March of 1981 and contained the papers of the Infant Care Symposium held in Louisville. In March of that year Dolly Clark became Administrative Secretary and I was hired as Managing Editor.

AKF was indeed coming of age and this point was reinforced by the fact that 1981 was the first year that AKF was indexed in Wildlife Review, the indexing and abstracting quarterly published by the U.S. Fish and Wildlife Service. It was becoming clear that AKF had something to offer, not just to its members, but to the zoological and biologically community as a whole.

Two new columns were initiated in 1981 - Bird Calls and Elephant Set. These continue to be published as material warrants. The first technical survey was included in the August 1981 issue--a survey out of the Psychology Department of the University of California on Primate Predation. We saw here the beginnings of others in the scientific community coming to AAZK and AKF for input and information. A second survey on Male Macaques followed a month later.

In December 1981, I took what I hope has proven to be a popular step when I expanded that month's issue to include all the papers and proceedings from the Fresno Conference. That 84-page issue was the largest ever published by AKF and contained the first commercial advertising from ZuPreem. The staff felt that the combining of the regular AKF issue with the Conference Proceedings was not only more sensible economically, but also was a nice membership benefit to those many keepers unable to attend annual meetings.

Nineteen-eighty-two saw regular features expand to include articles on

ANIMAL KEEPERS' FORUM: A Decade of Growth and a Future of Challenge, Cont'd

exhibit design and wildlife research. AKF added its second commercial advertiser, International Foods Co., Inc. and carried a four-part series on the Endangered Species Act when it was up for reauthorization before Congress. In September 1982, AKF produced another Special Edition containing the papers of the Tropical Habitats Exhibit Workshop which was put on by the Topeka AAZK Chapter. The December Conference issue of 1983 expanded to an incredible 134 pages including all the papers and proceedings from the Toronto meeting.

AKF began 1983 with a 40-page Special Edition highlighting the papers presented at the Third Annual Elephant Workshop held at Dickerson Park Zoo. January also marked the introduction of the Continuing Keeper Education column. Under the very able leadership of Judie Steenberg, this committee and set and achieved many fine goals and has kept members informed of its progress through the pages of AKF.

The 36-page March 1983 issue saw the announcement of the publication of "Biological Values for Selected Mammals". This 56-page booklet, researched and edited by a committee of keepers, docents and interns at the San Francisco Zoo, has proven very popular and members can look forward to a Second Revised Edition in the future. That month also marked the departure of Connie Cloak to Nashville, TN and Alice Miser stepped in to fill the slot of Associate Editor.

May 1983 saw the introduction of the THINK Safety! column with its humorous yet sometimes all too truthful, cartoon portrayals of zookeeper situations demanding extra safety thought. Jill Grade has coordinated this column and is still requesting input from members on safety on the job.

The field of nutrition began to be explored in August of that year with the "Feed Bag" column by Dr. Sergio Oyarzun of the Metro Toronto Zoo. While this column got off to a good start, again we need more input from members, so, submit your questions.

More staff changes were in the offing this past year as Mike Coker resigned as Executive Editor and Alice Miser assumed his position. Bernie Feldman, former Chapter Affairs Coordinator and ADT Form coordinator, became Associate Editor. We have averaged 32 pages per regular issue in 1984 with some running 36 pages. We would anticipate a 100-plus page conference issue again in December.

To give you a little bit of an idea of how the Forum is put together each month, I'm going to briefly describe the routine which begins at our mailbox and ends at yours. When material is received--whether it be a major article, a chapter news notice, B&H or whatever--it is reviewed, edited if need be, and typed up in the AKF format. Whenever possible, we try to run an article in its entirety in a single issue. Occasionally with longer articles and, of course, series, the material will appear over several issues. We make every effort to publish material in the issue nearest the date the article was submitted. Once all material for each issue has been typed up, I begin that month's layout. We try, depending of course on the availability of material, to achieve a balance of interests in each issue. At times we seem to have a "run" on articles of a particular nature--say all elephant, all giraffe, etc.--these we will spread out over several issues. I try for a balanced layout graphically as well--for example, use of artwork, headlines and the like so that you do not receive an issue which is what we call "grey wash" - namely, page after page of solid body copy.

ANIMAL KEEPERS' FORUM: A Decade of Growth and a Future of Challenge, Cont'd

Since the AKF is not prepared, but only printed commercially, my next step is the paste-up. Each page is pasted up on a drafting table using a T-square to align body copy and headlines--hopefully as even and straight as possible. Following paste-up, Alice Miser proofreads the issue. We have worked hard at trying to achieve clean, mistake-proof copy, but a few mistakes do get by. Each month's issue (excluding the conference one) averages about 15,000 words to be typed. The conference issue is something else!

When the proofreading is done, I make corrections and the copy is then camera-ready. This means that the printers shoot negatives directly from the copy or "boards" as we call them. It is printed in four-page sections on an offset press, collated, trimmed and bound. From there it goes to the mailing service.

While AKF is at the printers, I am busy updating addresses for the mailing service. Growing up for the first 20 years of my life as an Air Force "brat", I thought we moved a lot--but then I had not yet become involved with zookeepers! I maintain a mailing list of approximately 1800 names which includes members as well as complimentary and exchange copies. I take the updates to the mailing service where they are entered into the computer. When the mailing service receives the journal from the printers, it is sorted, bundled by zip codes and mailed. We mail all AKFs Second Class. First Class mailings, while insuring much quicker delivery, are just beyond the financial budget of AAZK at the moment. Every effort is made to have the AKF in the mails on the first Friday of every month.

Deadlines are something I work with all the time. In fact, I am always working at least one month ahead of the calendar preparing the next issue. A saying around the office is "If it's September, I must be finishing the October issue and beginning on the November one". It is so important and helpful to us if those submitting material--especially things like B&H, Coming Events and Job Listings--get their material to us by the 15th of the month preceding the month in which the article is to appear. And folks, that means material arrives at our office by the 15th, not that it is mailed on the 15th!

To say that we could put AKF together without you, the membership, would be the biggest of understatements. It is your willingness to share your knowledge and experiences that makes AKF what it is now and what it will become in the future. What began as a tiny newsletter those ten years ago, has grown into a truly professional journal. It has been interesting to me during my research for this presentation to follow the growth of AKF not only in the physical format changes that time brought about, but also the editorial content. Today we are seeing longer, more detailed and referenced research articles. I think this trend showcases the fact that not only are today's keepers becoming more knowledgeable in their field, but are also becoming more proficient in sharing their experiences through the printed word. While the old axiom for college professors of "Publish or Perish" will probably never be true for zookeepers, I think you will agree that expanding and fine-tuning your communications skills in your chosen field certainly reflects well on the professional status for zoo keepers which we all work to promote.

Journalism has always been my first love and animals ranked a close second, so I feel very fortunate to be involved in a job where I can combine these two. I thank you all for the opportunity to share with you a little bit of AKF's history and I look forward, with your help, to a future for Animal Keepers' Forum which will include expansion, growth and greater professionalism.



ILLNESS AND RECOVERY IN A MALE KOALA - A CASE HISTORY

By
Donald C. Richardson
Los Angeles Zoo, Los Angeles, CA

The koala (*Phascolarctos cinereus*) has long been an enchanting curiosity to people of all ages. Faced with extinction toward the beginning of the century this amazing marsupial has survived the hardships of disease and sport. Today, through the generosity of the Los Angeles people and the courtesy of the Australians, we are able to exhibit the koala in a unique and varied atmosphere at the Ahmanson Koala House in the Los Angeles Zoo.

This exhibit, opened on 3 March, 1982, is a reversed lighting nocturnal building providing the public with viewing of the animals during their active time of the day. The exhibit gardens, measuring 30' x 100', resemble a eucalyptus forest. Included are 22 life-size eucalyptus trees with koala-sized sitting forks to provide an atmosphere of home for the exhibit animals. Creating such an atmosphere for these animals has led to a successful first year breeding season.

At the onset of the 1982-83 breeding season our younger male koala, Jimmy, had not reached full maturity. At 20 months old and only 17 lbs., he posed no real threat to the older male, Felix. Sixteen months older and three pounds heavier than Jimmy, Felix proved his dominance and bred two of the three adult females. Then as the 1983-84 breeding season developed it was clear behavioral changes in the two males were taking place.

In September of 1983, Jimmy had reached full maturity and weight equal to that of the older male. During September and October many vocalizations took place but little direct aggressive interactions resulted. Only one female appeared to be cycling during this period since the first year joeys were still nursing from the remaining two females. It appeared that these two females would cycle later in the season when the joeys became independent.

Then in November, aggression between the two males increased and they sought each other out in their prospective territories. Jimmy utilized his hit and run tactics to harass the older male. Felix responded with his bulldog style of attacking the head with numerous bites to Jimmy's ear. Following an intense fight on 22 November, 1983, Jimmy received severe bites to his left ear.

The following is a chronology of events after the fight. After the initial injury the ear was cleaned with a betadine solution and monitored for several days. On 24 November, the ear was swollen and warm to the touch. The ear was cleaned again with hydrogen peroxide, and antibiotic therapy was begun with an injection of Bicillen®. On 25 November, cleaning the ear was repeated and a Gentocin® injection was given. Again on 26 November, the ear was treated and a Tribriksen® injection was given. At this time Jimmy appeared lethargic and was eating poorly. Antibiotic injections were repeated for two more days and on 3 December, 1983, the ear appeared to be healing but Jimmy still seemed lethargic, and he showed no interest in interacting with the other koalas. His vocalizations were weak and diminished in number as he failed to respond to the older male's threats.

Then at the weekly weighing on 4 December, he showed a one pound weight reduction and his feces were normally formed but unusually greyish in

ILLNESS AND RECOVERY IN A MALE KOALA--A Case History, Continued

color. Samples were taken for analysis and he was returned to the exhibit. Hand-feeding was initiated and was continued as long as he would accept it. This form of supplement was not stressful and provided 100-500 extra leaves per day.

On 7 December, Jimmy was reweighed and his weight had dropped seven more ounces. He was still lethargic and it was decided to remove him from the exhibit to the koala house isolation room. Hand-feeding continued and on 9 December, a vitamin injection was given. On 10 December, 5% Dextrose fluids were given, since koalas dehydrate rapidly if they fail to eat. It was also decided that antibiotic therapy may have lowered the intestinal flora and reduced his ability to digest the eucalyptus.

Next an attempt was made to increase the cecums microbial flora. Five to ten fecal pellets were collected from the other healthy koalas. Each pellet was estimated to contain thousands of enzymes essential to the microbial digestion. The pellets were diluted and blended in tap water and 15ccs of solution were given orally for the following six days.

The temperature of the isolation room was carefully monitored and maintained at 70°F and the humidity between 70-80%. On 11 December, vitamins, 5% Dextrose, Lactated Ringers[®] solution and Aminoplex[®] were given in order to stimulate his appetite and maintain his fluid balance.

After initiating the fecal solution on 9 December, the color and texture of the stools improved. The dry grey-colored stools discovered on 4 December changed to a more moist, dark green-brown colored stool by the 13th. Fecal output was also monitored during his stay in the isolation room. Fecal output overnight ranged between 90-103 pellets. His attitude began to improve and he showed some signs of wanting to eat on his own. To stimulate his recovery, he was returned to the exhibit with the other koalas. On his return to the exhibit he weighed 17 lbs. 15 oz.

On 14 December, he was reweighed and he had dropped to 17 lbs. 5 oz. A decision was made to draw blood for a panel. Even though his weight was down, his attitude was more alert. Careful watch on his behavior, weight and feces continued along with daily hand-feeding as a supportive measure. Results of the blood panel showed a low white cell count, but it was within normal parameters. By 26 December, he once again reached 19 lbs. 4 oz., and hand-feeding was discontinued. Food consumption and weight were improving. Then during the first two weeks of 1984, he began to relapse and drop in weight.

When he fell to 18 lbs. 4 oz., supplemental hand-feeding was resumed. During this period of relapse his attitude was markedly different than his December illness. He remained fairly alert and active. His stools remained consistent in both color and texture. He also was able to hold his ground against the older male. On 18 January, 1984, when his weight reached a low of 17 lbs. 15 oz., blood was drawn. In order to allow his system to regain natural order, treatment was kept at a minimum due to his improved attitude and behavior. Fluids and vitamins were administered once on 22 January, following an attitude change in order to stimulate his appetite as well as to support hand-feeding. By 25 January, he regained his weight to 19 lbs. 4 oz., and from that point on he gradually increased his weight. As a result of the blood test which showed an anemia, oral vitamin therapy was given for a two-week period following his recovery. Today at 22 lbs., Jimmy is strong and healthy.

ILLNESS AND RECOVERY IN A MALE KOALA--A Case History, Continued

As a vital part of our koala project, Jimmy functions as our backup, breeding male. He also serves as an important stimulant to our older male's activity level. The extensive and relentless efforts to save him during this illness maintained the stability of our breeding program. The information acquired during his illness proved vital to our koala management program.

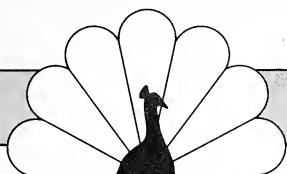
Observations by the Los Angeles Zoo research department provided the keepers with eucalyptus preferences, and additional interactions and activity by each koala. Recognizing each koala's behavior is a primary tool in keeping these animals. Each koala has an activity level and body language which may change dramatically at the onset of an illness. Discovering these changes as they occur can mean the difference between successful or unsuccessful treatment of the koala. For example, Jimmy is normally an active animal spending his time in different areas of the exhibit and in extended resting positions. When the illness first started, lethargy was noted. His extended resting positions changed to a crouched sitting position. His head drooped forward into his lap and he was anorexic.

Due to koalas' high inactivity, stress signs may not be as noticeable. Weighing the koalas once each week can provide additional information needed to discover the signs of illness as they occur. Dramatic weight loss of a pound or more between consecutive weighings may indicate the beginnings of an illness or behavioral problem. Immediate attention can then be focused on the affected animal. This is important when a large group is maintained in the same enclosure. At each weighing, the animals' body conformation and eyes are checked. Eye disorders are a common occurrence in koalas. The koala can also be checked for bite wounds, and during the breeding season, the females can be checked for the presence of a joey.

Finally, when administering antibiotic therapy, close attention should be kept on the animals' behavior and fecal output. This is important in an animal which relies on microbial action to break down food matter. Koalas are postgastric digesters, relying on micro-organisms present in the cecum to break down and detoxify the leaves and oils of the eucalyptus. Numerous injections of antibiotics may lower the microbial flora and proper nutrition may not be received. Change in fecal color or consistency coupled with depression may be the only immediate signs available. At the Los Angeles Zoo we generally rely on the individual koala to recover on its own from an illness. Frequent handling usually constitutes added stress which can further complicate the problem. However, if anorexia and weight do not show improvement, the rapid supportive therapy must be initiated. Due to koala folivorous diet of eucalyptus leaves, little or no fat can be found in their bodies. This enables them to carry a high proportion of body water. Much of this water is in the cecum which can hold large amounts of food. Since the majority source of water for koalas comes from the eucalyptus leaves, anorexia or inability to digest the leaves results in a loss of body water. During dramatic weight loss, fluid therapy is a must. Hand-feeding has proven a vital part in maintaining koalas through an illness at the Los Angeles Zoo. Techniques have been developed here which provide maximum consumption with a minimum of stress. These techniques are adjustable to account for differences in attitude and acceptance.

With the addition of two female koalas from the first breeding season, the Los Angeles Zoo maintains two male and five female koalas. Knowledge acquired during an illness such as Jimmy's, is constantly recorded and changes in our management program can be updated. With this flexibility, we look forward to our continued success at the Los Angeles Zoo Ahmanson Koala House.





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THE KEEPER AS AN EDUCATIONAL RESOURCE

By
Joanie Stinson, Keeper
The Phoenix Zoo, Phoenix, AZ

So you think you're a good keeper? You are always on time, your uniforms are spotless and you keep your work area and tools in order. You know all your animals by name and number and your diet cards are all in phylogenetic order. You feel pretty good about yourself and your job. But what about the public and the way you approach them? It's an area where everyone - myself included - needs improvement.

How many of us find ourselves hiding from the public, disappearing into the woodwork when the gates open? More often than not, don't we try to do our work in the public areas early so our afternoons can be spent inside, away from the rabble?

Dealing with the public is perhaps the hardest part of our jobs, but also one of growing importance. Today's zoos and aquariums are instruments of conservation in which the keepers play a very important role in the management and propagation of endangered species. All the hours of care, research, and behavioral observation that goes into our daily routine will mean nothing if the public is not educated about our efforts and the reasons for them.

Hopefully an evolution is taking place in which the animal keeper is more to the modern zoo than simply the person that does all the dirty work. Professional zoo keepers today have to go further than being general authorities on their animals. You must be able and willing to meet the public. The keepers' role in public relations is important for they are often the only employees a patron is likely to see during a visit. Interactions with the public can help to increase their awareness of the zoo's role in conservation.

For someone like myself who came into this field because I enjoy working with and have a respect for animals and don't enjoy working with people, this aspect of the job can be hard. It is especially so because most of our contact with the public involves a negative situation, usually reprimanding someone for breaking a zoo rule.

We all get together and joke about what we would like to do with the people who continually try to feed the animals, throw rocks, or cross barriers. But given a little self-control and forethought, these confrontations can be used to your advantage.

First, however, you must re-think your approach to these situations. Instead of simply telling a person "no" or threatening them with removal from the zoo, take the time to explain the reason for the rule that has been broken.

People seem to feel they must interact with the animals. Many don't care if the animal is disturbed, but there are some who are simply naive about the results of their actions. Explain the meaning of "special diet," and many people will understand that these animals are susceptible to diseases transferred by public feeding.

Keep in mind when dealing with the public that antagonism is not only uncomfortable for you, but hard on the innocent people exposed to it.

Some problems are easily recognized. Instead of waiting in the wings for the problem to develop, head it off before it starts. This is easier if the problem is occurring at an exhibit with several other people around. Make yourself visible, introduce yourself by saying something about the animals in that exhibit. Discuss their age, diet, behavior, and gradually work your way into the subject where your problem lies. If it's feeding, discuss disease control: if it's rock-throwing, mention "flight space" and how many animals break their necks after being accidentally frightened.

Innocently make eye contact with the person you suspect. You now have done two things: 1) the person you suspect knows he is being watched, and 2) you have touched the interest of the other patrons showing them you appreciate their interest enough to take time out to speak to them. You have spread a little information and won their sympathies for the difficulties of your job and the concern you have for your charges. Chances are pretty good that you can walk away with your problem solved.

Of course there are some people that you just can't talk to. They will do whatever they please. These people should be removed. In situations like this, be sure you are familiar with the policies of your institution before you act. Don't allow some idiot to antagonize you to the point your reaction could result in a blot on your record. Don't be afraid to ask for help. Whatever you do, don't give them the satisfaction of knowing they ruined your day. In other words, don't let them see you sweat. Remain cool, calm and in control.

As the elephant trainer I probably fall under public criticism more than other zoo keepers. I have never thought twice about disciplining one of my charges when necessary. I don't want things falling apart around my ears everytime a crowd develops because the elephants know I'm reluctant to use my hook. This can be a touchy situation, there is no denying that. At Phoenix all training from "chainbreaking" through the "lay down" was done in the open under the public eye. It's best under these circumstances to have an extra keeper or docent there to explain what you are doing. If people are curious or concerned, we explain exactly what we are doing and why. The elephants' daily routine is explained along with our objectives and goals.

My most frequent complaint is that I am impatient. This stems from my reluctance to repeat a command. I am careful to explain that once an elephant learns the behavior associated with a command, it's important that it responds immediately. That way, if I ever find myself between a wall and one of my elephants, they are more likely to move when I tell them to and - I hope - before I am injured seriously. Most people can understand this frightening situation. My explanation is given with a smile and my appreciation for their concern. Becoming defensive only agitates the situation. You are not doing anything to be ashamed of so don't act as if you're putting up a fight. If all your best efforts fail, offer to go with them to the administration building where they can file a formal complaint. Chances are the complaint - if it still exists - won't get that far.

Even under the best circumstance, people who would never dream of doing you or your animals harm can cause you grief. Personally I have never understood people's fascination with watching someone rake or scrub an enclosure. Being a constant brunt of bad jokes like "What kind of animal are you? or " Look, this one's trained to use a shovel!" is enough to make the most patient keeper want to disappear into the woodwork.

My problem spot is the zoo's orangu-tan exhibit. When down in that pit, I can really empathize with the animals. Just the sound of approaching voices is enough to make my hair stand on end. To the sound of my own gritting teeth I fantasize about how I would like to deal with these unknowing antagonists.

I've found that if I open the conservation as the people arrive, I don't have to pretend I find their jibes humorous. As they approach the wall, I explain something like, "I'm sorry, the oranges won't be out until I've had a chance to clean up after last night's dust storm," or "The oranges are very susceptible to colds, so we won't be exhibiting them until the temperature reaches 60°." If you simply explain what you are doing and how it benefits the animals they will proceed on their way wide-eyed and a little more knowledgeable. It may cost you a little time, but your ego nothing.

Communications between the keepers and docents should be encouraged. It's hard to put a price on the many hours these people work for our institutions. Their jobs can be made easier and the keepers' appreciation shown through workshops between the two groups. New and returning guides are given a chance to ask questions and get to know the animals more personally. In some cases these people are dealing with outdated information. By pooling your resources, you can insure the information disseminated to the public is consistent.

Now that we have mastered dealing with the public during our daily routine, it's time to move on to the more rewarding job of enthralling the captive audience with our wit and wisdom.

At the Phoenix Zoo and many others across the country, keepers are being used in educational programs. Six years ago we began our "Discovery Tours." Originally the lecture and tour were led by university instructors with stops at several night houses and brief contacts with the keepers. As more and more complimentary letters arrived, it soon became evident that the public enjoyed the keeper contact and the anecdotes they had to offer. Today the program has evolved into a series of four lectures: endangered species, elephants, reptiles, and an early morning bird walk.

Each tour lasts a minimum of two hours and includes a slide presentation researched and presented by the keeper, followed by a tour and a question-and-answer session. The elephant tour, consistently our most popular, includes a training demonstration and tour of the barn.

We recently began a new "after school" program involving the same programs but geared towards ages 6 through 16. Each child is given a copy of the ZOO BOOK in reference to the subject being discussed. The slide presentation is shortened to 20 minutes for the shorter attention span. As with the adult programs, it is completed with a tour.

Our program has been a big success with many people returning every year. We frequently get requests for special tours including one for the Nature Conservancy.

If you enjoy communicating to a captive audience that is genuinely interested in what you are doing, you might consider the challenge of teaching a community college course. In our area for several years a course on the role of the modern zoo in conservation is taught under the title "The Biology of the Zoological Garden". The catalog describes the class as "A survey of the functions and goals of zoological gardens with consideration

of how well these goals are being met. Animal behavior, evolution and ecology are examined with an emphasis on how knowledge from these areas is essential to the proper design and functioning of modern zoological gardens".

Though not directly associated with the zoo, it is taught on the zoo grounds by an anthropology professor and a zookeeper, Mike Carpenter. From the first assignment "Why Zoos?" in which the students are asked to justify or condemn the existence of zoos, the instructors take opposite points of view to stimulate both the students' imagination and sense of morality. The students are supplied with a list of suggested readings. The required texts are Wild Animals in Captivity by Hediger and King Solomon's Ring by Konrad Lorenz.

During the semester-long course, worth three credits in biology, the students will discuss everything from exhibit design and genetics to zootorphism. Controversial subjects like training, public contact, and euthanasia are covered. They have an opportunity to view several video tapes including Nova's "Memories from Eden", Lincoln Park's "Otto, Zoo Gorilla", and the documentary, "Say Goodbye".

The class meets once a week for three hours and each student is required to join in a day-long tour of the Phoenix Zoo. They also have the opportunity to join a tour to Tucson to visit Reid Park Zoo and the Arizona-Sonora Desert Museum. After their day at the Phoenix Zoo, the students are asked to critique what they consider to be the best and worst exhibits as well as design their own including graphics and a complete explanation.

The students passing through this course come away with a new or revised opinion of the zoo. It's no longer a source of simply recreation or entertainment, but a conservational resource hopefully worthy of their respect and help.

For those of us involved in these programs, we have found the opportunity to both expand our own knowledge of our animals and contribute to what is hopefully an important aspect to the philosophy of the modern zoo - education. So let's get out from behind our shovels and climb out of the woodwork. It's time to show that we have all it takes to be modern professional zookeepers, advocates for our animals, and friendly educators for our visitors.



"FISH WITHOUT TEARS" - Some Basic Considerations
In Aquatic Exhibit Design for Zoos

By
David G. Gordon, Aquarist
Point Defiance Zoo and Aquarium
Tacoma, WA

"Fish cannot carry guns." - Phillip K. Dick

In recent years, we zookeepers have seen a welcome shift from the phylogenetic approach to animal display - the reptiles in the Reptile House, small mammals in the Small Mammal House and the fishes in the Aquarium. Modern exhibitry has put more emphasis on the portrayal of regional or behavioral themes, where these animals are often placed under one roof, giving the zoo visitor a better picture of the interrelationships between all living things. Two examples of this current trend are the "Cascade Exhibit" at Portland's Washington Park Zoo and the "World of Adaptations Complex" at Point Defiance Zoo in Tacoma. It was through my exposure to the 31 mixed exhibits at the latter newly constructed facility that the insight and impetus for this paper arose.

With this change in exhibit strategy, today's zookeepers are faced with a new challenge - no longer confined to the specific, they must become generalists, versed in a range of biological techniques. The herpetologist may be confronted with the care of waterfowl hatchlings, the mammalogist delegated to the hermit tree crabs. While for the most part this shift may be deemed a "positive learning experience", I have found that most zookeepers dread accepting the responsibility for the aquarium systems at these new facilities.

I believe that the major area of conflict occurs largely as a result of contrasting dynamics between aquatic and terrestrial displays. This conflict has been sustained historically through "guild" sentiments that have attempted to keep the basic tenets of aquarium management under lock and key. From personal observation, I find that an open exchange of basic information is needed between zoo and aquarium workers, allowing zookeepers a better chance of survival, once confronted with the "mysteries" of operating aquarium systems.

In this paper I will not focus on specific mechanical or biological concepts - a visit to your public library will assure you that there are plenty of introductory books on aquarium care to confuse you with fact. I prefer to discuss some broad guidelines and philisophic considerations for zookeepers charged with the upkeep of aquarium displays. I have divided these considerations into three convenient categories: "Less is More", "More is More", and "Enough is Enough".

Less is More: Many zookeepers feel that they must be doing something of big proportion to be "really working" - hosing, shoveling, restraining, etc. Exactly the opposite tack is necessary for successful aquarium management. A well established aquarium should require a minimum of maintenance in its operation. Generally, aquatic systems may be characterized by a subtle but all pervasive stability. Hence the less manipulation, exhibit disruption or handling, the more likely the success of an exhibit. This divergence in operational tactics has created the stereotype of the passive, contemplative (i.e. lazy) aquarist in the eyes of some zookeepers. A good animal care technician will actually resist the temptation to fiddle with a balanced aquarium system merely to feel productive.

"FISH WITHOUT TEARS", Continued

More is More: This stability can best be achieved through intuitive observation, common sense husbandry and lots of heavy machinery! While I by no means advocate the use of gadgetry as such, I urge all keepers to employ redundant mechanical systems for filtration, water exchange, heating and lighting. By employing a "hardware heavy" exhibit design, you will not only insure against unforeseen equipment failure, but these redundancies will help provide the stable environment and ultimately save time and energy in overall maintenance. In few cases have aquarium systems been mechanically overdesigned. Don't play catch up ball in this area - it is far better to overcompensate with life support equipment.

Careful consideration of the exhibit tank that will be under your care is also recommended. A common misconception centers around exhibit size, and the inexperienced person will often feel that a small aquarium will be much easier to take care of. Surprisingly most often the reverse holds true. A greater volume of water will act as a buffer and allow for more flexible parameters in the event of heat loss, depletion of dissolved oxygen and general deterioration of water quality. I recommend exhibit aquaria of at least thirty gallon capacity for public displays.

Enough is Enough: There exists a common but tragic tendency of zoo workers to over-reach in their exhibit goals and expectations. Too often aquarium systems have been designed with the flashily obscure specimen, difficult to acquire and maintain, in mind. And as a result, the zookeepers' first experiences begin with the odds unnecessarily stacked against them. The choice to exhibit the more accessible fish or invertebrate specimen, if properly presented, will provide the same visitor appreciation, while eliminating much of the heartbreak or hair loss that follows striving for the unattainable. Most home aquarium primers contain lists of suggested hardy, easy to obtain animal specimens. When the choice is yours, I advise choosing aquarium display specimens carefully. The lionfish (*Pterois sp.*) display at Point Defiance Zoo's World of Adaptations Complex contains five inexpensive, robust fish, easy to display and care for, and has provided enjoyment for a rich spectrum of zoogoers. As is necessary to gain expertise in any new field, be conservative in your actions, observant of both success and failure, and be aware of when "enough is enough".

By following these suggested guidelines, I feel that many of you will soon be enjoying "fish without tears". Certainly unexpected problems will arise, for this appears to be the nature of all phases of animal husbandry. However, through forethought, sensitivity and open mindedness - in short those qualities that have led conscientious zookeepers to success over terrestrial challenges - a harmonious balance will be easily realized in your aquarium displays.



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HORTICULTURAL ENHANCEMENT OF EXHIBITS
AT THE ARIZONS-SONORA DESERT MUSEUM

By
George Montgomery
Arizona-Sonora Desert Museum
Tucson, AZ

The Arizona-Sonora Desert Museum is a zoological, botanical, and earth sciences institution focused exclusively on the natural history of Arizona, the Sonoran desert region of Mexico, SE California and the Gulf of California and its islands. This non-profit organization was established in 1952 and has increasing memberships and a yearly visitation rate of about 450,000.

The Museum has four scientific departments: Earth Sciences, Plants, Small Animals, Birds and Mammals. The Plant Department consists of seven full-time employees: Curator, Assistant Curator, Horticulturist, Plant Sales Manager, and three Landscape Technicians. As a landscape technician, my position is analogous to the keepers in the animal departments. Primarily, our duties are to maintain the gardens, path-sides and natural areas, and vegetation in and around the animal enclosures. We also assist with duties on this one-half acre propagation area.

Public awareness of native vegetation and its role in the Sonoran desert ecosystem is a valuable tool in the landscaping trade in the arid Southwest where water is not abundant. We participate in this public education program and add monies to our operating budget by holding biannual native plant sales. This popular event could be instituted at other zoos, and may be in some cases, a profitable fundraiser for the zoo, zoo society or AAZK chapter. Perhaps your state has a local chapter of the Native Plant Society that would co-sponsor such an event.

To explore the primary function of zoo horticulture as practiced at the Desert Museum, let us first define zoo horticulture as having the goal of the creation of living landscapes immersing the visitor in the characteristic animal habitat and demonstrating wildlife as exciting, interactive and indispensable elements of the landscape (Coe, 1983). This is a branch of zoo exhibition that is gaining greater recognition as a necessary complement to traditional zoo roles.

Enlarging on its past function of producing flower beds and shade trees, the modern zoo community is designing landscaping as an integral part of the zoo environment. The Puget Sound area zoological parks have taken great strides, as have many other institutions, in the incorporation of horticultural principles into new display and interpretation techniques at their institutions.

Front railing barriers are well planted at many zoos serving as a visual diversion from the actual barrier walls and providing additional cover for the animals. Where possible, vegetation native to the habitat or mimics of it should be used to set the theme of the animal as part of an ecosystem. Though cover is sought for the animals' well-being, visibility for the public is another consideration. These buffer plantings must be selected carefully to meet the display goals of the exhibit.

In cases of absence of barrier railings at the Desert Museum we are fortunate in the abundance of thorny plants available for use as barriers. For example, in the White-fronted Amazon exhibit, the animals gain a

HORTICULTURAL ENHANCEMENT OF EXHIBITS AT THE ASDM, Continued

small amount of distance from visitors by the planting of prickly pear cactus.

The support areas of the exhibit can be landscaped in a manner to suggest native habitats. This enables usage of plants that would be destroyed by the animals, and augments the total scope of the display.

Landscaping around buildings can ease the obtrusiveness of the artificial enclosure. The six-year-old walk-in aviary is becoming well-screened by native vegetation from the outside which adds to the continuity of vegetation from within. The schematic evolution sculpture at the entrance to the aviary is set off by, and protected from overly inquisitive visitors by the extremely sharp-spined Baja club cholla (Opuntia invicta).

Walkways, public access areas between exhibits and around buildings are surrounded by native vegetation throughout the Museum grounds.

The Arthropods of our region are displayed in the Orientation Room. Potted plants and cuttings are in most of these exhibits providing an enlargement of the scope of the presentation and interpretation of the animal, and in some cases its food or egg laying substrate. In these rearing cages, insects and other arthropods are watched through their life cycles to study their potential display value. The arthropod keepers use prunings from many species of plants around the grounds either collecting them themselves or putting in a special request to the Plant Department.

A standard procedure is being instituted for plant material requests from other departments by of a special request form. We are finding it useful in daily and long-range planning.

Plant materials are used in aquariums also. Cottonwood branches and leaves simulate a windfall into a mountain stream exhibit. The branches are replaced weekly; the landscape technician delivers the prunings on a regular basis to the aquarium keeper.

In the amphibian tanks representative plants of the toad's habitat are used as props. The giant Bufo marinus is exhibited in a diorama of a southern Sonoran river basin. The plant used, the wild fig (Ficus patifolia) is a characteristic tree of that region.

The plants in these and all other indoor animal exhibits are rotated periodically with others to prevent decline in health due to low light levels and lower than optimum growing conditions. The rotation system provides recuperation time and space for the plants; it takes additional service space but is well worth it, almost necessary, for the maintenance of healthy plants for display enhancement.

The mountain islands of southern Arizona are home to three rattlesnakes that inhabit slightly different microhabitats far different from those of desert rattlesnakes. The Banded rock rattlesnake (C. lepidus) is an example. The exhibits for these reptiles are enhanced by plants and plant material from their habitats. These exhibits are maintained by the reptile department with material occasionally supplied by the Plant Department.

Other reptile exhibits use dried plant material such as tree branches, dried grasses and pieces of bark as props and cover from plant species indigenous to some part of the range and habitat of the animal species on display (Lawler and Prchal, 1981).

HORTICULTURAL ENHANCEMENT OF EXHIBITS AT ASDM, Continued

The walk-in aviary is again an example of extensive plantings in an animal enclosure. The original concept provided four habitats within the structure but rapid plant growth and the birds' mobility quickly broke down the boundaries. The aviary contains 45 species of birds and about 140 individuals. Of the paired species, about 70% have successfully bred. Throughout the nesting season (February through September) varying amounts of prunings are left available for nesting and cover material for the birds. To aid in the introduction of hummingbirds into the aviary, we are planting naturalized tree tobaccos (Nicotiana glauca) and other nectar sources.

The Orange-fronted Parakeets (Aratinga canicularis) are one of several Psittacines native to the Museum region and were an exciting feature of this aviary--but far too destructive! They cut a nesting hole into a saguaro cactus but did not nest, only continued to enlarge the hole. This resulted in the death of the plant. When they started in on the second giant cactus, an interdepartmental decision to transfer them was made and followed through.

Animal destruction of plants in an enclosure is by no means new. It is one of the most difficult problems, besides budgeting, that the zoo horticulturalist faces, and needs extensive research and further discussion at another forum.

A regular renovation project at the Museum can be illustrated by the Black-tailed prairie dog (Cynomys ludovicianus) yard. On a yearly basis the yard is tilled by hand, soil amendments are added, and the yard is seeded with a rye grass to produce an aesthetically and nutritionally more complete exhibit. This winter and spring grass is suitable for Tucson's cool season but dies out in warmer weather. Attempts to establish a summer ground cover have not yet been successful. The prairie dogs eat this grass and are offered other grasses and prunings throughout the year. These prunings are made available to several mammals; including the mule deer (Odocoileus hemionus), and desert bighorn sheep (Ovis canadensis mexicana).

The ocelot grotto has undergone recent renovation. This exhibit has had serious secondary succession problems in terms of its landscaping. Introduction of a captive-born ocelot kitten five years ago resulted in the quick destruction of a vegetated enclosure. Her subsequent mating and raising of young left revegetation a low priority. Recent animal transfers allowed the opportunity for replanting with about eight large shrubs and small trees and several grasses. The cats were removed for two weeks allowing time for the plants' roots to begin to become established. Before reintroduction, these plants were sprayed with a foul-tasting antibiotic to discourage harmful inquisitiveness by the ocelots. Though a small amount of damage has been done by the cats, the grotto will continue to be vegetated as a simulated naturalistic enclosure.

At ASDM we are trying to achieve an increasing level of public awareness of the role vegetation plays in cultivated and captive displays and the natural world.

Continuing with its challenge to provide quality exhibition and interpretation, the Museum's current capital project is part one of four phases of the Large Animal Habitats Complex. The complex will exhibit four of the Sonoran Desert's major habitats: Mountain island forest, semidesert grassland, desert foothills, and subtropical riverine woodland. The mountain habitat is under construction and will include black bear, white-tailed deer, mountain lion, and Mexican wolf. The landscaping must perform

HORTICULTURAL ENHANCEMENT OF EXHIBITS AT ASDM, Continued

several important functions which combine to create the impression that the visitor is actually in the mountains, and conceal the barriers between the animals' enclosures and between the enclosures and the visitors, creating the impression of a single large space in which the visitor is immersed (Dimmitt, 1983). This Mountain Habitat will be landscaped with about 7,000 plants, from pine trees to wild irises.

An accepted value and function of zoological parks is education of the public in natural history and wildlife conservation. Viewing zoological specimens in an enclosure that is enhanced by the native or similar to native vegetation from the animals' community will further awareness of the concept of conservation of habitat. We realize the necessity of preserving natural habitat as the only means of preserving viable populations of both plants and animals. In this realization we must strive for that awareness to be directed to our visitors. In broadening the educational potential of zoos by including botanical exhibits and habitat replications, visitors will be encouraged to come more often and stay longer (Turner, 1974). We at the Desert Museum feel that presentation and interpretation of the animal in terms of its role in the ecosystem is a way to meet this challenge. Presenting exhibits that offer more than just one aspect of the ecosystem will enlighten our visitors to a greater extent.

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Information Please

Information is needed on care and environment of Blue & Gold Macaws during the hatching of eggs. Anyone having information on exhibit size and material, nests and nesting materials, cage mates, temperature, etc., please contact: Cynthia Kreider, Erie Zoological Society, P.O. Box 3268, Erie, PA 16508 or call (814) 864-4091.

The Honolulu Zoo, Mammal Section, is trying to develop a primate identification system. We would welcome any recommendations from keepers who have found a successful way of identifying primates. Please send information to: Honolulu Zoo, Irene Zane, Zoo Librarian, 151 Kapahulu Ave., Honolulu, HI 96815.

A GORILLA FOOD PREFERENCE STUDY

By
Patricia E. Sammarco, Zoo Keeper
Lincoln Park Zoological Gardens
Chicago, IL



Keepers tend to have lots of ideas and never enough time to get all their proposed projects done. Sometimes conditions do not allow us to make the particular observations we want to make. Fortunately, we can often find ways to try our ideas and answer our questions by using other members of the zoo family. I want to use the study I have started to illustrate intra-zoo cooperation, and the use of eager and knowledgeable people who can assist us with projects beyond our abilities.

I was watching our gorillas as they ate their afternoon produce feeding, commenting to a docent on how the choices that the apes made seemed to be different from what most people would think. The public, especially, found it amazing that gorillas would select salad before fruits. I thought it would be interesting to scientifically study their food preferences, but since our food is dropped out of keeper sight the first few choices are not to be observed by the feeder, and other keepers are not available to watch during this busy period in our day.

I was pleasantly surprised when that Docent, Joan Neymark, came in the next day to say that my project was approved and that I would have behavior Docents available. This was just an idea, and I suddenly had to organize it into a behavioral research project. With advice from Assistant Director Dennis Meritt, I designed what is my first formal research project.

I proposed ten observations on each of our 37 great apes, hoping to find individual and overall food preferences. Eventually I would compare and contrast the choices made by the gorillas, chimpanzees and orangutans. I saw possibilities for this to grow into a comparison of nutritional values of the choices if I could find a nutritionist who was interested and perhaps even compare wild preferences with the selections of our apes. I envisioned an army of Docents making copious daily notes and quickly giving me the data which would show, as I predicted, that the gorillas would show a preference in choosing lettuce and celery.

Most of our Docents go home at 2 p.m., having done their share of tours and observations. The produce feeding is at 3 p.m. My army became a squad and, as time dragged on to well over a year, a few other volunteers were added as regular observers. Many thanks to Volunteer Coordinator Susan Young; Docents Joan Neymark, Stephen St. Clair, Cindy Bowers, Fletcher Denton, Carol Fuller, Carol Rice, James Palmgren, Donna Brookins and Debbie McNully, and my friends Caren Thillens, Bob Ironside, Fred Jahnigen and Chuck for all their hours.

The great apes at Lincoln Park Zoo are fed meat and oranges at 8 a.m., Monkey Chow, carrots, seeds, nuts and goodies at 10 a.m., milk with supplements at noon, and produce at 3 p.m. This produce feeding of apples, bananas, sweet potato, onion, escarole and iceberg lettuce, celery, spinach and green beans was the focus of the study. Green beans and white potato are offered at a weekly or random basis, and were therefore eliminated from my data analysis. Escarole and iceberg were both counted as lettuce since it is difficult to differentiate the two at a distance. The choices of infants - Matadi, Brooks and Hope - are admittedly limited since they share with or steal from moms and babysitters. Bananas are routinely handed out before the rest of the produce is offered, so order of choice with

A GORILLA FOOD PREFERENCE STUDY, Continued

<u>FOOD ITEM</u>	<u>#APES</u>	<u>PERCENTAGE</u>
banana	23	100%
apple	21	90%
celery	20	87%
lettuce	20	87%
onion	14	61%
sweet potato	13	57%
banana peel	12	52%
spinach	12	52%
green bean	9	39%

Order of preference by number of gorillas choosing the item.

<u>FOOD ITEM</u>	<u>#CHOICES</u>	<u>PERCENTAGE</u>
apple	215	25%
celery	145	17%
banana	144	17%
lettuce	115	13%
green bean	54	6%
onion	54	6%
sweet potato	45	5%
banana peel	31	4%
spinach	31	4%

856 choices total for 32 gorillas during 69 observations.

<u>#APES</u>	<u>FOOD ITEM</u>	<u>#CHOICES</u>
16/70%	lettuce	29/42%
11/48%	celery	16/23%
9/39%	apple	12/17%
3/13%	sweet potato	3/4%
2/9%	green bean	2/3%
2/9%	onion	2/3%
2/9%	spinach	2/3%

Order of second choices

A GORILLA FOOD PREFERENCE STUDY, Continued

banana first is not necessarily accurate. On the occasions when this fruit was fed with the rest of the items, or handed out later, celery and green beans became first choices.

Observing 23 gorillas for three trials each produced 69 total scores, not enough for really scientific results. However, I learned a great deal and this study could be expanded to a more complete survey. I have breakdowns of the number of choices each gorilla makes during a meal. Some of these numbers surprised me. A gorilla may choose only three items from all that is offered as in the case of Frank who was seen taking only banana, lettuce and spinach. The others chose greater variety, although banana was the only unanimous choice.

Eating patterns varied a great deal, with Helen and Otto gathering an armful and leaving the food area to eat in leisurely seclusion while most others made repeated trips to the dump site and some remained on the spot. The number of selections made by each ape varied from 20 to 91 during the hour observation period. Some animals ate for as little as 20 minutes, others ate throughout the hour, but most finished their meal and took up lounging or play before 4 o'clock. Leftovers remain available for evening snacking, and are usually still apparent in the morning.

In looking at overall choices, some interesting figures appear. All 23 gorillas have been seen choosing banana, 21 made apple choices, 20 made lettuce and celery choices. These same four items are ranked highest in the number of choices although order changes to apple, then celery, then banana, then lettuce. Considering the relative abundance of bananas and apples (up to a dozen per animal), and the scarcity of celery ($\frac{1}{2}$ head per ape) and lettuce (with all sharing three heads), the greens appear as even more greatly preferred items.

Because of the routine of feeding bananas first thus influencing this choice, I looked at second choices. Sixteen gorillas took lettuce, 11 choose celery and 9 choose apple with relatively few making other second choices during the 69 observed sessions. Lettuce was taken twice as often as celery and three times as often as apple.

The informal observations during my routine seem to be verified by the more scientific study. Since we add produce for its amusement value to the nutritionally balanced prepared diet, it seems that offering more salad of the preferred greens and reducing the more expensive fruit would make all of us happier. Since wild gorilla diets consist of a great deal of rough vegetation and little fruit, this same change would also more accurately reflect the apes' natural habits.

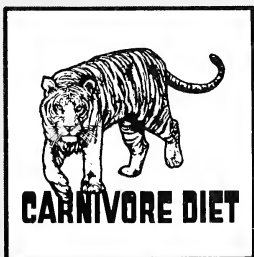
A commitment to zookeeping puts many demands on time and energy, but a keeper will find supportive people all around. We can be researchers, gathering needed assistants, or present a question beyond our limits to one more specially trained and become the assistants. Our animals reap the benefits since part of being a professional zoo keeper is being an applied behaviorist.



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FRESNO'S WOLF WOODS:
FRUSTRATIONS RESOLVED

By
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Fresno Zoo, Fresno, CA

At the Fresno Zoo we are just now completing a new Wolf Woods exhibit. This is the culmination of a long-held dream, as well as a long period of frustration for both the keeper staff and the management of our zoo.

We have exhibited wolves at the Fresno Zoo since 1936. We have had the Canadian or eastern timber wolf subspecies of wolf since 1974. The wolves have been exhibited in various locations in our zoo, but until now they have always had to be housed in concrete-floored, chain link enclosed cages.

The original pair of timber wolves had litters that totaled thirteen pups, which we were able to place at other zoos. After the death of the female in 1977, we acquired a new female, Tala, from the Philadelphia Zoo. Tala and Mingan had their first litter together in 1980, when they had Homer and Floyd. We did not know it then, but that was the beginning of a four-year period of frustration for all of us.

Right after Homer and Floyd were born, the old male, Mingan, died of liver failure. We wanted an unrelated male for breeding, so we acquired Willie from Mickey Grove Zoo in Lodi, CA. Willie had been hand-raised and was, and still is, friendly to his keepers. But again, little did we know the problem Willie would create for us. In 1982, he sired a litter of ten pups. It was not too long after that that Willie received a vasectomy. He was just a little too prolific.

Tala could not cope with all ten cubs, so one by one we attempted to hand-raise four of them, but they did not survive. In some ways that was a relief because by then we were beginning to doubt we would find homes for all our pups. Up until 1980, we had had little problem placing wolf offspring at other zoos. In the next few years it became obvious that most zoos, wildlife rehabilitation groups, and other reputable animal institutions could not take on any more wolves.

We had long dreamt of a more natural, roomier exhibit for our wolves. With six cubs surviving the last litter, and Homer and Floyd still on our surplus list after two years, it now became imperative to build a new exhibit as soon as possible.

As is usual for zoos, our first problem was raising the money. We had just completed our largest project ever, a \$950,000 new elephant exhibit. In the last two years we had also done considerable renovation of other areas of the zoo - all done with minimal amounts of money and a lot of in-house or donated labor.

We wanted to keep Wolf Woods in line with such renovations in costs. We had been able to renovate our ancient and sterile-looking Monkey Island into an attractive Lemur Island for \$30,000. Since over 80% of that cost went for creation of its rock mountain, it was a very inexpensive project. However, Lemur Island proved to be a very simple project compared to Wolf Woods, so eventually the cost of Wolf Woods rose to \$80,000. Even so, that is cheap for a completely new exhibit. We kept the cost down by the use of very cost-effective procedures.

FRESNO'S WOLF WOODS: FRUSTRATIONS RESOLVED, Continued

To finance Wolf Woods, we sought a major donor. A local firm, Martin Oil, donated \$30,000. It took time, but the rest of the money was raised from many other sources including our zoo society, our docent group "Zoolynx", and \$6,000 left over from renovation of our Big Cat Exhibit in 1981.

That \$6,000 from the cat exhibit was to cause frustrating delay at the last minute. It was from state grant money, so the State of California now had to approve the plans. They didn't like the tree guards we planned to use, so it took some time to negotiate a compromise on that issue, and re-draw the plans.

Acquisition of working plans for the exhibit took much longer than we expected. To keep things cost-effective, we sought and found an architect willing to do the plans for no cost. Then the architect ran into problems. We were in a recession when we asked him to help us, and he had some time on his hands to work on our project. But soon his firm acquired a giant project working on Fresno's Convention Center, so our Wolf Woods got put on the back burner. When someone does something free for you, you can't make demands, so we tried to wait patiently. Eventually, we had to hire a draftsman to complete the last bit of the plans.

Part of the cost escalation was due to a supply problem. We had tried to keep the costs down by purchasing the poles for the exhibit months before the plans were finished. Almost everything we build utilizes poles. In 1976 we built the Bison/Elk Exhibit, the first new exhibit in our Master Plan. It had peeled poles at the back of the exhibit. We liked the effect so much we decided to use poles as a major tie-in theme of landscaping and exhibits in the zoo. Even the new public restraining fences are peeled poles. The effect is very attractive.

The company we had bought poles from was going out of business and offered us a bargain rate, so we bought up a supply for Wolf Woods. These were pentachlorophenol treated poles. But by the time the plans were finished, we had revised our ideas and would need more poles. But by then we were unable to find any more penta poles.

We did find a company that had what are called CCA poles. "CCA" means copper chromate acetate treated. We consulted with other zoos that had used them, and found they felt they were superior and had greater longevity. So we worked out a trade, selling the old poles and replacing with CCA poles. But, of course, the costs had to rise some.

To compound the pole problem, the plant supplying them was temporarily closed by the state because of one of the worst toxic waste disposal problems encountered in California. Naturally this caused further frustrating delay in the project.

Another delay resulted when engineers questioned the soil stability because the planned moat was to be ten feet deep with the poles buried another seven feet. Tests had to be run to convince them that the soil would be stable.

Meantime, we had the problem of housing a total of ten wolves until their new home could be built. The young males, Homer and Floyd, were housed in one 18' x 18' exhibit next to an identical one housing their mother, Tala, and her new mate, Willie. Willie and Tala's exhibit couldn't house six growing pups too, so the pups went to a play yard in the nursery. They soon got too big and rambunctious for that area, so they were taken to the shift pen at the Bison/Elk Exhibit. Eventually, the male

FRESNO'S WOLF WOODS: FRUSTRATIONS RESOLVED, Continued

pup, Bruno, became so dominated by his sisters that we had to pull him out and put him into one of the three small holding pens behind the sea lion exhibit. The shift pen became too small for the five sisters too, and one day one of them tried to bite the keeper. So we decided to do a major shift. We moved Homer and Floyd to a holding pen behind the sea lions, and two of the female pups to a third holding pen. The other three females went to the public area cage where Homer and Floyd had been

That worked for awhile. Then Floyd became ill and died. So we were down to nine wolves. Then, shortly before Christmas 1983, two of the sisters ganged up on the third and bit her ear badly. Four of us stayed late that night to tranquilize her, treat her, and move her to the cat barn night house.

A few months later, Homer became ill and we moved him to another room in the cat barn to recuperate. This gave the two females in the holding pens more room, so we left the housing arrangements that way.

All the wolves but Willie and Tala were, and are, on our surplus list. Since 1980, the only inquiry we have received was from a zoo in Toluca, Mexico. We offered them five of the wolves last winter, and then the paper work started. But with the Endangered Species Act and two federal governments involved, nothing more has ever come of it. It is apparently a dead issue. So all nine wolves will move to Wolf Woods.

After the many long delays and endless frustrations for the whole staff, construction of Wolf Woods finally began on 6 June, 1984. The wolf keeper at the time, Sue Jones, was one of the official groundbreakers. The site of the new exhibit encompasses a quarter of an acre. It is located west of our reptile house. The original site was quite flat. The exhibit now grades from the edge of the ten-foot deep moat up to seven feet high at the center, with a flat area at the back of the exhibit. The public will view across the moat at eye level with the top of the center hill. This was accomplished by adding fill dirt to raise the public viewing area into a hill. Fresno is very flat, so when we build new exhibits we like to build hills to relieve the flatness.

There are two dens, one facing toward the public and one toward the back for more privacy. The dens form the foundation for the center hill of the exhibit. They are six-foot diameter corrugated metal piles high enough to stand in. Dirt was added for a den floor. Wooden "log-house" compartments are at the back of the dens. These have a trap door at the top for a keeper to open if necessary to drop down to get an injured or sick wolf. There is a plywood door in the compartment with a peephole for checking the den. Fill dirt was mounded over the dens after they were constructed, and rocks were placed around the openings to the dens.

A drinker pool was built at the east end of the exhibit. The drain leads down through a percolation bed of gravel to the soil. The drain valve is next to the pool. The fill valve for the pool is in a concrete pad outside the exhibit gate.

The exhibit walls are the CCA poles buried seven feet deep and cemented. The poles are bolted together with long redwood planks on the exhibit side of the walls. The moat is on the front side of the exhibit only. From the public viewing area, only a short two-foot height of pole is visible above the moat, so the view of the animals will be unobstructed. The public restraining fence is the same pole rail fence used at five other areas of the zoo.

FRESNO'S WOLF WOODS: FRUSTRATIONS RESOLVED, Continued

Keepers enter the exhibit by a side gate in the east wall. There is a guillotine door at the back which will lead to a future holding pen.

We have night events at the zoo and are open evenings in the summer, so we have also lighted this exhibit. Mounted inside the moat walls are "Cool-Cube" quartz halogen light fixtures. These use 300 to 500 watt bulbs.

Five large sycamore trees were preserved at the site. Short poles were used as tree guards to prevent fill dirt from sliding down onto the tree roots. One of the most difficult tasks during the long and very hot summer was to get enough water to these trees to keep them alive during construction. To keep costs down, our gardening staff and volunteers did the landscaping. In late September, a volunteer work party of 80 people placed all the plants according to the landscape architect's plan.

At the time of this writing the wolves have not been put into the exhibit. As each one is put in, they will receive physical examinations, necessary booster shots, and will be ear-tagged. While scattered in holding cages, of course, it has been easy to tell the wolves apart. We anticipate it might be harder to identify individuals with nine wolves in one exhibit. So we are using colored tags in the ears. These are about the size of a quarter (29mm in diameter). The three males will be tagged in the right ear and the six females will have tags in the left ear. We expect the tags will simplify doing behavioral studies.

Willie and Tala go into the exhibit first, as we hope they will be dominant. Then Virginia and Neka, the two sisters on public view, will go in. They have been within sight of Willie and Tala and should relate best to them. Ethel, Lucy and Jumper will be next -- we hope Jumper won't live up to her name. Homer and Bruno won't go in until they have been neutered as we certainly don't want any more babies.

We do not know yet what the problems will be. We don't know if nine wolves that have not lived together can form a proper social pack -- it will be very interesting to watch them sort out their social order. We don't know if we can condition all nine wolves into entering the holding area at once. We don't know what problems will arise with keepers going into an exhibit with a group of wolves, one of which is already friendly to keepers. We can only play it by ear and meet each problem as it arises.

What we do know is that at last we have a chance to resolve our staff's frustrations over the wolves. Our worst problem was having to house full grown wolves in inadequate, cramped, deteriorating, concrete and wire cages. We often had to defend ourselves against public criticism of the awful old cages. We also felt great frustration that the nine wolves scattered around the zoo have had no chance to experience and to display normal wolf pack behavior. We expect those basic frustrations will now be resolved.



CAPTIVE MAINTENANCE OF THE TAILED FROG
(*Ascaphus truei*)
AT THE WASHINGTON PARK ZOO, PORTLAND, OR

By
Stanley P. Held
Washington Park Zoo
Portland, OR

Ascaphus truei is the only North American species of the family Ascaphidae. It is a primitive frog as evidenced by its amphicoelous vertebrae, free bony ribs, and the retention of two tail wagging muscles: the pyriformis and the caudalipuboischiotibialis (Noble, 1931; Stebbins, 1954; Duellman, 1975).

The tailed frog is indigenous to the Pacific Northwest. This cryogenic anuran usually spends the daylight hours hidden under stones in shallow mountain streams. It becomes active at dusk, foraging for food on the stream banks, or, after rains, in wet woods. The many isolated populations are found at timbered elevations ranging from sea level to 2000m (Stebbins, 1954; Behler and King, 1979).

A male *A. truei* is unique among frogs in possessing a vascular extension of the cloaca which is used during amplexus as an intromittent organ to transfer spermatozoa into the cloaca of the female (Noble, 1931; Stebbins, 1954; Nussbaum et al., 1983).

Although field studies (Gaige, 1920; Noble and Putnam, 1931; Metter, 1964a, 1964b, 1967; Landreth and Ferguson, 1967; Wernz, 1969; Brown, 1975; Hailman 1982; Daugherty and Sheldon, 1982a, 1982b) as well as laboratory research (Noble, 1931; Metter and Pauken, 1969; Wernz and Storm, 1969; Altig and Brodie, 1972; Claussen, 1973a, 1973b; Brown, 1975; Hailman and Jaeger, 1978; Green et al., 1980) have been conducted on *A. truei*, there are no published reports on zoological exhibitry and husbandry of this species.

As compared with other zoo animals, there is a scarcity of published data on the captive maintenance of any amphibian, especially pertaining to cold-adapted forms. Most zoological institutions which exhibit amphibians do so in a reptile house which is usually fashioned to cater to tropical or temperate climate herptiles (Stuart, 1973; Nace, 1977).

This paper describes the captive maintenance, display techniques, and attempts to breed tailed frogs over a two and a half year period (March 1982 - September 1984) at the Washington Park Zoo, Portland, OR.

Materials and Methods

Exhibit - The exhibit tank (75 x 25 x 45cm) held approximately 15 liters of domestic tap water which created a depth of 7cm. Water for aquaria housing larvae was dechlorinated by aeging.

A water pump was connected to 7.6m of clear plastic tubing coiled inside an insulated, water-filled, plastic bucket. This bucket was attached to the refrigeration unit of a commercial juice cooler. An aerator in the bucket kept the cold water in motion. Exposed plastic tubing from the outlet and pickup tubes were wrapped with 15.9mm water pipe insulation. The outlet tube was divided in two: one section exited under the water while the other section released water in a spray from the top. This cooling system kept the exhibit water temperature within the range of 5°C to 15°C (see Claussen, 1973 a, for a discussion of *A. truei* thermal requirements).

CAPTIVE MAINTENANCE OF THE TAILED FROG AT WPZ, Continued

The filtration system consisted of a mechanical filter, which removed suspended particles from the water, and a chemical (activated charcoal) filter, which removed dissolved gases, chlorine, and other chemicals. This system maintained a high quality, aquatic habitat for the animals. The filters were installed between the water pump and the chiller.

Smooth stones, most with a diameter of 25-75mm (see Atig and Brodie, 1972), were layered on the floor of the enclosure. A few larger stones, western red cedar branches, and small ferns (*Filicophyta*) were added. The larger stones were angled against the front of the aquarium glass. An aerator was hidden under the stones.

The outside of the back and sides of the tank were covered with a neutral gray plastic. The cover of the exhibit tank was 6.4m opaque plexiglass with cutouts for the outlet and pickup tubes plus numerous smaller holes. On top of the plexiglass, a 30cm, 20-watt fluorescent full-spectrum lamp connected to an electrical timer provided lighting with the day-night cycle set to duplicate the natural photoperiod of Multnomah County, Oregon.

The theme of the Cascade Stream and Pond Building, in which the exhibit is located, was to show the faunal ecology and life history of a Cascade Mountain stream. The exhibit tank was positioned near the entrance of this building and was therefore influenced by natural light, outdoor temperatures, and noises from the public hallway. Disturbances from these sources were believed to be minimal. A 75 x 45 x 0.95cm piece of clear glass was placed between the front of the tank and the public viewing area. The back of the tank projected into an animal keeper work area which had low noise levels but was heated to 15.6°C at night and 17.8°C during the day. The back and sides of the tank were enclosed in 25.4mm styrofoam sheet insulation to minimize temperature influence from the work area.

Holding - The off-exhibit holding area, the Herptile Quarantine Cold Room, measured 2.7 x 2.1 x 2.7m. An 11,000 BTU/hr air conditioner maintained the temperature within the range of 5°C to 17°C with a mean of 11°C. Timed lighting, set to duplicate natural day/night cycles, was provided by a ceiling-mounted 1.2m standard double fluorescent fixture with a white full-spectrum lamp and a red lamp. Tailed frogs were housed in various sized aquaria ranging in capacity from 3.8 to 113.6 liters. These holding tanks were furnished similarly to the exhibit tank.

Subjects and Maintenance - A total of 5 male, 4 female, and 25 larvae of *A. truei* were captured for use in the study.

A few tadpoles and three to four males were the primary exhibit subjects.

Female *Ascaphus* were housed in the off-exhibit holding area and were introduced into the exhibit tank when adult males developed seasonal sexual characteristics as described by Gaige (1920); Noble and Putnam (1931); Metter (1964a); and Daughtery and Sheldon (1982a). The female frogs were removed after amplexus had been broken or after two days if amplexus had not occurred, and then reintroduced at a later date.

Diet consisted of purchased or captive-reared 2-10 week old house cricket nymphs (*Achete domestica*), flesh fly larvae (*Sarcophaga bullata*), mealworm larvae (*Tenebrio molitor*), wax moth larvae (*Galleria mellonella*), and sow bugs (*Oniscus asellus*). Also, the frogs were occasionally offered small local spiders: the long-bodied cellar spider (*Pholcus phalangoides*) and the American house spider (*Achaearanea tepidariorum*). Frogs were fed one or two times per week en masse. Once per week, animals were fed individually in small plastic or glass containers.

CAPTIVE MAINTENANCE OF THE TAILED FROG AT WPZ, Continued

Diet records were kept for individual animals and for groups. Each frog was examined and weighed monthly on a triple beam scale to evaluate health and food consumption.

Feces, uneaten and dead food items, and dirty water were removed from the tanks every few days. Complete water changes and tank cleanings were done once per month.

Results

This project resulted in the successful maintenance and exhibitry of *A. truei* in a zoological park. Tables 1 and 2 show the dates the animals entered the collection, metamorphosis dates, length of time in captivity, and disposition of each animal (only frogs were given identification numbers). No adults died during the study period. One adult frog is a two and a half year captive. Three frogs have been on exhibit for over two years. Two larvae have been sharing the exhibit for a year and a half.

TABLE 1. Date frogs entered the collection, disposition, and time in captivity.

Animal #	Arrival date	Time in captivity	Disposition
82-1♂	18 Mar. 1982	31 months	On exhibit
82-2♂	7 July 1982	27½ months	On exhibit
82-5♂	15 Sep. 1982	2 months	Died 8 Nov. 1982
82-6♂	30 Dec. 1982	2½ months	Died 13 Mar. 1982
83-1♀	5 May 1983	17½ months	In HQCR ^a
83-2♀	5 May 1983	17½ months	In HQCR
83-7♂	15 May 1983	17 months	On exhibit
83-5♀	1 June 1983	16½ months	In HQCR
83-6♀	1 June 1983	16½ months	In HQCR

^aHerptile Quarantine Cold Room

CAPTIVE MAINTENANCE OF THE TAILED FROG AT WPZ, Continued

TABLE 2. Date larvae entered the collection, metamorphose date, disposition, and time in captivity.

Arrival date	# of animals	Metamorphose date	Time in captivity	Disposition
14 June 1982	1	6 July 1982	28 months	82-3♂ on exhibit
14 June 1982	6	dnm ^a	10 months	Died 10 Mar. 1983
29 June 1982	1	13 Aug. 1982	4 months	Died 29 Oct. 1982
29 June 1982	3	dnm	9½ months	Died 10 Mar. 1983
12 Sep. 1982	3	dnm	2 months	Died 8 Nov. 1982
12 Sep. 1982	6	dnm	6 months	Died 10 Mar. 1983
17 Apr. 1983	1	25 June 1983	18 months	83-3♂ HQCR ^b
17 Apr. 1983	1	25 June 1983	18 months	83-4♀ HQCR
17 Apr. 1983	1	dnm	17 months	Died 4 Aug. 1984
17 Apr. 1983	2	dnm	18 months	On exhibit

^aDid not metamorphose

^bHerptile Quarantine Cold Room

The husbandry techniques utilized to maintain tailed frogs in captivity included clean, clear, cold, moving water; a relatively disturbance-free existence; varied food items providing adequate nutrition; a fairly constant, forest-like environment; uncrowded housing conditions; a natural photoperiod; and the keeping of concise records.

Pelvic amplexus with intromission was observed with three different pairs of frogs. These embraces were maintained 28, 78, and at least 144 hours. The production of eggs did not occur.

CAPTIVE MAINTENANCE OF THE TAILED FROG AT WPZ, Continued

Discussion

Exhibit - The exhibit enclosure was designed to achieve four purposes: 1) to recreate the microhabitat of a tailed frog in a Cascade Mountain stream; 2) to house and maintain *A. truei*; 3) to allow zoo visitors to see the frogs; and 4) to research numerous aspects of captive husbandry of this species.

Stones, branches, and vegetation placed at different levels gave the frogs a wide choice of temperature and humidity gradients. The temperature extremes ranged from the coldest water temperature of 5°C to the warmest air temperature, directly beneath the fluorescent lamp, of 16°C. The water flowing through the underwater outlet tube created a moving water stream effect; the water entering the tank in a spray from the top created a rain effect and helped keep the humidity level high. The small holes in the plexiglass top allowed for gaseous exchange.

The absence of external gills on the larvae and the reduction of lung size and lung vascularity in the adults indicate that these animals rely mostly on cutaneous respiration and, therefore, require a cold environment including highly oxygenated water. This was provided by the cold moving water and by the stone aerator. The bubbling action of the aerator also helped keep particles in suspension thereby increasing the efficiency of the filtration system. The reduced lung capacity in *Ascaphus* results in an increase in its specific gravity. Therefore, it is easy for these frogs to remain submerged.

Subjects and maintenance - Tailed frogs were fed during the day. However, they ate at night and were therefore rarely observed feeding. When *Ascaphus* were observed feeding they usually reacted opportunistically, lunging at active food items. Only rarely were frogs observed actively pursuing a live food item. Weekly individual feedings helped determine if all frogs were eating and to test food preferences. Of all food items offered, the frogs displayed a preference for spiders and crickets. Fig. 1 shows the percent of offered food items eaten. (Test for significance of differences between proportions. $Z = 2.24$, when $p < .05$).

Male frogs ranged in weight from 5.2 to 6.0g (n=4) with an average of 5.7g. Female weights ranged from 8.0 to 9.4g (n=4) with an average of 8.8g.

Because it was important that visitors see the frogs, several modifications were made to the exhibit to improve viewing. In an attempt to reverse the light cycle to show the frogs when they were most active, a one-way mirror was substituted for the clear glass fronting the exhibit. This proved too dark for proper viewing. A red fluorescent lamp was substituted for the white lamp, but this arrangement also proved too dark for exhibit viewing.

A more successful strategy was to arrange the enclosure substrate materials so that the frogs were visible even when they were hiding. *A. truei* concealed themselves by pushing between stones on the bottom of the tank, where they appeared squashed. Frogs hid under the large stones angled against the front glass and were thus visible. Branches, leaves, and moss were positioned in similar ways to provide "hiding places" visible to the public.

Despite these modifications, at times the frogs were difficult to see. Their brown, gray, and orange coloration provided excellent camouflage

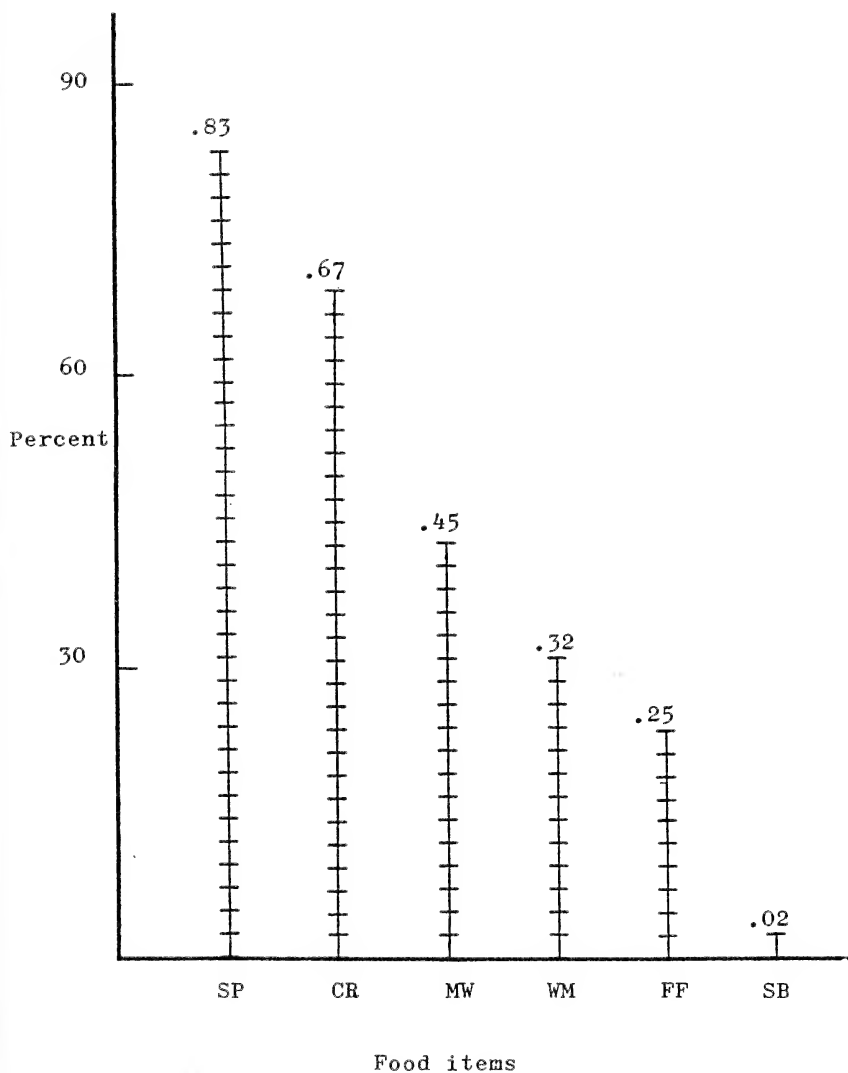
CAPTIVE MAINTENANCE OF TAILED FROGS AT WPZ, *Continued*

Fig. 1. Percent of offered food items eaten by tailed frogs. (Test for significance of differences between two proportions.

$Z = 2.24$, when $p < .05$).

SP, spiders; CR, crickets; MW, mealworms; WM, wax moth larvae;

FF, flesh fly larvae; SB, sow bugs.



CAPTIVE MAINTENANCE OF TAILED FROGS AT WPZ, Continued

among the similarly-colored stones. Because of their propensity to hide and their lack of sustained activity, the uniqueness of A. truei as an exhibit animal is frequently not appreciated by the casual observer. The zoo staff eventually agreed that careful scanning of the exhibit was part of the visitor's educational experience.

Rhyacotriton olympicus, the Olympic salamander, and A. truei are sympatric. Because of this relationship in the wild it was decided to try a mixed exhibit. An adult female R. olympicus has shared the exhibit tank with A. truei frogs and tadpoles for more than a year and a half.

Mortality - Two juvenile male frogs died two months after capture without having eaten. Three larvae also succumbed within two months of capture. A two-month-old frog that metamorphosed from a captive larvae died without having eaten. One larvae died when exposed to chlorinated water. Almost a year after their capture, 15 larvae died when algae-covered rocks from a migratory waterfowl pond and from a zoo exhibit housing North American river otter (Lutra canadensis) were introduced into the larval holding tank. All died within 24 hours. Cause of death was not clinically determined.

Breeding - When the adult males in the exhibit tank showed advanced development of transitory sexual characteristics, adult females were introduced. These male sexual characteristics included a series of small dark spines on the insides of the pectoral region, a rim of small dark tubercles on the edge of the lower jaw, the swelling of the forearm to two to three times its normal size, and the appearance of large black horny pads on the inner palmar tubercle and the inner forearm (Gaige, 1920; Noble and Putnam, 1931; Metter, 1964a; Daugherty and Sheldon, 1982a). Male and female frogs were introduced in the exhibit tank because it provided the best conditions for observation.

Three to four female Ascaphus were introduced into the enclosure at a time, and any of four behaviors resulted: 1) males and females ignored each other; 2) a male attempted to amplex a female but the female was not receptive; 3) a male inguinally amplexed a female but intromission did not occur; and 4) a male inguinally amplexed a female and intromission occurred. Females were never observed to initiate any contact behavior.

Males with fully developed seasonal sexual characteristics were observed attempting to amplex juvenile and other adult male Ascaphus as well as the adult Rhyacotriton sharing the exhibit (see Metter, 1964b). An amplexed pair often attracted other males which would attempt to amplex any part of the mating couple's bodies they could grab, sometimes holding on and dragging or being dragged around the tank for several hours before releasing their grips.

Mating pairs were occasionally handled to determine intromission and for photographic sessions to document these behaviors. The females often tried to jump away, dragging the amplexing males with them, but these disturbances did not cause the animals to break amplexus.

It has been shown that female A. truei can be induced to ovulate by injection of amphibian pituitary gland extract or human chorionic gonadotropin (Noble and Putnam, 1931; Wernz and Storm, 1969; Brown, 1975). It was hoped that by closely duplicating the frogs' natural environment that eggs would be laid without the use of chemical stimulants. Though this has not happened as yet, further investigation is ongoing.

CAPTIVE MAINTENANCE OF TAILED FROGS AT WPZ, Continued

The first frog to metamorphose from a wild caught larvae had spent its entire captive life, 28 months, in the exhibit. This particular frog had been more tolerant of light, noise, and other disturbances caused by captivity than had individuals captured as adults. Also, he was often quite active in the daytime. Because this frog was housed in the exhibit tank, its tank mates were all males. The only times it was exposed to female A. truei was when they were introduced into the exhibit tank for breeding. In the first year of this frog's life, during these introductions, he hid and did not approach the females. This frog began to develop transitory sexual characteristics at 16 months. At 20 months of age he actively pursued adult female frogs and attempted amplexus with whatever part of the female's body he grabbed first. However, he has yet to be observed successfully amplexing an adult female tailed frog.

A recent study of the life history of a naturally occurring population of tailed frogs stated that male A. truei do not show full development of skin tubercles (transitory sexual characteristics) until they attain four years of age (Daughtery and Sheldon, 1982a). It is well established that some mammals and reptiles can become sexually mature at an earlier age in captivity than in the wild (Hediger, 1950; Kleiman, 1975; Martin, 1978). Although this phenomenon has not been proven for amphibians, it may well exist for these animals also.

This project has shown that tailed frogs can be maintained and exhibited in a zoological setting. With the proper equipment, maintenance of these animals would not be much different than any other zoo animal. The movement of water as a rain, a waterfall, and/or a stream effect can make for very realistic and fascinating exhibit displays.

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THE MODERN KEEPER IN A
SMALL GROWING ZOO

By
Wayne Sager, Keeper
Valley Zoo, Edmonton, Alberta, Canada

The last few decades have brought tremendous changes in professional animal care. Modern technology and a global conservation movement are largely responsible for shifts in both techniques and attitude in today's zoos. Although still doling out diets and cleaning enclosures, zookeepers have had to learn new skills to keep pace.

I come from a small northern zoo located in Edmonton, Alberta, Canada. Primarily a children's zoo for its initial 15 years, the Valley Zoo has taken a new direction in the past decade. Within the past decade there have been a few new displays built that do not follow the original "Storyland" theme. When the economy began to tighten, further expansion was put on hold.

It was at this stage that keepers became interested in upgrading existing displays. With the help of the horticultural crew, keepers utilized readily available materials to transform previously barren pens into more natural appearing environments. This helped us realize we could still find ways to contribute to our zoo's development. Most of our personnel have learned their trade on-site. Several of the keepers joined the American Association of Zoo Keepers and began to learn many new ideas in animal husbandry. We began to realize that contact with other keepers, plus copious amounts of reading, greatly helped our progress in becoming modern keepers. We have incorporated record keeping, training, safety procedures, research and study into our daily routine.

As keepers in such a northern location, primary consideration is given to dealing with frigid temperatures that may dip to -40°C . Unfortunately, original construction of the zoo did not provide adequate heated quarters in the display areas of the resident exotic species. Instead, a large winter barn was constructed to house most of the animals during the cold months while the zoo is closed to the public. This necessitated a biannual shift of the majority of our animal stock. Keepers quickly became proficient in safe, low stress capture methods. Certain necessary improvements were implemented to deal with large, less cooperative individuals such as our 750 lb. Peruvian Sea lion bull (Otaria Byronia). Through cooperation of zoo keepers and associated city tradesmen, a mobile "Pinniped Squeeze" was built for far less than market price. Keepers also helped design squeeze/capture chutes for the Wood Bison (Bison bison athabasca) and Bighorn Sheep (Ovis canadensis) pens.

It is difficult to be a modern keeper without modern facilities. In the past, keepers often had to adapt their methods to buildings that were too often designed by people who seemingly wouldn't know a giraffe display from a bus shelter. Now we work with designers, sharing information learned from our experience, ensuring we are in on the planning of new work areas.

In the fall of 1981, a design team consisting of an architect, project manager and zoo officials drew up a preliminary floor plan for a large commissary/winter quarters complex that would replace the twenty-year-old winter barn at our zoo. Totalling nearly 17,000 sq. ft., this massive structure will also provide badly needed staff facilities plus nursery

THE MODERN KEEPER IN A SMALL GROWING ZOO, Continued

and public interpretive areas. Keepers at the Valley Zoo were invited to a series of meetings to update this building's interior functions. We came to agreement on matters of concern such as pool size, corral arrangement, drain locations, door and window operation, perches and feeding stations. As construction began, a new project was being drawn up. This was for an extension onto our elephant house that would contain an indoor pool and viewing amphitheater. Attached to this will be flanking wings housing nocturnal animals on one side and reptiles on the other. Keepers also had the opportunity to participate in the interior design for this building. With such involvement, we feel like an integral part of the growth and expansion of our zoo.

A zoo masterplan is in developmental stages outlining \$60 million of development to the remaining 55 of our total 70-acre area. We are all anxious to see our zoo expand into a world-class facility and hope to continue our participation in its planning.

Public education and involvement have become extremely important in recent times and the modern keeper is instrumental in this process. This couldn't be more evident than in a small zoo which requires public support to gain funding for expansion.

At our zoo, keepers initiated a "Meet the Keeper" program and the "Zoo-keeper Olympics" to stimulate public interest in the "behind-the-scenes" activities. Regular public training demonstrations of the elephants and sea lions proved to be popular attractions. Keepers also submitted informative articles for publication in a monthly newsletter sent out to season pass holders. Numerous appearances on television also helped to promote the zoo.

One interesting program was set up in the fall of 1983, through the cooperation of the C.N.I.B. (Canadian National Institute for the Blind) and zoo management. This was a "hands on" program for visually impaired children who, because of very limited exposure, have had few opportunities to know what animals were really like. Keepers were matched with children on a one-on-one basis to visit easily approached animals. At the conclusion of the 13 weekly sessions, great strides had been made in the children's confidence and knowledge of animals. This successful project will be repeated this fall of 1984.

As one can see, no longer are keepers unskilled laborers, but serious, versatile and dedicated professionals. Through the use of computers and modern techniques such as breeding and research programs, we are better prepared to face our everyday challenges. Modern keepers have to be self-motivated, willing to share and communicate. Presently having nine full-time keepers on staff in Edmonton, we have many opportunities to become involved in all phases of our operation. What we do today is extremely important to our future as we will likely form the core of a much larger keeper staff. We hold hope for the future and are striving to become modern keepers, ready for a new modern zoo.



WINTER QUARTERS/COMMISSARY SPECIFICATIONS

Planning of the Winter Quarters/Commissary commenced in the fall of 1981. A design team was established which included Architect, Project Manager, Operations Supervisor (Zoo), Zoo Director. The preliminary floor plan was developed by the design team. Several updates were initiated as a result of input by several sources (i.e. by law enforcement, fire department and zoo attendants.) The electrical and mechanical systems were designed by engineering consultants based on program requirements established by the Design Team. The final designed plan was established by the spring of 1983. An estimated budget allocation was approved by the City Council totaling \$3.4 million. The building was let to tender in the fall of 1983 and awarded to a general contractor in November 1983. Construction commenced in January, 1984 with the completion date being September 30, 1984.

Building components:

A) Winter Quarters	7,000 sq. ft.
B) Commissary	3,800 sq. ft.
C) Staff Facilities & Administration	3,500 sq. ft.
D) Public Program Area	2,500 sq. ft.
	<hr/>
	16,800 sq. ft. TOTAL

A) WINTER QUARTERS

Purpose: To provide winter facilities for exotic species displayed at Valley Zoo.

Sections and Features:

a. Pool Rooms: For Sea Lions, Seals, Waterfowl and Auxiliary pool for sick pinnipeds. Salt Water filtration system for the Sea Lions and Seals. Up-flow system custom designed from "Duraon".

Sealion Pool	: 1800 cu. ft. volume (24' x 15' x 5' deep)
Old Pool	: 280 cu. ft. (10' x 8' x 4' deep)
Harbor Seal	: 1125 cu. ft. (15' x 15' x 5' deep)
Old Pool	: 192 cu. ft. (8' x 6' x 4' deep)
Waterfowl	: 360 cu. ft. (15' x 12' x 2' deep)
Old Pool	: 144 cu. ft. (8' x 6' x 3' deep)

b. Center Pens: Primates

- 6 pens: each 12' long - 8' wide - 10' ceiling
- 2 pens: each 17' long - 12' wide - 10' ceiling with attached holding pens each 8' x 10' x 10' ceiling.
- Service space - Corridor door - 4' x 24'.
- Concrete block construction with Lexan viewing windows. Metal ceiling.

THE MODERN KEEPER IN A SMALL GROWING ZOO, Continued

- c. Corral Area;
 - 6 corrals - 17' long - 8' wide
 - detachable corral walls and gate to give size versatility.
- d. Holding Room:
 - 20' x 20' approximately - holding cage area
- e. Nursery:
 - 15' x 15'
 - isolation of young animals
- f. Reptile Room (with viewing windows)
 - 15' x 34' approximately
 - 3 large Lexan windows (8' x 4' height)
 - to have reptiles on display
- g. Storage and Mechanical
 - Storage - approximately 12' x 12'
 - general storage
 - Mechanical - Approximately 15' x 20'
 - Air systems, hot water boiler and filter system

Winter Quarters Features:

- a. 100% air exchange in Primate Pens (center pen). This to ensure separate air system from areas the public will access.
- b. 20 minute air flush system. To exhaust all re-circulated air from the building within 20 minutes. This feature is used to reduce smells.
- c. All drains 6" diameter
- d. Large viewing windows to each holding room (public viewing)
- e. 10,000 floor weigh scales
- f. Tempored Water Systems for pen wash down. Temperature pre-set to 65°F. This to reduce the loss of room temperature during wash down, thus saving heat costs.
- g. Up-Flow Filtration System. Sand-gravel filter with three pumps. Two back-up pumps to the main pump to reduce the problems associated with main pump breakdown.
- h. Special coating: Epoxy base paint used throughout the Winter Quarters to ensure low maintenance and ease of cleaning.
- i. Portable closed circuit television to monitor animals when required.

Nursery Features:

- a. Separate air system to ensure reduction of contamination by airborne agents.
- b. Stainless steel counters.
- c. Self contained room with fridge, microwave and autoclave.
- d. View windows for the public to watch the care of baby animals without the dangers associated with direct contact.
- e. Close circuit television to monitor baby animals when required.

COMMISSARY

- a. Separate air system to reduce the chance of airborne contamination.
- b. Quarry tile food preparation area flooring for easy care/cleaning.
- c. Stainless steel counters in food preparation area. Garborators for each sink.

THE MODERN KEEPER IN A SMALL GROWING ZOO, Continued

- d. Separate diet pick-up and dirty dish return to ensure no contact and thus eliminate contamination.
- e. 600 bed hospital specification. Pot washer for dishwashing.
- f. Ultra Violet light room for feed dish storage. This to ensure any contaminants not destroyed during pot washer cleaning are eradicated.
- g. Separate grain storage - freezer - cooler room. This on a separate air system from commissary. This room is air conditioned and maintained at 45°F to 50°F year round. This to reduce mice problems. Freezer capacity 200 sq. ft. Cooler - 100 sq. ft.
- h. Loading Dock. Enclosed, heated for diet wagon parking and heated area to pick up diets and dirty dish return.

STAFF FACILITIES

- a. Lunchroom with capacity for up to 20 people at one time. Outdoor attached patio.
- b. Security lock boxes for wallets and purses.
- c. Laundry Room (2 washers - 2 dryers)
- d. Lockers with showers.
 1. Lockers are divided in two sections.
 - a. Dirty side. This area for drop off of uniforms.
 - b. Clean side for personal clothing.
 - c. Showers between.
 - d. Two sets of washrooms as well. One to be used by Zoo Attendants exclusively (named dirty side) and one set to be used by other staff and guests (named clean side). This to prevent cross contamination.

ADMINISTRATION

- a. Offices for Director, Foreman, Operations Supervisor, Public Supervisor, Cashier room, Conference room.
- b. Complete, fully-equipped public first-aid room. Staff first-aid is separate from the public area.



"WHAT TO DO WHEN YOUR ZOO DOESN'T HAVE A GRAPHICS DEPARTMENT..."

By
Cathy Taibbi, Keeper
Atlanta Zoological Park
Atlanta, GA

In 1981, the Atlanta Zoo Chapter of the American Association of Zoo Keepers was casting about for a worthwhile project that could help our troubled zoo. Our public image was bad, the facilities old and deteriorating and keeper morale was at an all-time low. What could we do on our very tight budget that would not only spruce up the zoo's appearance, but boost our own morale and become a visible tribute to the efforts of our chapter?

We obviously could not do much about directly improving animal enclosures, the buildings or the grounds, especially since a new master plan was being discussed. Physical renovation, besides, is a task that is beyond the means of even the most affluent AAZK chapter.

However, when we took a look at things from the visitors' point of view, the first thing to strike us was the lack of adequate signage. As in many older and smaller facilities, existing graphics tend to be simplistic and incomplete, unattractive, weatherbeaten or incorrect. In many instances our animal enclosures contained no graphics at all.

If you think about it, where is the most effective front against public ignorance, when the keeper is busy behind-the-scenes and generally inaccessible, to answer those tedious daily questions?

Good graphics!

It is a sad fact that most zoos have very tight budgets which renders financing even the most modest in-house graphics operation impossible. Beautiful signage is a luxury that most institutions simply cannot afford.

The signs that were being displayed in our zoo were either city-produced wooden directional graphics or commercially produced plaques. Since the image any zoo presents with its graphics is a direct reflection on its' state of being, we realized that if we wanted to change the public opinion of our very old zoo, we would have to show some change. Older facilities often display graphics consistent with their era. The visitors' impression of a zoo is greatly influenced by graphics, i.e. less than professional-looking signs vs. beautiful signage and a modern-looking enclosure which go hand in hand. Great graphics can really enhance your zoo's image!

We decided that our facilities impending revitalization could be boosted by our project, and at the same time we could create signs to fit all those special needs that keepers are so aware of.

We solicited help from our zoological society in purchasing some equipment for us once we decided that the silk-screen would be the most flexible and cost-effective means available to us.

None of our members had any previous experience and nothing but a rudimentary knowledge of the silk-screening process. We found, however, that various zoo enthusiasts around the city were happy to assist us in such a worthwhile project, and soon we found individuals to show us how to operate the city-owned Varsity machine. With this we could photographically produce film-strips of text that would be used in exposing the silk-screen prior to inking. Our studio was quite simple and most of

"WHAT TO DO WHEN YOUR ZOO DOESN'T HAVE A GRAPHICS DEPARTMENT", *Continued*

our work was done during chapter meetings after work, although occasionally signs would be run off during a lunch hour. The Varityper and the actual silk-screening took a few weeks to master but soon we could produce several signs a week. We assigned keepers tasks ranging from text research to text production, sign production and cleanup, so that at any given time we usually had a couple of signs in progress.

Before we got started we had to decide on a basic format that all the signs would follow. We wanted the resulting overall image to be one of neatness and consistency.

The format we settled upon was a simple one. A range map would appear in the upper right hand corner of each sign; the common and scientific name in the upper left; diet in the space below that, and the remainder of the space was used for any additional descriptive text.

The copy was researched and written entirely by zoo keepers in the hopes that our daily and intimate contact with the animals would lend a sense of authenticity to the text.

Our target areas for our project were the outdoor Children's Zoo and the hoofed-stock areas first and then the animal buildings in the mammal department.

Being inexperienced and money-conscious, we attempted to use miterboard for the outside signs. Each board was given two or three time-consuming applications of yellow paint. We chose this color upon being advised that it would be a particularly pleasing and attractive color to readers. Then after screening one the text we would hand-paint in the range map of the animal in question with red model paint. Finally several coats of clear shellac were carefully applied as protection against the elements.

Unfortunately, despite all the trouble we had gone to, after a few weeks our outdoor signs were as decrepit looking as the original graphics. The varnish cracked and discolored. Other problems included mildew, fading (especially on the range maps), warping and flaking.

In the meantime we had invested in white acrylic panels to fit in existing lightboxes in the feline and primate buildings. Since even when new the miterboard signs never seemed as crisp and clean looking as the plexiglass signs, we immediately tried some of the acrylic sheets for the outside areas. Remarkably the look stayed new and bright even after months with no protective finish. So we replaced all the previous signs with pale yellow plexiglass panels.

In a few months we had made signs for virtually every exhibit in the mammal department. It is especially rewarding to see the difference the signs make in the overall look of the concourses and other surrounding areas.

Now that we have tamed that seemingly impossible task and raised the quality and consistency of all the signage, we can assess our success. We plan gradual and continual improvement.

We have found that our original format could stand many improvements, and that the field of visual communication is more complex and sophisticated than we had ever dreamed.

If your chapter would like to attempt its own graphics operation you will

"WHAT TO DO IF YOUR ZOO DOESN'T HAVE A GRAPHICS DEPARTMENT", Continued

want to avoid some of the errors we made. Here are some of the things we plan to try in the future:

Keep the design as simple and easily comprehensible as possible. Avoid extraneous markings or decorations that will confuse the viewer, and be careful about using symbols. A straight-forward format is, actually, the most effective way of disseminating knowledge.

Use large typefaces that are viewer-friendly and easy on the eyes.

Use pictures. Illustrations are great attention getters and can really drive your point home. Just as most people will scan the newspapers for photos and then read the captions, so will a picture invite the viewer's curiosity.

Break up large blocks of text. Try using headings such as Diet in the Wild, Breeding Behavior and others. This way the reader can scan the sign quickly to answer his question instead of having to wade through the text and possibly lose interest. Don't bury the information.

Use humor when possible. Give readers a chuckle. Pique their interest. The medicine is so much easier to take with sugar.

Include names in your range maps. We've found that to most people the outline of Africa, for instance, looks too similar to that of South America, and this can ruin the effect of your sign on a zoo visitor if he can't figure out where that animal comes from. Add the word "Africa" followed with the word "Kenya" for example, and the reader is instantly oriented.

When installing your signs be aware of placement. Study people to see where the focal point of each exhibit seems to be, and note which signs visitors read, passover, or just plain don't see. Remember to give them an unobstructed view and a close proximity for legibility.

Don't forget to fasten your signs securely! They take a lot of abuse out there!

Last, but not least, test all materials for durability prior to installation.

The nicest thing about setting up your own graphics department is that signs can be made to fit your particular needs. You can answer that perpetual question or direct the flow of traffic.

For a change of pace try making your own endangered species screen or crowd-control plaques. Special, temporary or occasional signs can be installed quickly and professionally for those of you who are tired of the old construction paper and magic marker routine.

If your budget is too tight to allow even this much expense, don't be discouraged. Instead see how far you can go with what you've got. There is a closet artist in every zoo. The illustration for your sign can be as simple or as elaborate as you please. Lettering can be done by hand or with stencils. You can even use photos in lieu of an artist. Just be sure, when mounting your work in a lightbox, that there is no print or other distracting element on the opposite side of the photo. The surface can be simple posterboard laminated for durability.

"WHAT TO DO IF YOUR ZOO DOESN'T HAVE A GRAPHICS DEPARTMENT", Continued

This system is beautifully flexible, changeable, and signs can be produced for only pennies per piece. Studio space can be the simplest of available spaces.

More ambitious chapters might attempt something really elaborate. Why not a viewer-involvement sign? For example, a sign in which the visitor can lift a panel to read about his favorite animal. This is a design that is especially appealing to children. A keeper alterable sign, in which the animals on exhibit can be posted easily and changed as needed, is another possibility. You could build an information marquee, carve wooden plaques or do something completely different that no one has thought of yet.

Our small chapter has barely begun to tap the resources of its members. The more involved we become in this intriguing science the more involving it becomes. Now with the advent of universal symbols, yet another whole new area is opened up for exploration.

Finally, once your chapter has done its part to improve your zoo, why not blow your own horn a little? With permission we were allowed to erect a marquee that stands near the front gate of the Atlanta Zoo. We arranged a display, outlining our AAZK chapter's contribution to the welfare of the city's zoo, and to tell the world that Keepers Care!



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*



PREPARATIONS FOR ARTIFICIAL INSEMINATION
IN TWO ASIAN ELEPHANT COWS

By
Julia Parker, Keeper
Santa Barbara Zoo
Santa Barbara, CA

The Santa Barbara Zoo is located in south central California, 160 kilometers north of Los Angeles and 448 kilometers south of San Francisco. It is bordered by the Santa Ynez Mountains on the north and overlooks the Pacific Ocean to the south. Over 500 specimens of exotic animals are exhibited in the 80-acre park.

In July of 1972 the Santa Barbara Zoo received two Asian elephant calves (Elephas maximus) from Mysore, India in trade for two California sealions (Zalophus californianus). The cows, Sujatha and Little Mac, are now sixteen years old.

During the night the cows are housed in a cement block barn, each stall measuring 16 square meters. During the day the cows have free movement in the yard measuring 140 square meters. The yard is covered with a base of basic decomposed granite. The elephants have access to a 45,000 liter pool in the yard. A dead eucalyptus tree serves as a rubbing post. There is a dry moat, 1.83 meters deep, with a base of decomposed granite and grass surrounding the elephant enclosure.

Of the seven keepers on staff, six are elephant handlers. We are in contact with the elephants at least four times throughout the day. The management schedule includes taking the elephants out of the barn at 8:00 a.m., a daily health check at 10:00 a.m., health maintenance and reinforcement of learned behaviors at 3:00 p.m. The cows are led back into the barn for the night at 4:30 p.m. Part of the elephant management program includes an ongoing foot-care regime. This involves cleaning and trimming the pads and filing, trimming and polishing the toenails. The elephants have a repertoire of thirty commands. They are ridden by the keepers and bathed regularly. The keepers strive for unified control and discipline of the elephants. We are fortunate to have two quite tractable cows.

There are between 30,000 and 42,000 Asian elephants in existence. (Adams, 1981). The International Species Inventory System reports 159 Asian elephants housed in zoos currently. Importation of Asian elephants has been restricted by the federal government since 1973 (Adams, 1981). In order to preserve and perpetuate the species in captivity it will be necessary for zoos and wild animal parks to undertake some type of reproduction program. This paper describes our program at the Santa Barbara Zoo which is preparing two Asian cow elephants for artificial insemination (AI). AI has not yet been done successfully. Under the guidance of Dr. Michael Schmidt from the Washington Park Zoo in Portland, OR, both of our cows have become conditioned for AI. We began preparations for AI in 1981 in a three-phase program. Blood collection, restraint or hobbling and tubing are the components of our program which is sponsored by a \$10,000 grant from an anonymous donor.

The mammoth problems associated with breeding elephants in captivity has inspired our consideration of AI as an alternative to natural reproduction. Elephant keepers are well aware of the aggressive and unpredictable nature of bull elephants. The Santa Barbara Zoo has no plans for

PREPARATIONS FOR AI IN TWO ASIAN ELEPHANT COWS, Continued

a facility to house a bull. When one considers transporting the cow to the bull for breeding, at least 36 weeks of relocation are required to ensure encompassing two estrous cycles, two possibilities for a successful mating (Schmidt, 1981). Transportation of the cow could prove stressful enough to alter the predetermined estrous cycle, thus delaying the opportunity for breeding (Schmidt, 1981).

Preparations for AI are now incorporated into the elephant management program. The first step of our program was to start a regimented collection of blood samples from the elephants to determine their estrous cycles. Initially we collected blood every week to gain a complete definition of the progesterone hormone pattern. The Asian cow cycles every 3½ months. The cow is receptive to breeding (AI) for 7-12 days. As the hormone level falls below 100 pg/ml, (pico grams), AI can be administered with reasonable accuracy four weeks later (Schmidt, 1981). Subsequent pregnancy can be determined by measuring the hormonal levels 4 months later (Schmidt, 1981).

The keeper staff assumed the collection of the blood after learning the technique of venipuncture. The procedure is done in the elephant yard for practical reasons regarding lighting and space. On hand for the venipuncture are: 6 one-inch, 18-gauge sterile disposable needles, 6 standard red-top serum tubes, a spray bottle of Betadine and rubbing alcohol. A designated keeper controls and feeds the cow during the bleeding. Initially bleeding was tried while the elephants were lying down. This method proved unsatisfactory. The elephant is positioned so the sun shines on the back of the ear to help expose the vein. We have considered the use of tourniquets, hair dryers and a mentholated vasaline, Tiger Balm, to help dilate the ear vein. However, it has not been necessary so far to regularly use these methods. The unfamiliarity of these objects to an elephant warrants a slow introduction.

A vein is dilated by applying pressure on it with the finger, holding off the blood supply between the ear and the heart. The ear veins range in size from one to three cm. in diameter in adult elephants (Schmidt, 1981). While a second keeper holds the ear perpendicular to the elephant's head, a third keeper inserts the needle into the center of the ear vein. As blood drips from the hub of the needle, the tube is held below to catch it. When the tubes are filled the needle is removed carefully from the ear and manual pressure is applied at the puncture for 20 seconds. This procedure is not without risk. Although there is room for movement of the elephant's ear and head, without obstruction of the collection of blood, in rare instances when the wall of the vein is re-punctured or when arterial blood is collected, the formation of a hematoma results. Gentle rubbing on the front and back of the ear breaks the clot without further consequences.

The blood is spun down following its coagulation. After 20 minutes, the serum is separated from the red and white cells and is transferred into two 1-dram Shell vials via a 12cc syringe and spinal tap needle. Duplicate supplies of serum are stored at a separate freezer.

The second step of the AI preparations was to condition the cows to stand calmly while hobbles were fastened around their rear legs above the knees. The hobbles were constructed of pipe approximately 6 cm. in diameter and .75 meters in length. A .63 cm. link chain passes through the pipe. At the ends of the pipe the chain extends enabling it to be snugly clasp around the leg. Extending beyond the clasped left leg 3.05 meters of the chain is threaded through an anchored bolt in the yard, pulled taut, doubled back and locked in place.

PREPARING FOR AI IN TWO ASIAN ELEPHANT COWS, *Continued*

A patient acclimation provided time for the elephants to sniff and probe the hobbles, presumably alleviating some of their apprehension and resistance. The hobbles are left on the elephant for three minutes. They are removed while the elephant is calm. After hobbling became a routine and acceptable procedure, the third phase, tubing, was begun.

Four keepers participate in the tubing process. After the cow is chained by the left front leg by one keeper handling the elephant, two additional keepers fasten the hobbles to the rear legs and to the anchored bolt in the yard restricting the elephant's movements. A fourth keeper restrains the tail. In a series of hobbling sessions encompassing many weeks, the route of the urogenital canal is defined and the cow is conditioned to the cleansing and insertion of the tube. The bathing and probing was initially met with the elephants squeeling and squirming. Luke warm water is transported to the elephant yard from the kitchen for rinsing the external genitalia prior to tubing. The second keeper, wearing latex gloves, unwraps, lubricates and hands the tube to the third keeper who inserts the tube into the elephant over the pelvic brim toward the cervix. An equine or bovine stomach tube 1 meter in length is used in the AI preparation. During the actual insemination the tube must remain inside the cow for at least three minutes (Schmidt, 1981). We compensate for the awkwardness of this procedure by feeding the cows various treats to effect their complacency.

During each session of AI procedures one of the keepers provides informative explanations to an inquisitive onlooking public. Since all of our AI preparations are performed in the elephant yard, we feel it is extremely important that the public have an explicit understanding of our AI program.

Although the elephants have adapted well to these unusual procedures, when our tubing procedures began we were a little apprehensive of public attitudes. In recourse, we set up two portable green canvas screens as a visual barrier. The appearance of the screens in the yard, at various angles and especially on windy days, was an immediate source of agitation to the elephants. It was readily apparent that the use of the screens was creating a set back in the conditioning and control we had established. We decided not to risk the relative complacency of the elephants associated with the AI procedures. Introducing our efforts towards conservation of an endangered species are graphics describing our AI program located near the elephant exhibit. This addition serves our public relations as well as our educational goals.

Currently our AI regime involves bi-weekly bleeding and tubing under the supervision of our veterinarian, Dr. Don Gillespie. We are waiting for a date to be set when Dr. Schmidt will schedule an actual AI with semen collected from one of the bulls at the Washington Park Zoo. Prior to the actual AI we will submit urine samples from our cows for flehmen-like testing by the bulls. Flehmening is the behavioral response by the bull elephant determining receptivity of the cow and indicating the interest of the bull towards mating. There are no visible physiological indications of the estrous cycle in Asian cows (Rasmussen, 1983). We are looking forward to an actual AI set tentatively for late November of this year providing semen collection in Portland goes as planned.

It has been proposed that the Asian Elephant be added to the Species Survival Plan. The Species Survival Plan (SSP) promotes a national conservation strategy for species facing extinction in the wild. As techniques of collecting elephant semen are perfected and research in the field of

PREPARATIONS FOR AI IN TWO ASIAN ELEPHANT COWS, *Continued*

cryopreservation of elephant semen if furthered, AI may help insure a future for the Asian elephant.

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Thanks to all the keepers at the Santa Barbara Zoo for their initiative in implementing the artificial insemination program.



HUSBANDRY AND BREEDING OF THE WATER OUZEL
(*Cinclus mexicanus*)
AT THE WASHINGTON PARK ZOO

By
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Lewis and Clark College, Portland, OR

Introduction

The American dipper or water ouzel (*Cinclus mexicanus*) is the only North American member of the passerine family *Cinclidae*. Dippers are found throughout western North America from Central Alaska to Central America. They are restricted to swift flowing, unpolluted rocky streams in and along which they feed on a variety of aquatic insects and small fishes. Their foraging behavior of diving into swift, turbulent waters is unique among passerines. Adults are the size and general shape of starlings and have a slate-gray plumage except for white feathered eyelids. The legs are light gray with a pinkish tinge. The species has been kept infrequently in zoological collections, possibly because of the difficulty of recreating a rapid, rocky mountain stream. When suitably displayed, however, the dippers's high levels of activity, unusual foraging behavior, and attractive song create an exhibit very appealing to zoo visitors.

This paper describes the water ouzel exhibit at the Washington Park Zoo (WPZ), husbandry practices, certain aspects of captive behavior, and the initial breeding attempt at this institution.

Exhibit and Holding Facilities

The ouzel exhibit was designed and constructed as part of the Cascade Stream and Pond Building, which opened to the public in July of 1982. The exhibit complex is devoted to the native flora and fauna of the Cascade Mountain Range. The ouzel exhibit is included in the stream habitat segment of the building, as are major exhibits for river otters and rainbow trout and a variety of smaller exhibits for the insects, fishes and amphibians typical of a Cascade Stream.

An open-air, netted aviary exhibit was built into a structural cleft of the building in such a fashion that the surrounding roofs provide partial protection from the elements. The exhibit measures 5.5m L x 1.51m W x 2.16m H. It portrays a cutaway view of a waterfall and stream course and provides the viewer with both underwater and above surface viewing. The construction materials are gunite, concrete, natural boulders and organic material. The stream bank contains structural pockets for the inclusion of live native plants. The stream bottom is covered with a heterogeneous mix of boulders and river rocks which creates variation in water depth to a maximum of 75cm. A standpipe over the exhibit drain maintains the water depth and rids the water surface of floating debris and surface films which could impair the birds' waterproofing. The total water volume is approximately 3800 liters. A boulder pile at the base of the waterfall conceals two submersible sump pumps. One pump (1/3 horsepower, 1" discharge) recirculates water to the top of the waterfall. The other pump (1/2 horsepower, 2" discharge) provides a jet of water at surface level that creates a turbulent stream effect. Filtered, ultraviolet-

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, *Continued*

treated water is supplied to the exhibit from an adjacent trout exhibit at an adjustable rate of up to 38 liters per minute. This water flows into the exhibit at the top of the waterfall where it mixes with the recirculated water.

Abundant perches were provided by a variety of logs and branches positioned to maintain adequate flight space and keeper access. Two roost platforms (described later in detail) are also available and have been used by the birds for overnight roosting and nest construction. These are not visible to the public. A 2.5 m² portion of the exhibit is protected from precipitation by clear Plexiglass sheets attached over the netting. The protected area includes one roost platform and the area of food presentation.

The gunite surfaces of the exhibit are abrasive. The feet of a dipper are delicate and susceptible to small cuts and abrasions. The loss of one ouzel to infected lesions on its feet was attributed to these abrasive surfaces. To prevent further foot problems, exposed gunite surfaces were covered where possible with moss obtained from typical dipper habitat. Some of this is periodically replaced, but much of the moss has become nicely established in the exhibit. Also, three additional perches were installed on vertical gunite walls where birds were observed landing and clinging with their feet. These perches were created by driving concrete nails into the gunite and attaching moss covered wood dowels to the protruding nail heads.

The exhibit is fronted with 3/8 inch tempered glass which dampens noise disturbances from the viewing area. A speaker in the viewing area allows visitors to hear the trilling song of the dippers and sets an ambiance with the sound of the rushing water.

A variety of off-exhibit holding cages have been used. These were fabricated from rolls of 1" x 1/2" welded wire with small plastic tubs for pools. Dippers used the pools only after water movement was created with small pumps or hoses. Dimensions of the most elaborate holding cage are shown in Figure 1. This cage was provided with a pool and short section of "stream" constructed of Fiberglas and embedded smooth rocks. The "stream banks" were composed of more rocks bedded with moss. A recirculating pump in the pool moves the water to the top of the inclined "stream". Occasionally it has been necessary to remove an exhibit bird from the exhibit for a short period. An "overnighter" box was constructed of smooth plywood for this purpose. It measures 1 m³ and is without water. The box is floorless so it is set on a soft rubber mat when in use. It proved especially useful for a bird with temporary waterproofing problems. A light fixture fitted with a 50 watt bulb assists warming and drying a wet bird in an emergency situation.

Husbandry Practices

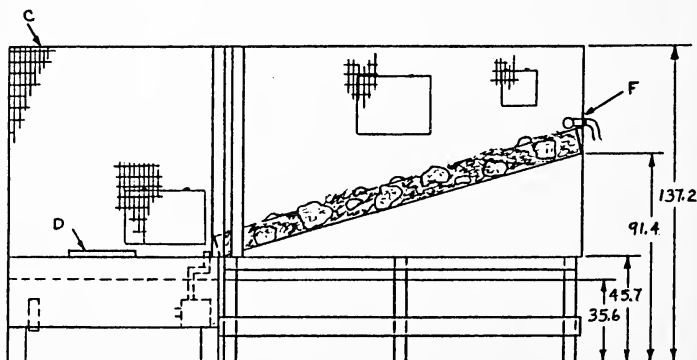
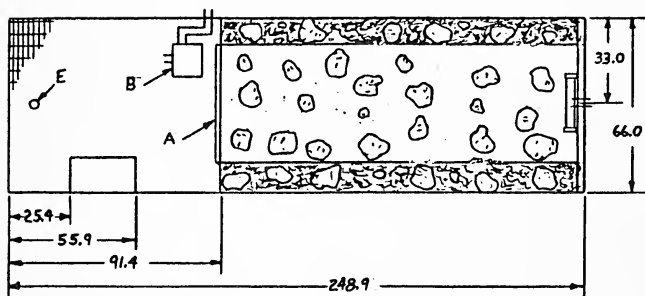
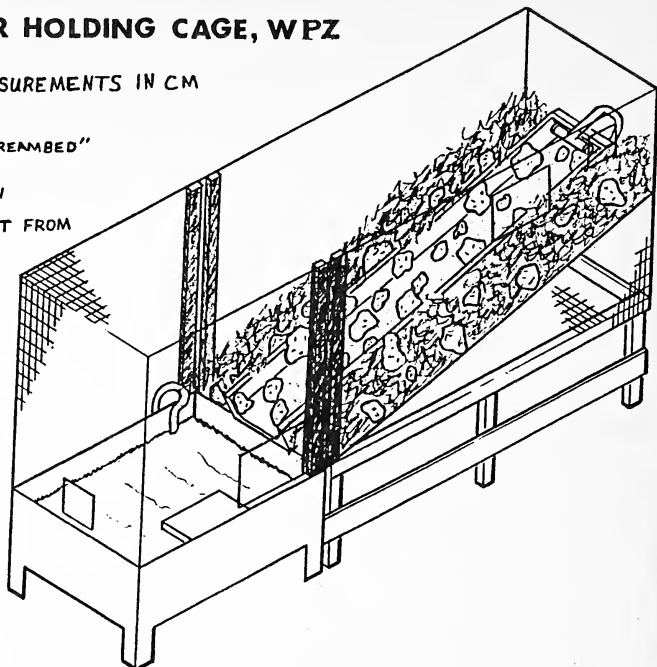
Four birds were obtained in pairs, two at a time, in August and October 1983 from John Colby, Bainbridge Island, Washington. These birds were removed from nests in Washington State in the spring of 1983 at approximately 20 days of age and were hand-reared. One of these birds died of complications from foot lesions in October 1983. A second bird failed to develop adequate waterproofing and was kept off exhibit until it died, apparently of exposure and chilling, in August 1984. The remaining two birds formed the unrelated pair reported on in this paper. We also collected two nestlings from an Oregon nest in June of 1984. Captive rearing techniques for these birds will be reported on in a subsequent paper.

FIG. 1: DIPPER HOLDING CAGE, WPZ

NOTE: ALL MEASUREMENTS IN CM

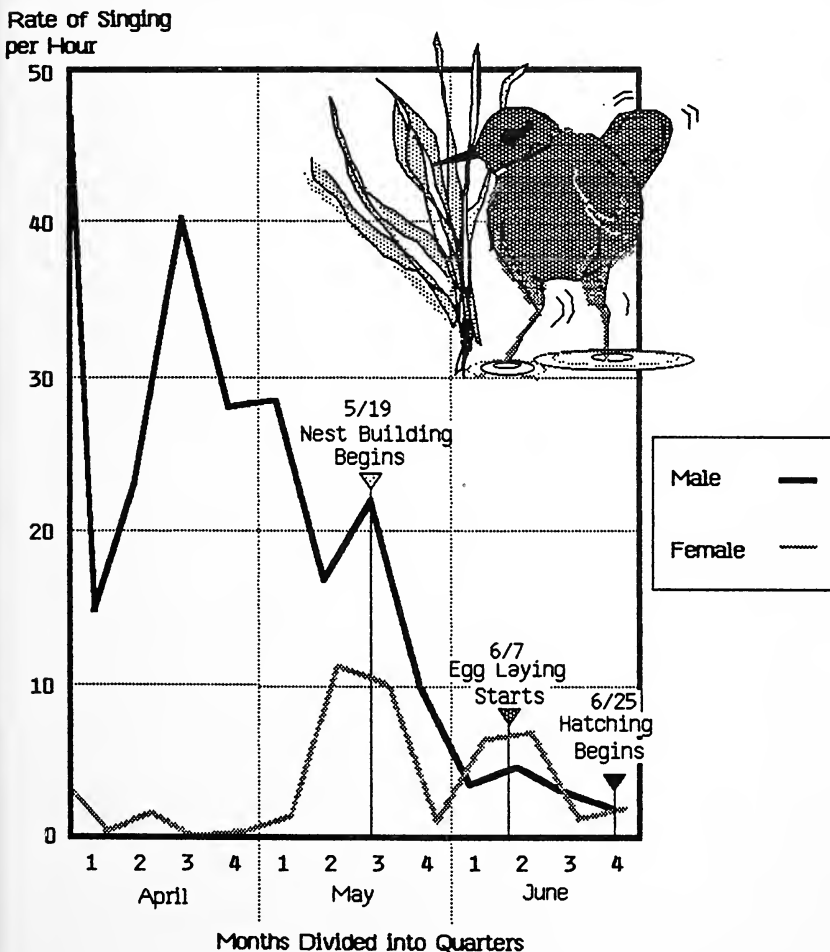
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- A. FIBERGLASS "STREAMBED"
- B. SUMP PUMP
- C. .5"x1" MESH
- D. FEEDING STATION
- E. STANDPIPE DRAIN
- F. STREAM OUTLET FROM PUMP.



Dippers cannot be sexed by their appearance. Price, et al. (1983) found that males have longer wings than females. However, their statement was based on unpublished data so ranges were not available. The risk of laparoscopy was considered too high since a single pair of birds was used for breeding purposes. Only females incubate (Bakus, 1959a). The identities of the breeding pair were obvious (one was missing a toe), so sexes were established on the basis of copulation posture and incubation. A significant difference in the singing rates of this pair was found (see Figure 2). Singing was distinguished from the rapid, repetitive call notes also used by dippers. Point--sample observations were taken at 20 second intervals and hourly averages of each week were plotted against time from one month after introduction date of the pair through the completion of nest construction. A test of difference between two proportions was significant at the 1% level for a two-tailed test. Singing rates during this period may be useful criterion for sexing captive dippers. The small sample size warrants a note of caution, however.

Fig. 2: Singing Rates of Dippers, WPZ



The diet offered to water ouzels at WPZ is listed in Table 1. Sources for the food items are listed in Table 2. Live insects are purchased on a weekly basis. The breakfast bowl of "bird mix" (Table 3) is placed in the exhibit by the night keeper before the birds awaken. Receptivity to it has been variable but having it available to the birds when they wake up hungry helps ensure that at least some of it is taken. To supplement calcium and vitamins, waxworms are dusted daily with Osteoform[®] and weekly with Plex-Sol-C[®]. Also, crickets are fed a mash of monkey chow with Osteoform[®] and vitamin powder. All food is presented in shallow bowls of water except the bird mix and waxworms, which are offered dry. The birds generally eat several food items at the food bowl as soon as it is presented, but they frequently carry items to the water's edge to consume it. Feeding amounts are adjusted slightly up or down, depending on the bird's appetites.

The stream banks and planting pockets are hosed and watered every other day (every day in summer) to remove accumulated droppings. The birds show a tendency to favor a few discreet areas for defecation, but use random locations as well. The exhibit is drained for more complete cleaning every 7-10 days. Algae is scrubbed from underwater rocks and windows at this time. High water quality is considered an essential part of captive dipper management and care is taken that the water does not get turbid.

Birds are caught up for weighing and toenail trimming every 3-4 months. Birds have not responded adversely to handling, but it is kept to a minimum. Generally, they have been tame and not at all flighty. Parsons (1975) found a weight range of 47-67g for 15 wild birds in Oregon. The Washington Park Zoo's exhibit birds each weighed slightly more than 50g at one year of age.

Fecal samples are collected twice a year. No internal parasites have been found. The only medical problems encountered have involved foot irritation. One bird, with swollen, infected feet, was successfully treated with Amoxicillin (2.5mg/lb, 2x/day, 28 days, injected in cricket).

Balat (1960) found that adult European dippers (C. cinclus) undergo a complete body molt at the cessation of the breeding season. The molt lasts several months and includes a 5-14 day flightless period when the remiges are molted simultaneously. A similar molt and flightless period has been described for C. mexicanus (Sullivan, 1965, 1973). During the flightless period, birds seek refuge in tangled logs and brush. The dippers described here were in molt from 21 July 1984 to 11 September 1984, a period of 52 days. The birds were flightless for approximately 11 days, commencing 4 August 1984. They did not appear to seek refuges, though several apparently suitable sites were available and they were able to hop, walk or climb to nearly all areas of the exhibit.

Captive Behavior

Hann (1950), Bakus (1959a, 1959b), Sullivan (1973), Parsons (1975), and Price et al. (1983) described the ecology and behavior of wild dippers. This section describes typical behaviors seen in the captive exhibit specimens at the WPZ. A detailed, quantified analysis of captive behavior will be presented in a subsequent paper. In general, the captive birds displayed the same behaviors described for wild birds.

The birds typically awoke shortly before dawn and were active throughout the day. Resting was characterized by inactivity except for head move-

Table 1. Water ouzel diet, Washington Park Zoo

Per bird:

breakfast bowl	-	1 tsp. "bird mix"
7:30 am	-	20 crickets
9:30 am	-	20 waxworms (Osteoform, vitamins)
11:30 am	-	20 corn grubs
1:30 pm	-	20 slivers of smelt or 1 tsp. krill (euphausiid shrimp)
4:00 pm	-	30 crickets
occasionally	-	fresh salmon eggs, mealworms

Table 2. Sources of captive dipper foods, Washington Park Zoo

<u>Food Item</u>	<u>Source</u>
crickets (3-5 weeks old) <i>Acheta domestica</i>	Fluker's Cricket Farm 2625 Beech St. Baton Rouge, LA 70805
waxworms <i>Galleria mellonella</i>	Grubco, Inc. P.O. Box 2001 Hamilton, OH 45014
corn grubs <i>Sarcophaga bullata</i>	Grubco, Inc.
krill (frozen) <i>Euphausia sp.</i>	local aquarium retail stores
salmon eggs	Oregon Department of Fish and Wildlife (seasonal)
Osteoform (Vetamix)	local veterinary supply company
vitamins (Plex-Sol-C)	local veterinary supply company

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, *Continued*

ment, slightly fluffed feathers, and perching on one leg with the other tucked into the feathers. Resting periods occurred throughout the day and were usually short in duration (5-10 minutes). They seemed to occur most often after feeding. The birds went to overnight roosting at the same spot together only once. The same roosting spots were used habitually by each individual, the male roosting on one of the covered roost platforms which was added to the exhibit and the female on a wood dowel perch under an overhanging ledge of concrete. Wild dippers also use protected roost sites (Hewson, 1969). At night the birds were inactive, presumably asleep, and difficult to arouse.

Table 3. "Bird mix" recipe for dippers at the Washington Park Zoo

1 C.	Purina Hi-pro Dog Chow (ground)
1 C.	Carnation Trip-L-Duty All Purpose Poultry Feed
1/4	hard boiled egg (plus shell)
1/2 tsp.	grated carrot
1/2 tsp.	Osteoform
1/2 C.	water

The birds spent approximately 12% of the active daylight period preening in bouts of up to 25 minutes. The birds used their feet to scratch areas of the face, head and neck and meticulously groomed other areas with their bills. The bill was also presumably used to obtain oil from the uropygial gland located at the dorsal base of the tail and to spread it through the plumage. The uropygial gland of the water ouzel is ten times larger than that of equivalent sized, non-aquatic passerines (Murrish, 1970). It would be interesting to compare time spent preening by dippers with that spent by a non-aquatic species. Presumably, the dipper, because of its highly aquatic nature, preens more. Parsons (1975) found that wild dippers spent 6.1% of their daylight time preening and over 50% foraging for food. With food provided to the captive birds, it appeared that they spent far less time foraging so the increase in preening time may simply reflect that more time was available for preening in captivity. Resting, preening, and singing bouts were frequently interspersed. Most singing is done from the same posture used for resting.

The dippers frequently, as mentioned, carried food items from the food bowl to the water's edge. Food was sometimes consumed directly but often it was held in the bill and dashed on a rock and passed repeatedly back and forth crosswise through the bill. These actions undoubtedly kill and soften the food item prior to ingestion. This was done with live food items (crickets, waxworms, corn grubs) and occasionally with dead food (smelt slivers). Wild dippers were observed using this technique to extract caddisfly and stonefly larvae from their cases. The captive birds also caught live insects, primarily gnats and mosquitoes, that flew into the aviary. The birds either captured these insects on the wing as soon as they saw them or tracked them visually until they were close enough that the birds could use a short hop into the air for capture. These opportunistic feedings were probably

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, *Continued*

an insignificant part of the diet. Foraging for food in the exhibit's stream was also seen. Birds were observed scanning the stream from elevated perches and plunging into the stream for insects. The birds also used the "stand-dive" technique (Sullivan, 1973) in which they waded into the water, then plunged the head and neck below the water surface to scan for food. This was often followed by a dive into the stream to search among the rocks at the bottom. The birds did this spontaneously but the behavior was periodically "encouraged" by tossing corn grubs, which sank, into the stream.

Dippers possess a number of adaptations typical of diving birds, including increased oxygen storage ability, bradycardia, nasal flaps to exclude water from the nostrils, and a nictitating inner eyelid (Murrish, 1970). Goodge (1959) described the mechanics of swimming and diving in dippers. Dives in the exhibit rarely last longer than five seconds; the longest timed dive was seven seconds. The birds seemed to prefer the more turbulent areas of the stream directly in front of the pump discharge for diving. They swam on the surface with a duck-like paddling motion.

Breeding

Henderson (1908), Hann (1950), Bakus (1959a), Price et al. (1973), and Sullivan (1973) described breeding biology and behavior of wild dippers. The WPZ pair of captive dippers bred successfully during the spring and summer of 1984.

As mentioned above, the sexes of the birds were not established conclusively until copulation and incubation commenced, so references to the sex of the birds in this discussion are based on hindsight. A chronology of the breeding effort is listed in Table 4. The birds were housed separately prior to the introduction date of 26 February. The basis for selecting this date for introduction was observation of wild dippers in Oregon, which were establishing pairs at the time. Two days prior to actual introduction, the female, who had been kept singly in the exhibit all winter, was removed to allow the male sole access. The male was thus able to adjust to new surroundings, find the feeding station and roost sites, and generally settle down without the pressure of another bird in the exhibit. The male swam and dove extensively during the first 45 minutes, then explored all areas of the exhibit, finding the feeding station quickly. An additional feeding station was provided to reduce the possibility of food-related agonistic behavior. When the female was put back into the exhibit, the male repeatedly chased her; she invariably retreated or attempted to escape. Two prominent displays were seen repeatedly on the first day. The first was a "wing vibration" display performed by the male. He inclined his head and body forward to a nearly horizontal plane and rapidly fluttered his wings over his back. During the display he uttered a series of short, rapid, repetitive call notes. The second display was performed by both birds, often at the same time. The birds approached each other with the bills held up vertically and necks stretched upward. Their feathers were sleeked down against their bodies. No vocalization accompanied this "bill raised" display. They persisted in this posture for up to 40 seconds until one bird, usually the female, broke off and flew away. Both the "wing vibration" and "bill raised" displays are common in passerine courtship (Andrew, 1961). Further evidence of the male's dominance occurred when the birds went to roost that night. The female tried to roost on a shelter near the male, who repeatedly drove her away. She roosted on a precarious ledge where she appeared uncomfortable but spent the entire night. The site was improved the following day with wood dowels and moss and the female used this site thereafter.

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, *Continued*

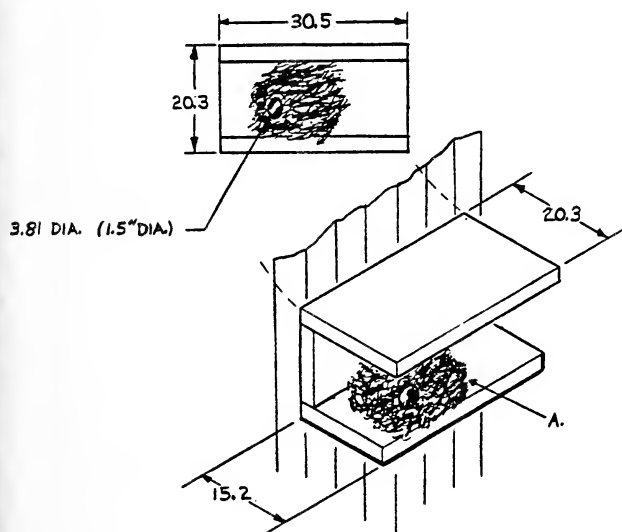
For the following week the birds continued the same pattern of chasing and display but were observed feeding simultaneously from the same food bowl, and they began to perch within 30cm of each other for bouts of rest, preening, and singing. The male began to sing much more than the female. Throughout March, the female was repeatedly observed performing the "wing vibration" display. One display lasted 13 consecutive minutes in close proximity to the male who, in a one leg rest posture, alternately preened, sang, and watched the female. On 18 March, the male chased the female in flight until she plunged into the stream and swam away underwater. Bakus (1959a) described a similar "courtship flight" in a pair of wild dippers. Throughout the remainder of March, April and the first half of May the birds continued to perform courtship displays. The male continued to actively chase the female but she was observed on several occasions chasing the male. On the night of 23 April the birds roosted together on the male's roost. This is the only time this is known to have occurred.

Table 4. Breeding season chronology for a pair of dippers at the Washington Park Zoo, 1984

<u>Date</u>	<u>Event</u>
February 2	Introduction of birds
April 8	Earliest observation of moss carrying
May 19	Nest construction began
May 28	Nest construction completed
May 29	Nest lining began
May 31	Copulation observed
June 2	Nest lining completed
June 3	Copulation observed
June 4	Copulation observed
June 5	Copulation observed
June 6	1st egg laid
June 7	2nd egg laid
June 8	3rd egg laid
June 9	Incubation began
June 25	Chick hatched
July 3	Male removed from exhibit
July 11	Chick fell from nest and expired
July 12	Nest lining removed by female

The birds were observed carrying moss as early as 8 April, a new behavior. This continued sporadically through April and May. They picked through the moss and scattered it about. The birds may have been searching for insects while doing this. Their appetites increased during this time and the duration between feedings was shortened to provide about 15% more food. On the evening of 19 May, the male was observed carrying moss to a roost shelter located above the main viewing window. Nest construction had begun. The dimensions of the roost structure (and completed nest) are presented in Figure 3. On the first full day of nest construction, 20 May, the male did most of the work but both birds were observed at the nest site arranging moss. From this point both sexes participated approximately equally in nest construction. A typical wild dipper nest is described by Bakus (1959a). The outer shell of the nest was completed 28 May. Nest lining began the following day and lasted through 2 June. Materials used were lead and dried grasses, fern fronds, and Ponderosa pine needles, all are typical nest lining materials of wild dippers (Sullivan, 1973). These materials were placed in the exhibit by the keeper prior to completion of the outer shell.

FIG. 3: ROOST STRUCTURE AND DIPPER NEST



NOTE: ALL MEASUREMENTS IN CM
SCALE: 1=6

A. NEST COMPOSED OF MOSS EXTERIOR

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, *Continued*

During nest construction and lining, the female landed on the nest platform several times while the male was working on it and performed the "wing vibration" display. After one such encounter on 24 May, the male attempted copulation but the female turned on him when he tried to mount and clawed at him with her feet. Copulations which appeared successful were observed on 31 May and 3, 4, and 5 June. Three of these events were videotaped. An analysis of these tapes is in preparation. The following is a description of the 31 May copulation. The male, with a cricket held in his bill, flew to the female on top of the roost structure. He landed beside her and both performed a brief "wing vibration" display. The male then mounted the female's back and copulated for 15 seconds with wings aflutter. The female's body axis was near horizontal with the head slightly lowered. She lifted her tail above a 45° angle and the male curled his tail under to oppose cloacas. Both birds then flew off the roost, the male still carrying the cricket in his bill. The female "wing vibrated", then approached the male with head forward and bill gaped. The female called loudly during this display and after five seconds the male fed her the cricket. The other observed copulations were similar, but the female was not fed when she gaped and called.

A three-egg clutch was laid on 6, 7, and 8 June, one egg each day. Incubation commenced on 9 June. During the incubation period the female typically spent extended periods on the nest and shorter periods away from the nest to feed, preen, or display at the male. On 22 June, for example, she was observed on the nest for over 60 consecutive minutes, then emerged for 12 minutes before going back to the nest to incubate. She spent the nights during the incubation period on the nest. The male was observed on many occasions taking food to the nest but was not observed actually feeding the female. This may have occurred, however, as he left the nest many times without the food item. The male continued to show considerable interest in the nest during the incubation period, frequently landing just outside the nest entrance. During the latter part of the incubation period, the female began to give a harsh "scolding" call whenever the male landed at the nest. Bakus (1959b) described an increase in territorial defense behavior in a wild female as early as the nest lining period. Winter territorial defense has been reported for some populations (Sullivan, 1975), but is variable in others (Price, et al. 1983).

During incubation the female was repeatedly observed picking at her feet when off the nest. This became so intense that on 20 June she was caught and examined by the zoo veterinarian. The feet appeared to be in perfect condition. The toenails were trimmed slightly and the female was put back into the exhibit. The foot picking behavior continued for several weeks, then gradually abated. The source of the irritation was never discovered.

On 25 June the male tried repeatedly to enter the nest but was refused admittance by the female. That evening a chick was heard peeping and could be seen through the nest entrance when the female was away. The incubation period was 16 days, the same reported for wild dippers (Sullivan, 1973). The remaining two eggs did not hatch. One was later found to be infertile; the other was not found. Both adults began feeding the chick the following day. They dashed crickets on the rocks and carried tiny pieces to the nest. The adults ignored all other food items at this time. The female began to chase the male aggressively at this time, when not brooding the chick. The male began to carry whole food items to the nest on 28 June, and on 30 June, he was observed feeding both the chick and the female on the nest. The chick was observed to be healthy and begging for food at this time. From 29 June through 2 July the male did most of the feeding, assisted to a lesser extent by the female. The male was also the only bird

HUSBANDRY AND BREEDING OF THE WATER OUZEL AT WPZ, Continued

observed removing fecal pellets from the nest during this period. He held these in his bill and deposited them on rocks near the water.

The aggressive behavior of the female appeared to escalate daily until 3 July, when she chased the male almost constantly for nearly five hours and began to attack him with her feet and peck at him. The male was removed from the exhibit at this point. The female settled down immediately and began feeding the nestling regularly. From 3 July to 11 July, the female spent most of her time on the nest, leaving for up to 15 minutes to preen, bathe, feed, carry food to the nestling or remove fecal pellets. Once the female made seven trips to the nest with food items (small crickets) in one minute.

On 11 July, the chick was observed for the first time backing over the edge of the nest to excrete into the stream below. The female was off the nest at the time. Late that evening, the chick was found floating in the pool. It had apparently fallen from the nest and drowned. It was 16 days old, weighed 41.2g, was well-formed and nearly fully feathered. Wild dippers occasionally fall out of the nest at this age when disturbed (John Sullivan, pers. comm.).

Dipper nests are re-used in successive years by the same birds (Sullivan, 1973). On the morning of 12 July, the female removed the nest lining from the moss outer shell and tossed it into the stream. This behavior is characteristic of wild dippers (Hann, 1950). We intend to modify the roost structure upon which the exhibit nest sits to prevent future nestlings from falling out.

Using the same introduction procedure described previously, the male was reintroduced to the exhibit on 17 July. The birds remained together throughout the molting period, with acceptable levels of agonistic behavior. These behaviors, characterized by the male repeatedly chasing the female, increased dramatically after the molt was completed in mid-September and necessitated the removal of the male to an off-exhibit cage for winter holding.

In summary, a pair of water ouzels was successfully kept and bred in an exhibit that simulates their natural habitat. Clean, moving water and non-abrasive surfaces to avoid foot problems are important exhibit parameters. Although winter separation of birds is necessary, the high activity level of the dipper and interesting behavior insures a pleasing exhibit to the zoo visitor.

Acknowledgements

The authors gratefully acknowledge the insight and advice of John Colby on dipper husbandry. The assistance of the following people is greatly appreciated: Kathy Bucher, Andrew Burke, Jan Hixson, Sarah Holland, Janice and Eric Houck, Michael Illig, Jessie Karr, Mike Keele, Nancy King, Chris Kurtz, Ann Littlewood, Steve McCusker (General Curator, WPZ), Luke Metcalfe, Lisa Rapaport, Charlie Rutkowski, Corey Wright, and especially Warren Iliff, whose original inspiration led to the creation of the Cascade Stream and Pond Exhibit. A special note of appreciation goes to Stanley Held, Cascade Exhibit Keeper.

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ZOO CAMP: A LEARNING EXPERIENCE

By
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During the National Conference of the American Association of Zoo Keepers last October in Philadelphia, a paper on the Riverbanks Zoological Park was presented. A section of this paper was on overnight campouts which are a very important educational program. Many keepers present at the conference were interested in obtaining more information on zoo campouts.

Mr. Don Winslow, the Education Curator, began the zoo camp program in August of 1980. Assisting him in this educational endeavor are some of the zoo staff: vet technician, commissary workers, mammal curator, and several animal keepers.

Before the school groups come to the zoo, one person from the education department visits the classroom and delivers a pre-visit lecture. During this discussion students are prepared for what they will encounter while visiting the zoo. Most of the groups that attend zoo campouts are from South Carolina, but recently requests have been received from a few other states.

Each student pays a fee of \$25.00 which includes the overnight stay with dinner and a snack. The program length is from Friday 5:00 p.m. to Saturday 8:00 a.m. When the group arrives they are directed to a classroom in the new education building. After bed rolls and suitcases are suitably placed, the children form a circle on the floor and they are once again instructed on how to behave properly around wild animals. Face masks are passed out and an explanation of their use is given. A usual group size of approximately 20 children is then divided into two groups. The program outline is as follows:

Friday:

1. 5:00 p.m. - 5:30 p.m. - Introduction
2. 5:30 p.m. - 6:30 p.m. - 1st group-cats 2nd group-birds
3. 6:30 p.m. - 7:30 p.m. - 1st group-birds 2nd group-cats
4. 7:30 p.m. - 8:30 p.m. - Supper
5. 8:30 p.m. - 9:30 p.m. - reptiles
6. 9:30 p.m. - 10:00 p.m. - animal hospital
7. 10:00 p.m. - 10:30 p.m. - commissary
8. 10:30 p.m. - 11:00 p.m. - snack
9. 11:00 p.m. - 12:00 a.m. - hippos, bears, baboons, giraffes
10. 12:00 a.m. to 12:30 a.m. - campfire - evaluation

Saturday:

11. 7:00 a.m. - 8:00 a.m. - elephants

The first group is taken to the large cat back-up area, while the second group learns about birds. After the students get over their initial shock and excitement at being only five feet from a Siberian Tiger, a keeper gives a natural history talk on the animals and also explains that this is one of the endangered species that has successfully reproduced at the zoo. The children are next taken over to view the African lions. A few children are chosen to act as junior zoo keepers. While the animals wait out on exhibit, these new keepers get to unlock the doors to individual cages and place each diet inside them. After all locks are securely latch-

ZOO CAMP: A LEARNING EXPERIENCE, *Continued*

ed, handles to the guillotine doors are eagerly grasped, but rarely successfully opened to allow the lions entrance into their cages. The students observe, at a close view, how rapidly large carnivores devour their diets.

Next the group makes a switch, with the first group going back to the classroom to learn about birds. Different types of feathers and their purposes are discussed in detail. The students also see various shaped eggs and learn what type of nests each would be found in. Live birds are also used in the lecture. A child gets a taste of the art of falconry. Donning a glove holding meat, a student anxiously waits for the young Black Vulture to fly from the keeper to him.

Both groups then meet at the birdhouse where dinner is served. Chicken, green beans, chips, and soft drinks are consumed in front of an exhibit housing curious Jackass Penguins.

After dinner the students are introduced to the subject of herpetology. A few representative species are observed while their characteristics and behaviors are discussed. Later, a few brave individuals are given the experience of holding one of the live specimens.

The group is once again divided into two sections. The first group is taken to the hospital. Before entering, face masks are properly placed. While in the hospital, the vet technician introduces the children to the various techniques for treating sick and injured animals. With the help of a few eager volunteers, a heart monitoring machine and a pole syringe are observed in action.

In the commissary, three general categories of animal diets are discussed. Representative diets are used to illustrate the three categories visually. All the children are given the once in a lifetime experience of sampling both Primate Diet and Monkey Biscuits. However, only a few were able to comment on the flavor and texture of both.

By this time most of the students are ready for something to eat other than primate diet and biscuits. Milk and cookies are served while the zoo staff gets a necessary break.

For the last of the backup tours, the children are divided into four groups. Tours are conducted through barns housing Spectacled Bears, Mandrill and Hamadryas Baboons, Giraffes, and Hippos. After all the tours are concluded, the groups meet in front of the Polar Bear pool. Riverbanks is one of the zoos that has an underwater viewing room. With all the children assembled in front of the glass windows, a few herring are thrown into the lighted pool to entice one of the bears into the water. Here the children are able to view a 600-pound animal swimming rather effortlessly through the water.

By this time it is usually around midnight and everyone is getting rather tired. Teachers and children are escorted to a warm campfire. While enjoying the fire, everyone evaluates all that has been seen during the entire evening. Many questions are asked. "How have your perceptions of certain animals changed? What did you like least about the program? Usually the children realize that the animals are not at all tame like they thought they were. Cockroaches, smells, and primate foods are some of the things that they liked the least about the program.

ZOO CAMP: A LEARNING EXPERIENCE, *Continued*

After sleeping in the education building overnight, the entire group spends part of their morning with an animal larger than any they have ever seen in their lives. Hesitantly they move closer to a six-ton elephant.

The elephant trainer demonstrates his handling abilities with this enormous animal by running her through a routine. A small amount of grass extender is passed around and the children are given the opportunity to touch the elephant's trunk. Reluctantly at first, the children eventually relish this opportunity to get so close to one of their favorite zoo animals.

Children who attend these campouts always leave the next morning with a very different perspective of the animals than they had when they arrived. The fact that the animals in the collection are wild and not pets definitely makes a serious impression on these young people.

Campouts are becoming very popular in zoological institutions. Other zoos that host them are: Columbus, Bronx, Philadelphia, and Miami. Approximately 28 campouts are held each year at Riverbanks and there is a great demand for more. Campouts are usually held on Friday nights, but in the future they may be held on Saturday nights as well. The year 1985 is now full of scheduled campout dates.

Zoo camps are a wonderful way for keepers to get involved in educational programs. Since keepers function as educational aides for the public, most are at least general authorities on their animals. Through zoo campouts keepers are able to work as educators and introduce students to zoo animals in such a way that no one else can.

Today most people will never see exotic wild animals except in zoos. The zoo is also an important place for breeding endangered animals which helps ensure their conservation. Campouts are a unique learning experience. Using them as an educational tool to reach hundreds of people, these outings help children and accompanying adults to realize how important a role the zoo plays in animal conservation.



Chapter

PUGET SOUND AAZK CHAPTER (Seattle, WA)

In spite of being very busy with preparations for the National Conference, we did manage to hold an election, and the results were announced at our August meeting. Officers for the coming year are:

President.....Joyce Ford
Vice Pres.....Scott Barton
Secretary.....Nanette Taniguchi
Treasurer.....Mary Bennett

Many thanks to Pat Maluy for doing such a great job as Elections Officer.

---Nanette Taniguchi

SAN ANTONIO AAZK CHAPTER

Placing the SAZ AAZK Chapter back on firm footing has become the task of newly elected officers:

President.....Rose Gabriel
Vice Pres.....Lisa Fitzgerald
Sec/Treas.....Janice Nicholls

Our monthly meetings feature presentations by keepers, staff members, and visiting speakers. We were pleased to welcome Connie Cloak to the zoo in November. She graciously shared her experiences from the 1984 AAZK National Conference with members of the SA Chapter. Thanks, Connie!

We recently held our first occasional backgammon tournament. It was such a success that we may make it a quarterly event. We are collecting aluminum cans as our newest money-grubbing venture. In the works: keeper exchange program, inter-departmental keeper exchanges, and monthly education seminars.

---Lisa Fitzgerald

COLUMBUS CHAPTER AAZK

The Columbus Chapter of AAZK held a workshop on 25 October, 1984. The following zoos participated: Cleveland Metro Zoo, Indianapolis Zoo, The Good Zoo, Toledo Zoo, and the Winnipeg Zoo.

The workshop consisted of extensive behind-the-scenes tours, slide shows, movies of animal births and exchanges of ideas over lunch and dinner. To conclude the day's activities, an Octoberfest party complete with music and dark beer ended the workshop.

Approximately sixty-five people were able to make it to Columbus workshop. The workshop was a great success because we were able to share ideas and unite in the common goals of all of us - to stress professionalism in animal care and promote education in the zoo field.

---Stacy Katz

News



Please send Chapter News to Lee Payne, Chapter Affairs Coordinator at the Detroit Zoo. Also send a copy to the AKF editorial offices, 635 Gage Blvd., Topeka, KS 66606.



ACTIVITY PATTERNS AND SEXUAL BEHAVIOR
IN TWO PAIRS OF SNOW LEOPARDS
(*Panthera uncia*)

By
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Washington Park Zoo, Portland, OR

The endangered snow leopard continues to decline in its native habitat of high altitude mountain ranges of central Asia. Until recently the habits, population density, and inhospitable habitat of this species made its biology and behavior a subject of captive study. The number of snow leopards born to captive-bred pairs has increased dramatically in the last several years (Foose, 1982). Institutions are beginning to sell surplus snow leopard offspring rather than offering them for breeding loan only; ten were advertised in the September 1984 AAZPA surplus list. This is a potential sign of a soon-to-be saturated market (McCusker, per. comm.). It is critical to the future of this species to cease the indiscriminate breeding of a few productive pairs and instead concentrate on the breeding of carefully selected pairs to equalize the representation of wild-born founders, as recommended in the snow leopard Species Survival Plan (Foose, 1982). Many of these genetically important animals have not produced offspring; about one-half of the founder stock is nulliparous (Foose, 1982).

The most extensive studies done to date on the snow leopard have been the work of Helen Freeman (1980, 1982, 1983), who established an ethogram and data base. Differences in behavior between sexes, between estrus and non-estrus periods, and between successful (i.e. reproducing) and unsuccessful pairs were found. As a result, examining the behavior of an unproductive pair may help to determine which member is most likely to be the non-breeding. Changes over time and the effect of changes in management techniques should be examined.

During the six weeks training program at the Jersey Wildlife Preservation Trust (JWPT) general activity patterns and exhibit utilization were examined in their pair of snow leopards. A comparison was also made between the reproductively successful Jersey pair and an unsuccessful pair at Washington Park Zoo (WPZ) in Portland, OR. These results were then compared with previous studies (Freeman, 1980, 1982, 1983). Emphasis is on the pair at JWPT.

METHODS

Subjects

The JWPT male, Stasik, was born in 1979 in Seattle to a wild-caught pair. The female, Fonga, was born at the Zurich Zoo, also in 1979. This pair has been housed together since September 1981. The three-year-old pair copulated in February and June of 1982. They bred the following February and Fonga gave birth in May of 1983 to a cub that was found dead; they bred again in June. In 1984, they bred in February, April, and June and were therefore unsuccessful in the year they were observed for this study. For the purposes of this study, the Jersey pair was considered to be a successfully breeding pair, based on the cub produced in 1983. Freeman (1983) established that successful pairs, even in years they do not produce cubs, behave differently from pairs that have never produced cubs.

Piotr, the WPZ male, was born in Seattle in 1975 to the same parents as Stasik. Natasha, the WPZ female, was born at the San Antonio Zoo in 1977,

also to a wild-caught pair. They have been housed together since September 1978 and have copulated every year. For the last four years copulation has been seen in February and April. There have been no offspring.

Procedure

Both pairs were observed before, during, and after their first estrus of the year. Data was collected in Jersey using behavior categories (Table 1) similar to those defined by Freeman (1982). The duration of behaviors was timed to the nearest five seconds and all occurrences of behaviors were recorded except for "play" and "locomote," which usually involved more than one area in a brief period. The exhibit was divided into ten areas (Figure 1). The areas labeled with Arabic numerals varied in height, #5 being the highest. Platforms suspended in the exhibit were identified by letters; Roman numerals indicated the holding areas. The cats had access to an off-exhibit area, but were otherwise visible in the exhibit.

Data was collected from 0700-0830 and from 1600-1730 hours when the cats were most active, as well as during the middle of the day if they were visible. Observations began on 30 January and ended on 24 February, 1984. Sixty-five hours of data were collected on each specimen.

Data on the WPZ pair was collected using the 20 second scan sampling method used by Freeman (1982) (Table 2). Observations were made by research students during a nine-week period from 9 January to 13 March, 1983. Observations were mostly from 1000-1100 and from 1500-1600 hours. Several areas of this exhibit were not visible to observers. The exhibit was mostly cement substrate with two terraced structures of wood filled with pea gravel. The location of WPZ animals was not recorded. Thirty hours of data was collected on each cat. The WPZ female was kept separate inside the holding area for 24 hours every few days during the 1983 breeding season.

RESULTS

Exhibit Utilization

The Jersey pair spent most of their time on platform B (Figure 2), the one farthest from the ground, being sedentary or social sedentary. They also spent much time not visible in holding area II. They were most active in the flat areas of the exhibit, especially area #1, usually pacing. The cats used more of their exhibit during estrus than before or after and were seen copulating in every area.

General Activity Patterns

Both pairs were sedentary the majority of their time (Figure 3). Levels of aggression were too low to analyze. Social grooming also occurred very infrequently in both pairs. The social grooming seen in the Jersey pair usually lasted less than five seconds and frequently consisted of only a lick or two around the head in greeting.

Sex Differences

Ten behaviors were analyzed for differences between sexes for the Jersey pair (Figure 4). A test for the difference between two proportions (Van Tassel, 1981) were used. Four behaviors were exhibited significantly more often by the male than the female ($p < .01$). These were: sniff ($z = 9.33$), social sniff ($z = 3.30$), flehmen ($z = 4.6$), and marking ($z = 23.4$). Four behaviors were performed significantly more often by

Table 1. Behavior categories and how they were defined and recorded for the Jersey pair.

Behavioral States			Behavioral Events		
Name of Behavior	Definition of Behavior	Symbol for Recording	Name of Behavior	Definition of Behavior	Symbol for Recording
sedentary	sitting, lying, sleeping, standing, generally inactive, for more than 10 seconds	S	quick social play	play directed at mate less than 5 seconds	QSPL
social sedentary	same as above but within 30 cm of mate	SS	quick play	solitary play of less than 5 seconds	QPL
pace	covering same area in stereotypic manner, break of less than 10 seconds	P	head rub	rubbing head and/or cheeks on inanimate object or mate	H
social pace	same as above but within 30 cm of mate	SP	aggression	aggressive swipe at mate, snarl or growl	A
locomote	directional movement with a break of less than 10 seconds	L	catemvaul	vocalization heard during copulation	C
social locomote	same as above but within 30 cm of mate	SL	prusten	puffs of air expelled through nostrils in greeting	P
autogroom	self grooming by licking or biting, break of less than 10 seconds	G	sniff	sniffing of inanimate objects	S
social groom	grooming mate by licking or biting for longer than 5 seconds, break of less than 10 seconds	SG	social sniff	sniffing of anogenital area of mate	SS
sexual	mounting, nape biting, longer than 5 seconds	X	fleihen	open mouthed grimace	F
social play	play directed at mate (whether or not they joined in) for longer than 5 seconds	SPL	roll	rubbing back on ground while forepaws in air	R
not visible	not visible or unable to tell what animal is doing	NV	vertical mark	squirting urine on vertical surface	VM
play	solitary play longer than 5 seconds	PL	horizontal mark	scraping of ground with hind paws	HM
eat	eating grass or chewing on calf legs	E	quick social groom	social groom of 1 or 2 licks, less than 5 seconds	QSG
other	none of the above	0	quick sex	sexual behavior less than 5 seconds, nape bites	QX
			vocalize	other vocalizations heard	V

ACTIVITY PATTERNS & SEXUAL BEHAVIOR

IN TWO PAIRS OF SNOW LEOPARDS, *Cont'd*

Table 2. Behavioral categories and corresponding codes used for Snow Leopard Pair Sample Study by Freeman, 1979-80.

Solitary Behavior	
100	sedentary; lying, sleeping, dozing, no movement
105	stand; a transitional behavior between sedentary and active
110	pace, covering same area in stereotypic manner
115	locomote; directional movement
* 120	auto-groom
130	head rub inanimate object
140	solitary play; includes leaping and jumping alone
150	roll on back
155	claw sharpen
160	eat or drink
161	urinate or defecate
165	sniffing inanimate object
170	mark horizontal surface; scraping with hind legs
171	mark vertical surface; spray
172	tail flag
* 173	flehmen
Social Behavior	
* 200	social sedentary; within 30 cm of mate
* 205	social stand; standing within 30 cm of mate
210	social place; both pacing within 30 cm of each other
215	social locomote; together with a directional movement
* 220	social groom; one animal is grooming the other or both are
* 225	being groomed; one animal is being groomed
* 230	social head rub or cheek rub
235	being head or cheek rubbed
* 240	social play; includes chase, rolling, wrestling, ambush, cut
250	aggressive swipe or bite
* 260	mount ventral ventral
* 261	mount ventral dorsal
* 263	mount unspecified
* 265	sniffing anogenital area
* 266	being sniffed in anogenital area
* 267	nape or ear bite while mounting
399	not visible
400	none of the above
Vocalizations	
* 300	snarl
* 305	growl
* 310	caterwaul: high, piercing vocalization associated with copula
* 315	prusten: purr-like sound in which animal exhales air through

* Indicates behavior may occur simultaneously with other behavior; not both behaviors.

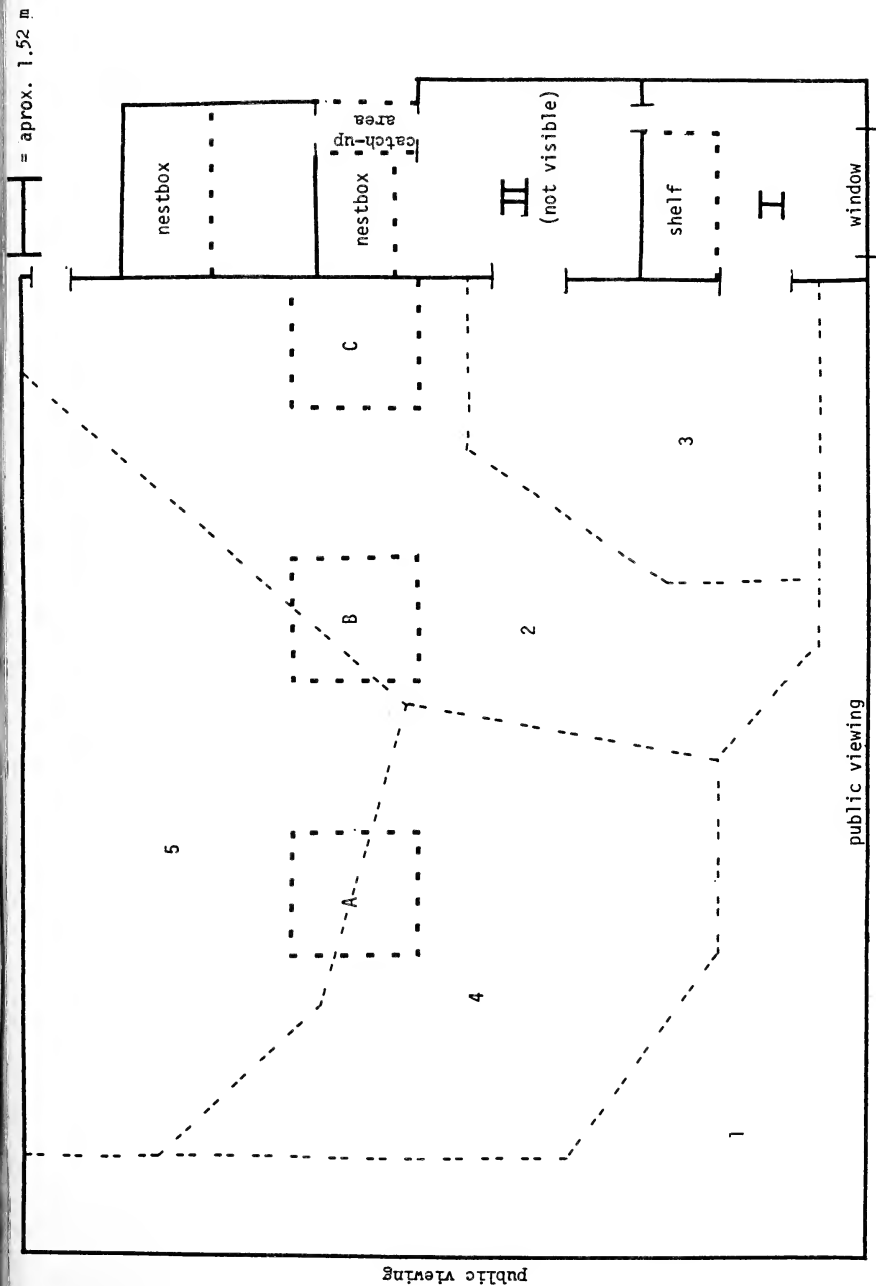


Fig. 1 Exhibit division at Jersey. The exhibit was divided roughly by height, #1 was the lowest point, #5 the highest. Three platforms in the exhibit were labeled with letters. The holding areas were labeled with Roman numerals.

ACTIVITY PATTERNS & SEXUAL BEHAVIOR
IN TWO PAIRS OF SNOW LEOPARDS, *Cont'*

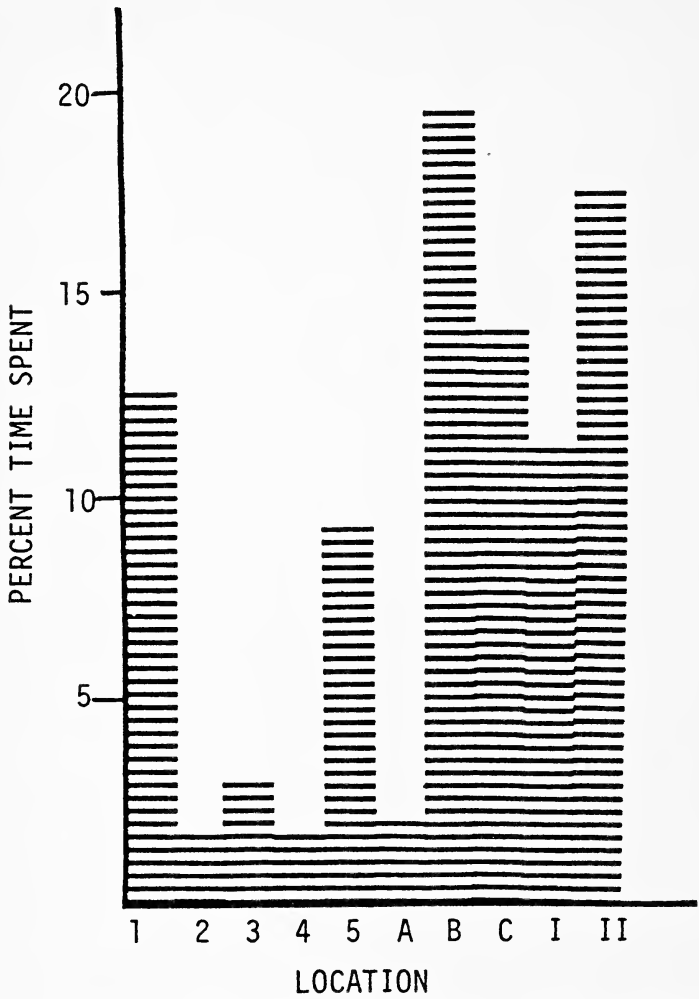


Fig. 2. Percent time spent in locations for Jersey pair.

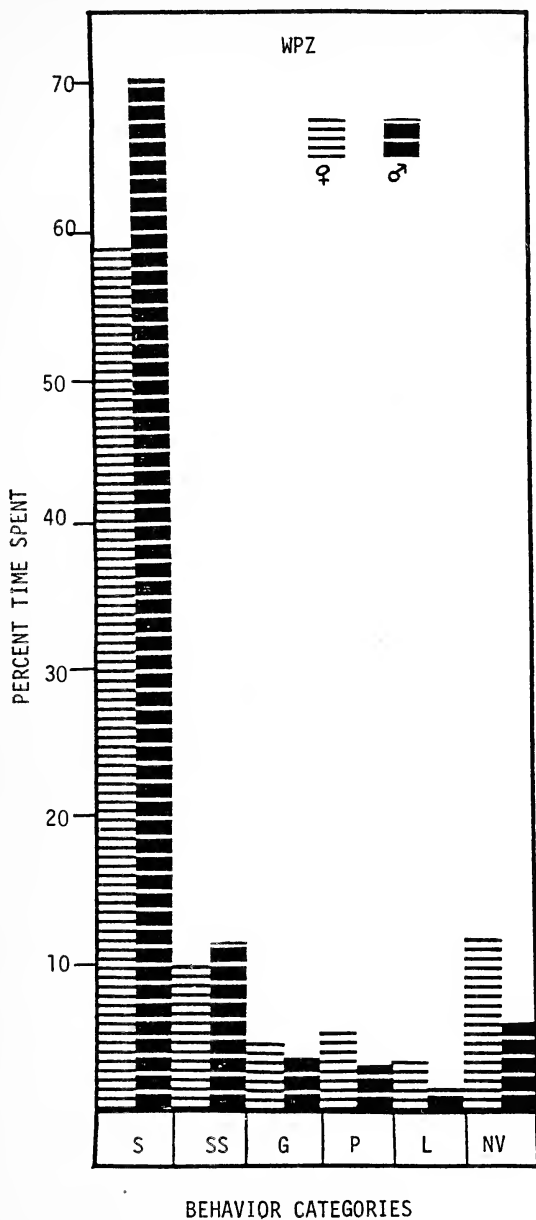


Fig.3 Percent of time spent in frequent behaviors of the WPZ male and female, and the Jersey male and female.

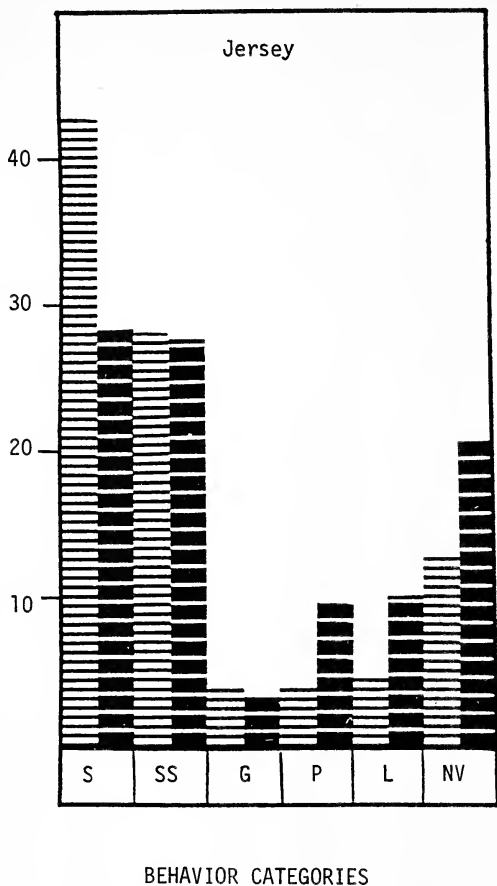


Fig. 3 Percent of time spent in frequent behaviors of the WPZ male and female, and the Jersey male and female.

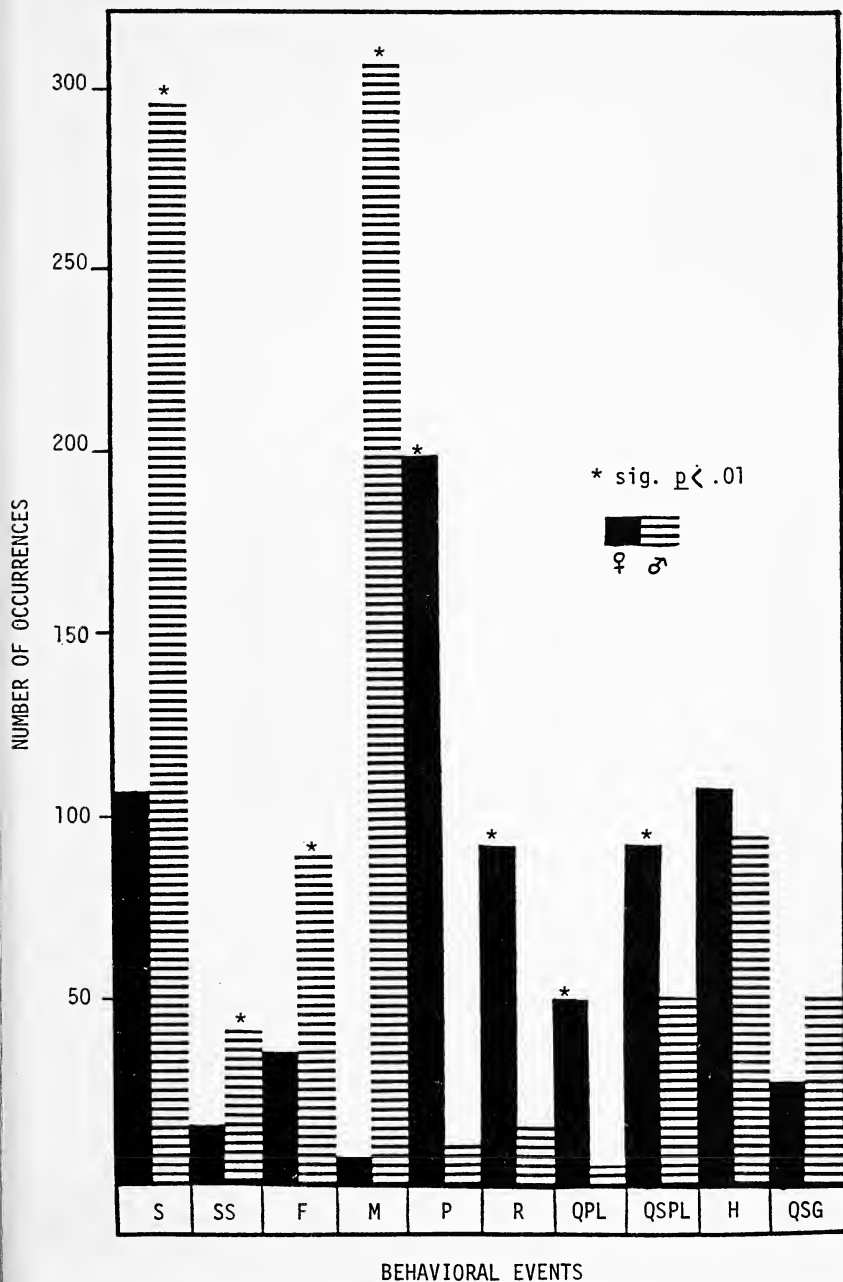


Fig.4 Total number of occurrences of behavioral events of Jersey pair.

ACTIVITY PATTERNS & SEXUAL BEHAVIOR IN TWO PAIRS OF SNOW LEOPARDS, *Cont'd*

the female than the male ($p < .01$). They were: prusten ($z = 3.87$), quick play ($z = 6.29$), quick social play ($z = 3.87$), and roll ($z = 7.88$). There was no significant difference in the behaviors head rub and quick social groom.

When both pairs were combined and tested for sex differences by a two factor analysis of variance (Figure 5) the only behavior that showed a significant difference ($p < .05$) was solitary play by the females ($F = 6.92$, $df = 6,1$).

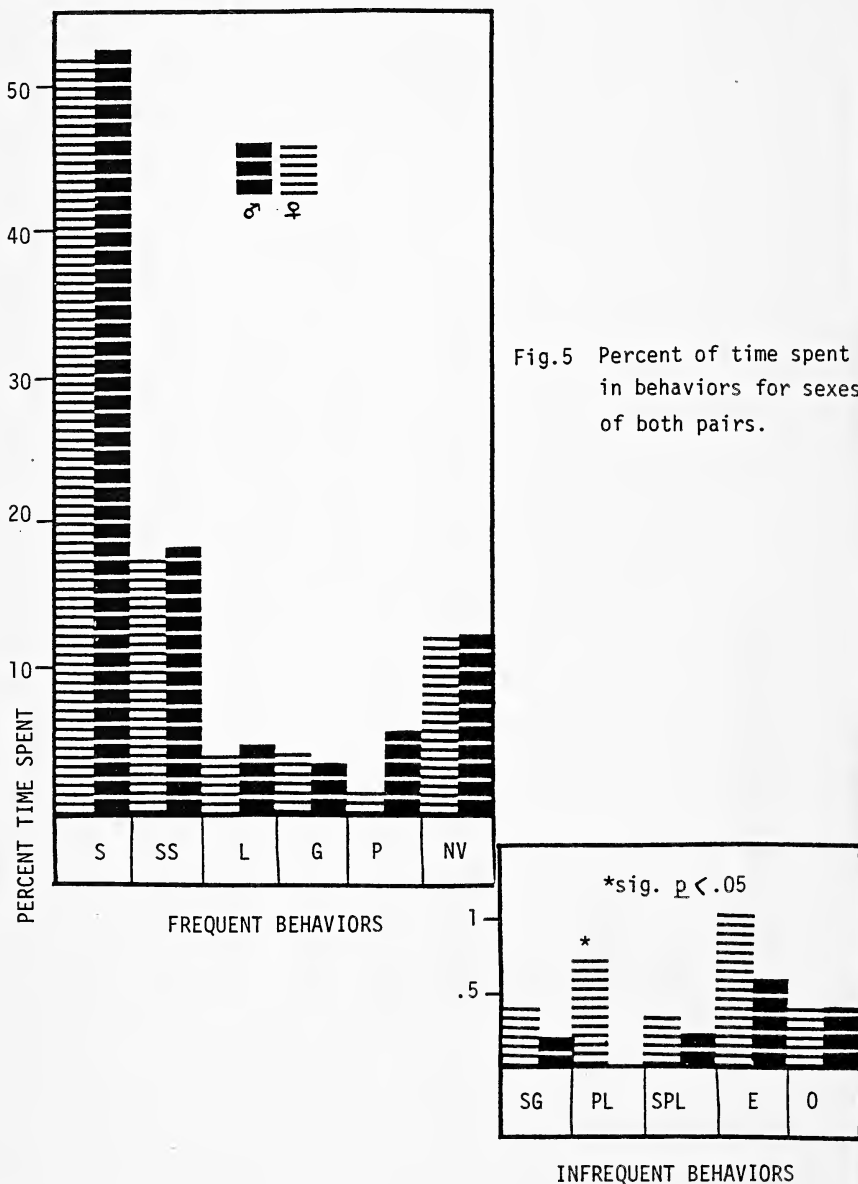


Fig.5 Percent of time spent in behaviors for sexes of both pairs.

Differences during Estrus

The frequency of six behaviors in the Jersey pair were graphed to show differences before, during, and after estrus (Figure 6). The rate of rolling and prusten increased sharply during estrus for the female. The male did the least sniffing and flehmen during the estrus period. Play increased substantially after estrus for both animals. It is not known if these behaviors differed significantly or not.

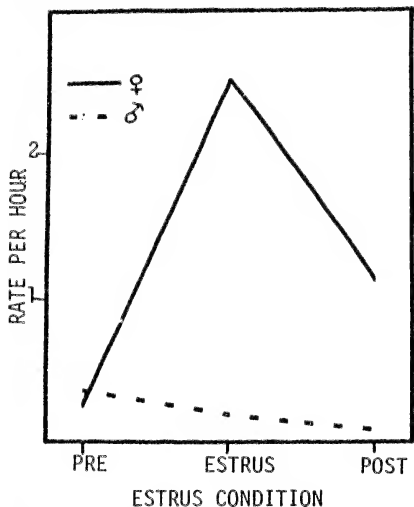


Fig.6a Rate per hour of Jersey pair over the estrus time block for rolling.

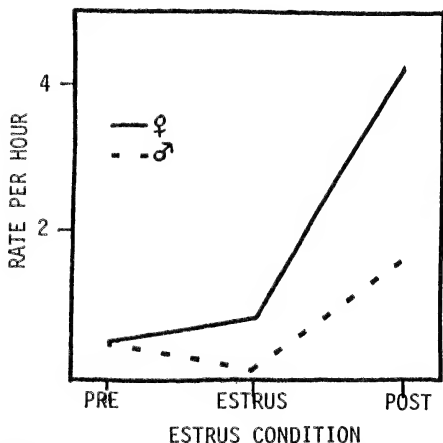


Fig.6b Rate per hour of Jersey pair over the estrus time block for quick play, solitary and social.

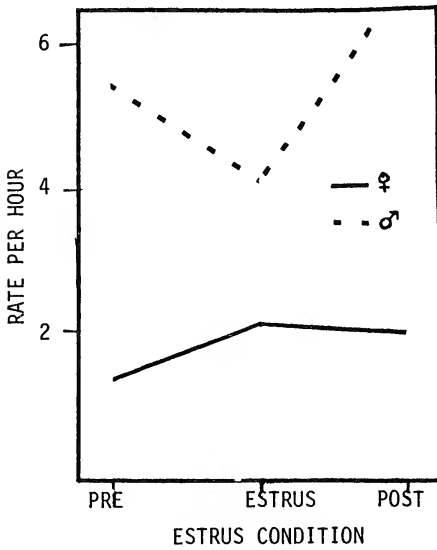


Fig. 6c Rate per hour of Jersey pair over the estrus time block for sniffing and social sniffing.

Fig. 6d Rate per hour of Jersey pair over the estrus time block for prusten.

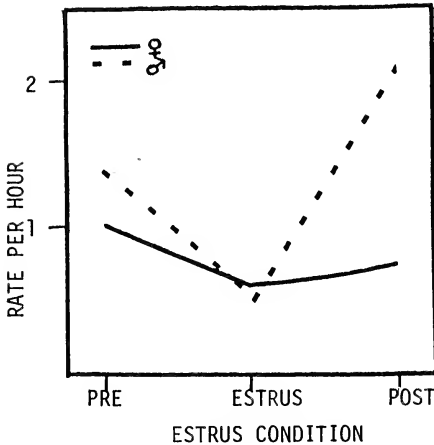
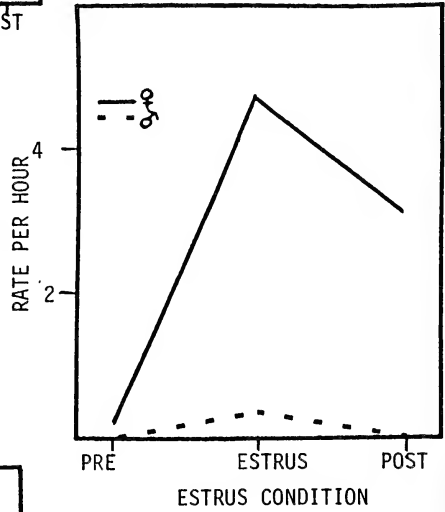
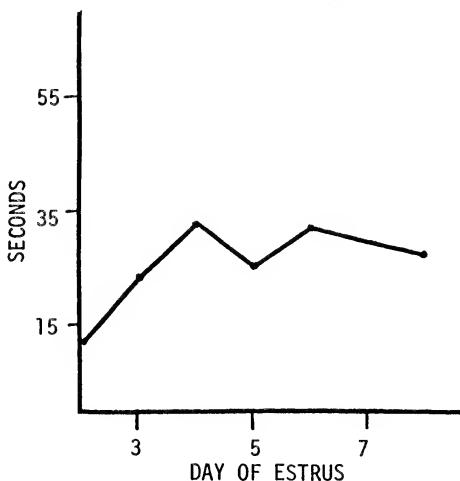
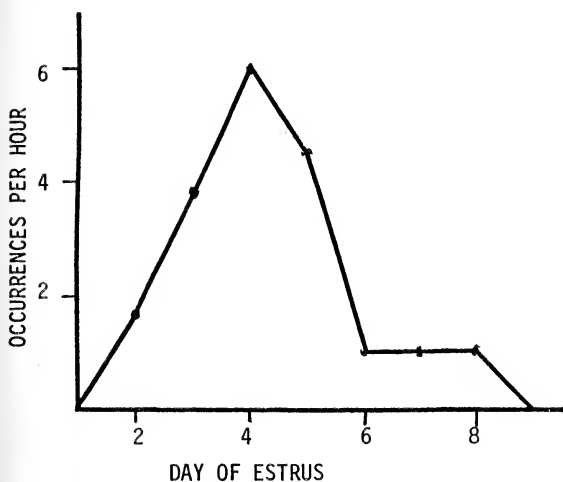


Fig. 6e Rate per hour of Jersey pair over the estrus time block for flehmen.

During estrus the frequency and length of copulation increased in the Jersey pair until a peak of six times per hour, observed in the middle of the eight-day estrus period (Figure 7). The longest copulation observed lasted one minute, five seconds; the average was 27 seconds.

Behaviors were tested for sex differences before, during, and after the estrus period with a two factor analysis of variance. The females showed a significant ($p < .05$, $F = 6.92$, $df = 6,2$) increase in autogrooming after estrus (Figure 8c). Pacing by the males did not show a significant change, but did drop during estrus (Figure 8a).

Fig.7. Number of occurrences of copulations per hour and length over estrus for Jersey pair.



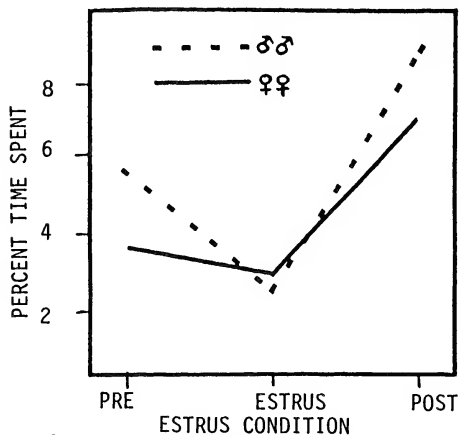


Fig.8a Percent means of sexes of both pairs over the estrus time block for pacing.

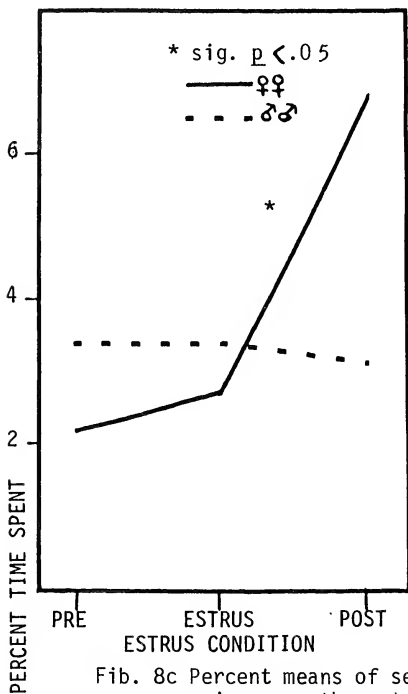


Fig. 8c Percent means of sexes of both pairs over the estrus time block for autogrooming.

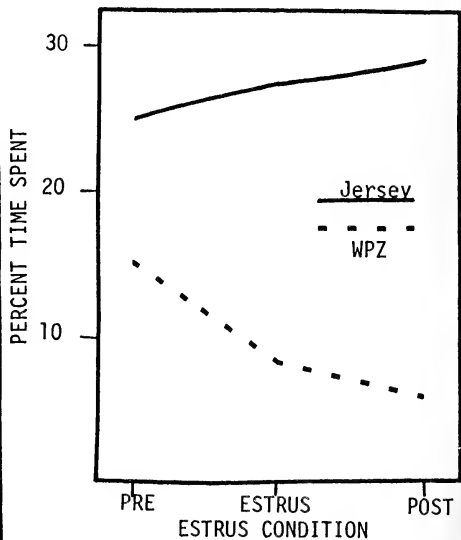


Fig. 8b Percent means of WPZ and Jersey pairs for the behavior of social sedentary.

Differences between Pairs

When the behavior of the WPZ pair was compared to the Jersey pair by a two factor analysis of variance, three behaviors were significantly different (Figure 9). The WPZ pair spent more time sedentary ($p < .01$, $F = 22.24$, $df = 6,1$) but less time being social sedentary ($p < .01$, $F = 596.63$, $df = 6,1$). The Jersey pair spent significantly ($p < .05$) more time locomoting than the WPZ pair ($F = 11.72$, $df = 6,1$). While time spent in sexual behavior was too brief to test, the Jersey pair spent twice as much time breeding as did the WPZ pair.

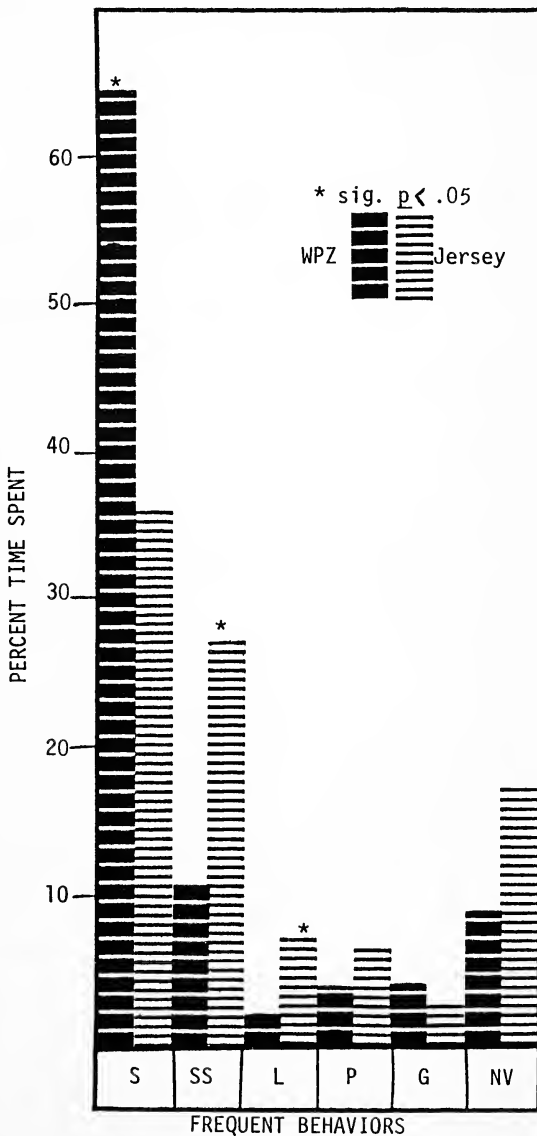
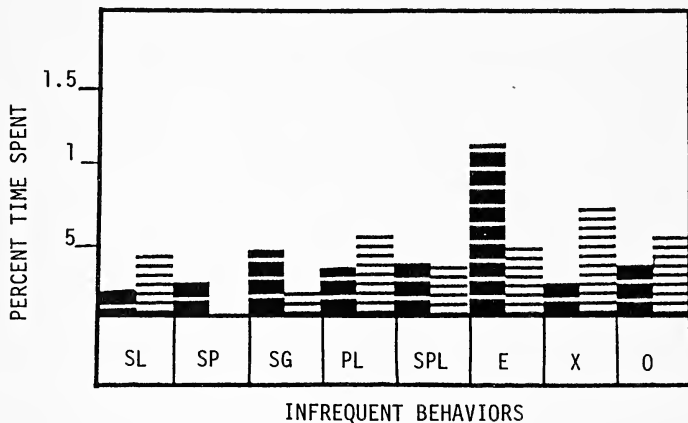


Fig. 9 Percent of time spent by the WPZ pair versus the Jersey pair.

Fig. 9 (cont'd) Percent of time spent by the WPZ pair versus the Jersey pair.



DISCUSSION

One purpose of this study was to gather data to compare the behavior of the WPZ and JWPT snow leopards with published results.

Freeman (1980, 1982, 1983) found that males do significantly more marking, both scraping the ground with hind feet and spraying urine at a verticle surface, than females. The Jersey male did do significantly more marking than Fonga, the female (Figure 4). The WPZ pair was not tested because of insufficient data, but the male did only slightly more marking than the female. It could be that many markings went unrecorded because a well-used area for this, as demonstrated by stains on the wall, is not visible to observers.

Freeman (1982) stated that 99% of the time the males will do significantly more social grooming than females. The rate of social grooming was much lower than expected for both pairs. The Jersey female did not differ significantly in this behavior. The WPZ female did more social grooming than the male, but this was not tested for significance.

The testing of urine for pheromones with the grimace-faced behavior of flehmen is thought to be used primarily by males to test female urine for signs of estrus (Ewer, 1968). It would seem likely to see flehmen more often in males than females. The Jersey male did significantly more flehmen than the female (Figure 4). Flehmen was not a behavior found to differ significantly between the sexes by Freeman (1982, 1983). Flehmen in the Jersey male was highest prior to and after estrus, as if determining exactly when the female started and ceased estrus (Figure 6e).

The significantly higher amount of solitary play seen in the females of the pairs studied (Figure 5) is hard to interpret. This is not a behavior found to be significantly different between the sexes according to Freeman (1980, 1982, 1983). It may be that during the breeding season of January

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through March, females are more inclined toward play because of restlessness caused by the proximity of estrus, or it may be just a coincidence of two playful individuals.

Freeman (1982, 1983) reported the three behaviors of roll, prusten, and autogrooming were found significantly more in females than males. Rolling on the back was often seen immediately following copulation. The amount of rolling in a particular female could be directly effected by the amount of copulating. The Jersey female did significantly more rolling than the male (Figure 4). The WPZ percentages weren't tested, but the female rolled twice as much as the male.

The soft purring vocalization of prusten is used as a friendly greeting and to appease aggression. The Jersey female did prusten significantly more than the male (Figure 4). The WPZ percentages were very small for this behavior. It could be because of the distance the observers were from the subjects that prusten went unheard. The small number of observations could also account for the low amount of prusten heard.

Self grooming was significantly higher in both females than the males in this study, but only after estrus (Figure 8c). The higher percentage of autogrooming occurring after estrus may be a response to the low levels of social grooming they received from the males, especially during estrus. Freeman (1982) found social grooming highest in males during the estrus period. This was not seen in either male in this study.

Behaviors reported by Freeman (1982, 1983) to be affected by estrus are roll, pace (in successful males), marking, and sexual behavior. The females in this study did do more rolling during estrus than during any other period (Figure 6a), although this was not tested for significance.

Freeman (1983) found that head rubbing and marking in females decreased just prior to estrus. This could not be seen clearly in either female studied. Because they are infrequent behaviors, this might have been missed with the small observation time.

Both pairs in this study engaged in more of the sexual behaviors of mounting and nape biting during estrus than at any other time, which is not surprising. On the first day of estrus for the Jersey pair, Fonga, the female, pestered Stasik, pawing at him while he rested until he got up and then moved. She did this several times, apparently trying to get his attention. No copulations were observed on this day, but the male nape bit Fonga several times. After ejaculation in the first copulations observed, the male sprang off the female and ran several feet away from her. No aggression from the female was seen after copulation. As estrus continued, Stasik relaxed and it was Fonga moving out from under him that ended copulation.

It has been observed in some pairs of cat species in captivity that the female may make no aggressive moves after the male dismounts if the individuals are familiar with each other (Leyhausen, 1979). Therefore, even though the aggressive reaction of a female can be a good indication that intromission has occurred, intromission should not be discounted if the female does not react aggressively.

This familiarity between individuals may be advantageous in the wild for the conservation of energy from unnecessary aggressive/defensive encounters and risk of injury after copulation in the harsh environment of the snow leopard. Wild studies to date have shown that individuals are normally solitary. The male's territory encompasses that of one or more females (Jackson, 1983). This suggests that individuals might be familiar with

each other. Preferences for familiar individuals for breeding have been observed in the domestic cat (Ewer, 1968; Leyhausen, 1979), and beagles (Clemens and Christensen, 1975). This may also be true for snow leopards.

Freeman (1983) found that pacing in successful males decreased significantly during estrus, while the pacing of reproductively unsuccessful males remained constant through the estrus period. It is possible that the decrease seen in pacing in successful males is due to increased interactions with the estrous female. The unsuccessful males could be unsuccessful because the female they are with is not cycling, which would explain the constant pacing rate, or because the male is not paying attention to the female's estrous condition. Pacing did not show a significant decrease in the males in this study, but the rate did drop for both during estrus. (Figure 8a).

The second purpose of this study was to evaluate why a particular pair, the WPZ pair, has not reproduced, and why the JWPT pair has done so.

Pairs in which the males was the same age or older than the female were reproductively more successful than pairs in which the female was older than the male (Rieger, 1980). Both pairs in this study have males the same age or older than the females.

Pairs that have a special exhibit have a better chance of reproducing than those in a feline house (Rieger, 1980). The Jersey pair had an exhibit of their own. The WPZ pair were exhibited in a feline building housing ten other carnivorous species.

Successful pairs were found to be generally more active (Freeman, 1983). This was true for the Jersey pair who did significantly more locomoting and less sedentary than the WPZ pair (Figure 9). However, they are several years younger and live in a more complex exhibit.

Freeman (1980, 1982, 1983) found that reproductively successful males marked and sniffed inanimate objects and their mates more than unsuccessful males. Though it could not be tested, Stasik, the Jersey male, appeared to do more sniffing and marking than the reproductively unsuccessful Piotr. Piotr spent .29% of his time sniffing; unsuccessful males were found to spend 1.1% of their time in this behavior (Freeman, 1980).

Freeman (1983) reported that autogrooming was done significantly more by reproductively successful females than unsuccessful. The rates of autogrooming for the females in this study were similar. The successful Jersey female could have spent a percentage of her time when not visible in this behavior.

Freeman (1983) reported that pairs that are successful were seen to spend significantly less time not visible than unsuccessful pairs. There was not a significant difference between the pairs studied for this behavior. The successful Jersey pair may have spent less time not visible if the weather had been better.

Jersey spent twice as much time in sexual behaviors as WPZ. The higher percent of time spent copulating seen in successful pairs (Freeman, 1982, 1983) may reflect the need of frequent copulations to induce ovulation or for the sperm to successfully find the egg in the convoluted uterus of cats (Sadlier, 1974). Induced ovulation has been studied in the domestic cat (Clemens and Christensen, 1975; Verhage, Beamer, and Brenner, 1976) and is being investigated in other species of cat, such as the African lion (*Panthera leo*) [Schmidt, Nadel, Schmidt, and Beamer, 1979], the cougar (*Felis concolor*) [Bonney, Moore, and Jones, 1981], and the leopard (*Panthera pardus*) [Schmidt, per. comm]. If a domestic cat is stimulated by intro-

mission to ovulate, but the egg is not fertilized, a period of pseudo-pregnancy lasting from 30-73 days will occur before she will come into estrus again (Verhage, et al., 1976). The WPZ pair has exhibited longer than normal inter-estrus periods the last four years, from 56-61 days. The normal time for snow leopards should be 21-30 days (Knowles, 1982; Koivisto, 1977). While it is not known whether snow leopards are induced or spontaneous ovulators, a pseudopregnancy could explain these long periods, perhaps because of a low sperm-count in Piotr or some physiological problem with Natasha that prevents the egg from being fertilized. Little is known about the snow leopard regarding this phenomenon and further investigation is needed.

Induced ovulation would be an advantage for a solitary animal with a widely distributed population like the snow leopard. It would insure that ovulation would not occur until a male was present and the egg likely to be fertilized.

The percent of time spent by the WPZ pair in most of the behaviors which distinguish successful from unsuccessful pairs found by Freeman (1980, 1982, 1983) were at or below the level of unsuccessful pairs for both sexes. This may be a result of the small number of observations since many of the indicative behaviors, such as flehmen, roll, and prusten, were infrequent. The low percentages may also accurately reflect their unproductive status. From this study it is not clear which, if either animal, is responsible. The Jersey pair could not be compared directly with many of the results found by Freeman, so it is not known how they would fare in many of the behavioral categories.

Freeman (1980, 1982) found that snow leopard pairs that have been together for over one year spent more time socially sedentary (a mean of 20.9%) than pairs that have not been together as long (mean of 6.3%). The Jersey pair spent 27.8% of their time resting together; this was significantly higher than the WPZ percentages of 10.9 (Figure 9). Even though the WPZ pair has been together twice as long as the Jersey pair, they spend much less time together. The WPZ pair appear to tolerate each other well, but might not be compatible for breeding and may do better with new partners or in a different environment.

There is some evidence that the individuals, Seattle 1 and 2, parents of both males, are siblings, which results in an inbreeding coefficient of .25 for their offspring (Foose, 1982). This may have an effect on the fertility of these individuals. When comparing the descendents of Seattle 1 and 2 to the descendents of the founders in San Francisco and San Antonio, Seattle is much lower in second generation births (Foose, 1982). The Jersey pair has been considered successful in this study, but may have been classified prematurely as such since they have produced no viable offspring yet.

Many pairs of captive snow leopards have one litter and never produce again (Foose, 1982). Hopefully this will not be the case with the Jersey pair. According to breeding records kept on them, they have been less and less intense every year, with a decrease in vocalizations. This might be just the process of getting to know each other and acquiring more sexual experience. Hopefully observations on these snow leopards will continue so comparisons can be made over the years.

There are many things which could have affected the results of this study. During the first weeks of data collection in Jersey, the islands had the worst storms in the past 25 years; this appeared to influence the amount of time spent not visible during the pre-estrus period. There were twice

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as many observations made during estrus and post-estrus than for pre-estrus in the Jersey pair. The data collection method was also being refined during the pre-estrus period. The small amount of data collected on the WPZ pair and the number of people collecting it could have affected the results.

Acknowledgements

I would like to acknowledge the JWPT for an unforgettable six weeks and the chance to watch Stasik and Fonga. Special thanks go to Dr. David Waugh, Training Officer; Dennis Mosley, Ged Cadwick, David Bowles, and John McNicholas, Keepers at JWPT, for their help and advice. I also want to thank the WPZ and the Portland Chapter of the AAZK for support on this project. Nancy King Hunt and Ann Littlewood deserve thanks for helping with the statistical analysis and advice in writing. I'm especially grateful to Jan Hixson for last-minute typing and to Jim Barclay for trying his best to help.

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CAPTIVE BREEDING OF THE COMMON TRUMPETER

(*Psophia crepitans*)

AT WOODLAND PARK ZOOLOGICAL GARDENS

By

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In October, 1983, Woodland Park Zoological Gardens received 1.2 surgically sexed Common Trumpeters (*Psophia crepitans*), which had been wild-caught in Guyana, South America (captured in June, 1983, approximately 150 miles south of the Caribbean Sea, along the Venezuela border; pers. comm. R. King). The Common Trumpeter, also known as the Grey-winged Trumpeter, belongs to a small family of birds, *Psophiidae*, one genus and three species, which is endemic to northern South America. This species has the widest range, "inhabiting Guyanas, Venezuela, south of the Orinoco and locally further north, most of eastern Columbia, eastern Ecuador, northeastern Peru, and various localities in Brazil, mostly in the Amazon Basin" (Holyoak 1978: p. 85). Phylogenetically, trumpeters are most closely related to the crane family, *Gruidae*, and to rails, of the family *Rallidae*.

On 25 May, 1984, the first of three common trumpeters to hatch hatched at the Zoo's incubation facility. To the best of our knowledge, this represents the first captive breeding of any number of *Psophiidae*, despite the fact that trumpeters have been kept in numerous collections for many years.

Our current breeding trio was part of a shipment of 2.4 trumpeters, with the additional 1.2 birds held in quarantine at our facility pending transfer to the Vancouver Aquarium. These six birds arrived in two sky kennels containing 1.2 birds each. The two trios were set up in separate isolation rooms at our Animal Health Department. A minimum of 14 days in quarantine is the standard procedure for any new birds entering Woodland Park Zoo's collection. New birds are not released until careful monitoring of their general health and fecals indicates that they are parasite-free. At times this will lengthen the quarantine period. This proved to be the case with the Common Trumpeters, and treatment for a number of persistent endoparasites (i.e., tapeworms) resulted in their remaining in quarantine until December, 1983.

The decision as to which birds went to Vancouver and which remained in our collection was an arbitrary one. There were no apparent physical nor behavioral differences between the two groups. In fact, both trios remained very flighty during the entire two-month quarantine period.

The birds that were chosen to remain in our collection were moved to a glass-fronted exhibit at our Neotropical Aviary. The exhibit (approximately 9m. L x 3m. W x 2.5m. H) has a translucent glass roof which allows for natural lighting and photo-period, and is heavily planted with a variety of tropical plants. Floor substrates include potting soil covered with beauty bark, sand, and some areas of bare concrete. There is also a shallow pool, approximately 1 meter in diameter (15cm. maximum depth), which provides both bathing and drinking water.

The trumpeters shared this enclosure with an established pair of Crested Oropendolas (*Psaracoloius decumanus*). All the birds in the exhibit shared the same diet from two separate pans. Woodland Park's trumpeter diet consists of chopped fruit (papaya, apple, banana, blueberries, and raisins mixed together), soaked Wayne's dog meal (25% protein), chopped Romaine, soaked Purina monkey chow, wild bird seed, and omnivore diet (WPZG's own

in-house mix i.e. information available). This was supplemented with crickets, meal worms, and mouse pinkies.

Prior to introduction, the birds were wing-clipped and the windows of the enclosure were soaped over to help prevent injuries. Flighty at first, the birds quickly settled down into the heavily planted Aviary and began to behave the same as those previously held here. They proved to be an excellent addition to the collection, and very popular with both the public and Zoo staff.

In the early spring of 1984, courtship behavior was observed for the first time. This consisted of mutual preening, wing flitting displays, and dancing similar to that seen in courting cranes. A secluded nest site was provided by the addition of more plants and a wooden nest box. Nest box design was an attempt to simulate a cavity formed by a rotted stump. Holyoak (1978) refers to two nest sites found in holes in rotted trees. Nest box construction was of cedar planks and plywood and consisted of an open-top design, 35cm. square and 55cm. high on three sides, the front side being 25cm. high. The floor of the box was elevated 8cm. above the base of the nest box. Rotted bark and old leaves provided nesting material, although the birds did throw most of it out.

The first egg was laid 26 April 1984, in the nest box. Two days later, a second egg was laid. The male and one of the females spent a large amount of time at the nest site after the egg was laid. Despite this attentiveness, one of the eggs disappeared from the nest shortly after the second egg was laid, and only small fragments of its shell were found in the nest. The remaining egg was immediately pulled for artificial incubation and replaced with two dummy chicken eggs. It was also decided to pull the pair of oropendolas in case they were the egg eaters. However, since one of the chicken eggs was later destroyed too, it appeared that the trumpeters themselves were destroying the eggs. The next four eggs were pulled as they were laid because of the previous loss. None of these eggs was found in the nest box, but laid randomly within the exhibit, with one being found badly cracked. The three good eggs were set in an incubator with the original first egg. Of the total eggs being artificially incubated, the first hatched after an incubation period of 26 days, and the last three eggs were found to have died during various stages of development.

Because of the low hatchability we experienced using artificial incubation, it was decided to risk allowing the adult birds to attempt natural incubation. When an egg was laid in a dark, cavernous depression within some exhibit rockwork during mid-June, it was substituted with a wooden dummy egg. The following two eggs were also substituted with dummy eggs. When it was clearly established that one of the females was beginning to incubate, a real egg was substituted back into the nest. The remaining two eggs were placed into an incubator concurrently. The nest was carefully monitored and, after five days without an egg breakage problem, a second egg was placed into the nest from the incubator. The third egg remained in the incubator and later proved to be infertile.

Interestingly, all three of the adult birds shared in the incubation of the eggs, and all three were very protective of the nest. Both eggs successfully hatched, though the last chick to hatch was found lying just outside the nest severely traumatized to the left eye and head area. This bird was immediately pulled for hand-raising and fully recovered. It is not known who caused this trauma, but inter-chick aggression amongst cranes (Walkinshaw, 1973) does frequently occur. Further observations

CAPTIVE BREEDING OF THE COMMON TRUMPETER AT WPZG, Continued

in captivity or the wild might provide information on whether inter-chick aggression also occurs in the closely-related trumpeters.

Despite this injury to the second hatchling, the adults were attentive and protective of the first chick. Therefore, it was decided to leave the chick in the exhibit for parent-rearing under continuous dawn to dusk observation by volunteers from Woodland Park's docents. The adults proved to be excellent parents and all three shared in the rearing process. In fact, they often "seemed" to compete with each other in their attempts to feed the chick. Favorite food items, such as crickets, pinkies, and egg yolk, were offered first and most frequently. Food was offered either from the bill or was dropped to the ground in front of the chick, thereby encouraging it to feed on its own. Feeding was accomplished by a barely audible vocalization and by wing flitting displays similar to those observed during courtship. This same behavior was also used by the adults to call or lead the chick to various parts of the exhibit, i.e. to the food pans or to cover when alarmed. Interestingly, the adult male played the largest role during this rearing process. He was observed doing the majority of the feeding and was the most protective of the chick, never straying very far away from it. Brooding of the young was the only aspect of parental care that the male did not do readily. This task was usually performed by the females.

Of the nine total eggs that our birds laid, five were artificially incubated, two were found broken in the enclosure, and two were parent incubated. Of the five artificially incubated, one was infertile, two died during early stages of development, one chick was helped out of its shell after being overdue and died the following day, and one chick hatched after 26 days of incubation.

Incubation temperature was 99.5°F (+ .25°) and humidity was 84° wet bulb (i.e., 50%), the same as we incubate eggs of precocial birds. The egg piped on the 26th day and hatched out within 6-8 hours after pipping. Eggs were manually turned three times a day and were weighed approximately every four days to determine weight loss and proper humidity. Weights were graphed along a line whose slope showed a 15% weight loss during incubation. Rahn et al. (1979) collected data on 65 species of birds which showed a 15% weight loss during natural incubation, a result of respiration from the developing embryo.

The chick was left in the incubator 16 hours before transfer to a brooder (15 gallon terrarium). Nomad[®] carpeting (3M Company) was used for a substrate. Since they are closely related to cranes, chick rearing procedures to prevent leg deformities which are used at the International Crane Foundation were employed when feasible and possible (Archibald and Viess, 1978). Primary concerns were: 1) not to overfeed the chick, and 2) to give the bird as much exercise as possible. The bird was offered a combination of food items based on the adult diet, plus egg yolk and "white" meal worms and cricket abdomens, i.e. soft parts only. For the first four days, the bird would not pick up food items unless the particular food item was presented in front of it, using forceps. Once the chick would begin to peck at the forceps-held food, the food item could be dropped and the chick would then eat it from the ground, i.e., simulating bill-feeding by the adults. ABDEC[®], a liquid multi-vitamin supplement (Parke-Davis), was added to the water and offered in a likewise manner to the chick, using a eye-dropper. After two days the bird was drinking water by itself, and after five days it began to peck at food items from the dish without artificial stimulation. At this point, the bird was hand-fed small amounts of food every two hours from 0700 to 1900 hours. After 19 days,

CAPTIVE BREEDING OF THE COMMON TRUMPETER AT WPZG, Continued

the bird was transferred to a larger indoor enclosure. Feeding was three times a day, with fresh food provided at each feeding.

The bird was weighed twice each day just before the first and last feedings, to monitor weight gained through the day and weight lost through the night. As the bird became older, and thus increasingly unwilling to be weighed, weighing was limited to once each day. As previously mentioned, there was some concern that the bird might gain weight too quickly, possibly resulting in leg deformities. Growth curves were compared to another *Gruiiforme* species, the Red-crowned Crane (*Grus japonensis*) at the International Crane Foundation (LaRue, 1981). Both growth curves were similar and no leg problems developed. On a daily basis the chick was taken outside for exercise, sunshine, and photo sessions which recorded plumage changes. While outside the bird was handfed as much clover (*Trifolium repens*, *T. macrocephalum*) as it was interested in. It was observed that the chick "enjoyed" having its head and neck scratched. This may stimulate normal grooming behavior as the gregarious adults frequently preen each other around the head, neck, and eyes.

On 11 July, one chick that hatched under the parents was traumatized, almost to the point of death. This bird recovered from injuries and was hand-reared using those same procedures as outline above; the only major difference being that it showed less preference for favored food items (such as blueberries, papayas, etc. as was favored by the first hand-reared chick) and consumed more food at each feeding. In comparison, its weights were higher for the first 20 days. From day 20 to 40, both weights were approximately equal; and during the following 20 days, the "injured" bird's weights again increased faster than the other hand-reared bird. (See Table 1).

TABLE I

Age (days)	Hand-reared Chick #1	Hand-reared Chick #2	Parent-reared Chick
at hatching	45.3 grams	----	----
1	42.6	49.3	----
10	95.5	111.5	----
20	204.3	225.0	----
30	353.9	356.0	430.7
41	471.6	518.9	----
51	593.4	587.3	----
59	591.4	672.1	----
65	----	----	614.0

We had the opportunity to compare and contrast feeding and rearing methods with two being hand-reared, the other being parent-reared. This data has not yet been fully analyzed, but preliminary observations suggest that the parent-reared bird had gained weight all too quickly. As observed with overfeeding of protein in hand-reared cranes, the parent-reared trumpeter is very slightly bowlegged. This could be the result of too much protein in the diet or not enough exercise, or a combination of both as a result of being reared by three adults who constantly gave the bird attention and bill-fed it with favored items (i.e. mouse pinkies, crickets, etc.). With the larger clutch size thought to be the norm, such over-attentiveness

CAPTIVE BREEDING OF THE COMMON TRUMPETER AT WPZG, Continued

on the part of the adults towards one individual chick would not occur. The hand-reared birds were only handfed in two-hour increments, and in the interim periods the young chicks did not feed very much. In the future it will be necessary to better monitor food consumption in the parent-reared birds, possibly limiting feeding opportunities of adults, and to monitor weights of the parent-reared chicks more frequently.

Much gratitude goes to Woodland Park Zoological Gardens' Curator of Birds, Walter English, for his constant advice regarding the aviculture of this species. In addition, many thanks to the entire bird crew for their assistance in everything that led to the success of this first breeding in captivity.

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- Walkinshaw, L.H. 1973. Cranes of the World. Winchester Press, New York. 370 pp.

PRODUCTS MENTIONED

- ABDEC liquid multi-vitamin supplement: Parke-Davis, Div. of Warner-Lambert Co., Morris Plains, New Jersey 07950.
- Nomad carpeting; Seaport Chemical, Inc. 1215 E. Columbia, Seattle, Washington 98122.
- Purina monkey chow; Ralston Purina Co., Checkerboard Square, St. Louis, Missouri 63164.
- Wayne Dog Food; Wayne Pet Food Div., Continental Grain Co., Chicago, Illinois 60606.



AAZK EXHIBIT DESIGN FORM

By

Diane Forsyth
Akron Zoological Park, Akron, OH

Presented By

Beth Poff, Mill Mountain Zoological Park

The idea for the Exhibit Design Form started from the frustration of keepers at smaller zoos who needed information to either assist in the design of an exhibit or to build one themselves. After many correspondences, telephone calls and reading of what scarce material might be available; many times you would end up with an exhibit which still did not quite work. Perhaps the drains were in the wrong places, or there was not enough work area for the keepers, or the animal would hide in one corner and go nowhere near the exhibit's wonderful tree grouping artfully placed in the center of the exhibit. I am sure we have all dealt with these types of problems at one time or another. What can make the problem worse is to find out that someone else made the same mistakes three years ago.

A little over a year and a half ago Diane Forsyth at the Akron Zoo started to work on a form which could be used to help keepers and others not only request information about exhibits at other zoos but to also start a collection of information on exhibits in a standardized form called the Exhibit Design Form. This form would have keeper input included on it, thus the form can be a tool to help get keeper views, opinions, and information into the design process, at the beginning, where it is most needed.

Members of the Education Committee, other keepers, zoo design firms, and lawyers have all worked on the composition of the Exhibit Design Form. We are still in the process of finalizing a release statement to make it clear that this form is to be used as a tool and not as a blueprint. Any information gained from the forms is to help avoid past mistakes and to improve upon present designs. Along with individual research, the Exhibit Design Form can help you avoid mistakes but is not a guarantee of success.

Just after the conference, a mailing will be sent to design and architectural firms, and universities with design courses. Also the mailing will be sent out to a random sampling of small, medium and large zoos. The mailing will request that forms be prepared on three exhibits and returned to the collecting zoo. The collecting zoo will be Akron Zoological Park, 500 Edgewood Ave., Akron, OH 44307, to the attention of Diane Forsyth. Each time the form is used, a copy will be sent to the collecting zoo so that in a short time there will be quite a range of completed forms. Information from these forms can then be requested from the collecting zoo in three ways:

- 1) By the type of exhibit (i.e. all bear exhibits)
- 2) By cost
- 3) By zoo location

Eventually a looseleaf publication can be made available of all collected forms, much like the AAZPA Infant Care/Diet Notebook.

Teamwork is a must since the completion of the forms will involve every department in the zoo, from keeper to director. Cooperation by all to help get the forms completed can help alleviate possible problems such as the length of time it takes to fill out the form, upper management being

leery of the intent of the form and the negative attitude that it is just not worth the trouble. As keepers we must take the extra effort to fill the forms out when we receive them, talk to others about the importance of having the form accepted as a worthwhile tool in the design process. This is a way keepers can become involved in the building of an exhibit and air their opinions in the beginning when it counts and not after the fact when constructive options become hopeless complaints that are expensive if not impossible to make right.



THE DAWN PHILOSOPHER

*I was walking
through the zoo
in the early dawn's
awakening blackness
when all of the old scenes
hit me--
the Congo, the Amazon
and old Tarzan movies...
stories from Grandma's
ragged pages.*

*I wondered as I twisted
myself 'round and 'round
eyeing my captives
as they blinked in the night,
"What is this world of mine
where freedom holds keys
visible and cold
to opposable thumbs
and higher intelligence?"*

*Then it hit me - again -
I am their captive
in a world
held by a raw and greedy species,
and they hold the keys I seek
to the hot and bloody honor
that the Humans, in cold and
sleeping blackness,
can never give.*

*by Terry Weber-Atkinson, former primate
keeper at Jackson Zoo, MS 1974-84*

MANAGEMENT AND HUSBANDRY OF THE WESTERN TARSIER
(*Tarsius bancanus*)
AT THE NATIONAL ZOOLOGICAL PARK

By
Frank Kohn, Miles Roberts, Angela Keppel,
Eugene Maliniak & Michael Deal
Department of Zoological Research
National Zoological Park, Washington, D.C.

Tarsiers are an ancient group of primates and the living species are little changed from ancestral forms living approximately 50 million years ago. Tarsiers are unique among primates in being exclusively carnivorous, subsisting almost entirely on insects and the occasional small vertebrate. They are unmistakably primate-like in appearance and at least one species, the spectral tarsier, exhibits a monogamous social system, typical of other small primates like tamarins and marmosets. The social system of other species is less well known but there is growing evidence that the species I will be discussing today, the Western tarsier, has a social system much more similar to that of solitary carnivores than to that of other primates.

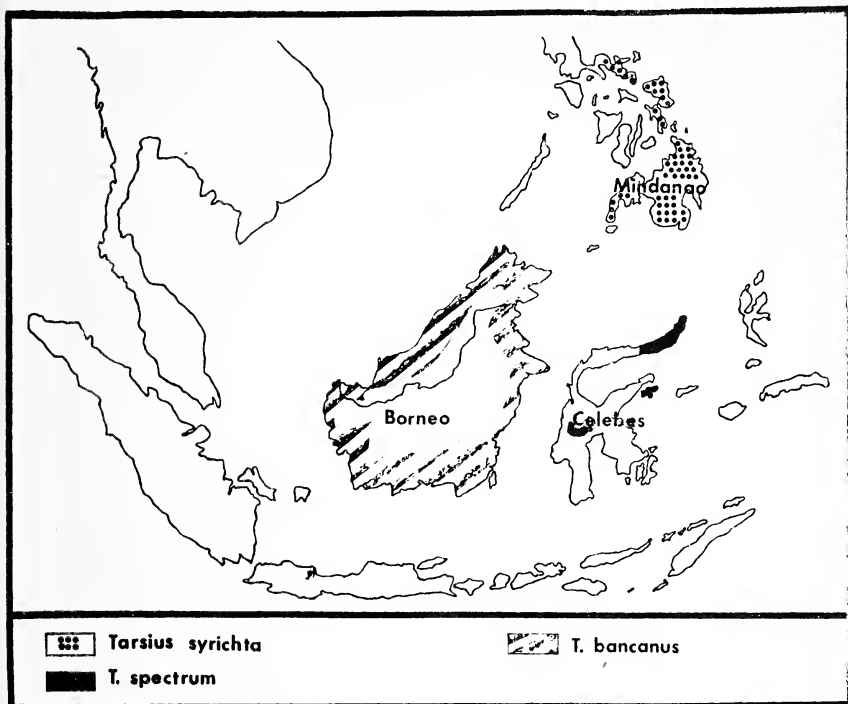
It is becoming clear that tarsiers are a very complex group that can give us some insight into primate beginnings. To date, field studies have provided most of the useful information as zoos and research facilities have had poor success in even maintaining animals in captivity. Nevertheless, captive studies should be pursued because a large amount of useful information can be accumulated rapidly, cheaply and easily and the information obtained can be a very useful supplement to data obtained in the wild.

In 1983, the National Zoological Park and Duke University initiated a cooperative program of study on the Western tarsier (*Tarsius bancanus*). Today I will discuss management and husbandry techniques used to maintain the animals at the National Zoo and some of our successes and failures. First I would like to give you some background on tarsier biology and their history in captivity.

There are three species of tarsiers: The Phillipine tarsier (*Tarsius syrichta*), from Mindanao; Horsfield's or Western tarsier (*T. bancanus*), from Sumatra and Borneo; and the spectral tarsier (*T. spectrum*) from the Celebes (See Figure 1). The extant forms of tarsiers are specialized from a more widespread form found in North America, Europe and Asia during the Tertiary period. Earlier forms have been found in the Paleocene and Eocene periods placing the animal's origins to at least 50 million years ago. It has been noted that *Tarsius* is probably the oldest mammal now inhabiting the earth.

Tarsiers weigh between 105 and 135 grams and measure an average of 30 centimeters from head to tail. The tail comprises approximately half this total length. All three species are found mainly in secondary tropical rain forests and occasionally near the fringes of primary forests in low-lying coastal areas. The Western tarsier is exclusively arboreal and is a specialized leaper and climber. It is nocturnal and crepuscular. The social system appears to be different from that of the other species studied to date. The territory or home range of a male overlaps that of several females while the females maintain individual territories. Thus, the Western tarsier appears not to be monogamous in the strict sense. Like the other species, the Western tarsier is a specialized insectivore but occasionally eats small vertebrates such as lizards and snakes. Almost all food is taken below 4 meters height. Vegetation is never includ-

FIG. 1 Distribution map of the three living species of tarsiers - *Tarsius bancanus*, *Tarsius spectrum* and *Tarsius syrichta*.



ed in their diet. As a rule they feed exclusively on live prey. Their breeding season occurs between October and March. After a gestation of four to six months, a single precocial young is born which begins to move about on its own at about two weeks of age.

Tarsiers see well in the dark and have binocular vision as evidenced by their forward directed eyes. They also have good hearing. Olfaction may play a large role in behavior since both sexes have circumanal and epigastric scent glands and display marking behavior. Vocal, visual and olfactory modalities are employed in communication. Hearing and sight play a major part in prey location. Predators are few (See Table 1).

History of Tarsiers in Zoos

Tarsius syrichta has been the species most frequently kept in captivity in zoos and research facilities abroad and in this country. Although a few individuals have lived as long as 11 years, in general, their history in captivity has been very unsuccessful (See Table 2). A high mortality rate in transit, poor captive longevity and poor reproductive success predominate the history of all species in captivity.

Diet is perhaps the single most important consideration for successful management of this specialized insectivore. Although some animals have been reported to eat freshly killed insects, many animals refuse to eat

TABLE 1. Foods taken by wild *Tarsius bancanus* and *Tarsius syrichta* and a list of potential predators of these two species.

<u>WILD TARSIER DIET</u>		
<u>INVERTEBRATES</u>		<u>VERTEBRATES</u>
Mantids	Beetles	Snakes
Ants	Grasshoppers	Birds
Cicadas	Cockroaches	Bats
Moths	Butterfly	Rodents
 <u>PREDATORS</u> 		
	Owls	Slow Loris
	Snakes	Giant Civet

nonliving prey. Most animals have very narrow diet preferences often accepting only one type of food despite the availability of others. Often the preferred foods are not nutritionally balanced and provision must be made to administer supplements in some form. Reported captive diets have varied from zoo to zoo, but some foods have been consistently favored. These include mealworms, crickets and anolis lizards. (Foods offered to and taken by tarsiers are presented in Table 3).

Enclosure specifications are a second very important consideration in maintaining this active and acrobatic species. Animals are extremely active, if given adequate space, and spend much of their waking time foraging among the tree branches. Although socially tolerant, individuals partition available space both temporally and spatially suggesting that provision must be made to accommodate animals in their own 'personal space'. Cage sizes of all previously captive tarsiers have been described as quite small ranging from three cubic feet to barely one cubic foot. In our experience, such enclosures are clearly too small.

Records of causes of death of tarsiers are scant. The few instances of described post mortem findings suggested: Degenerative liver and kidney conditions, trichomoniasis in females following miscarriages, and pneumonia. A Phillipine tarsier at the Philadelphia Zoo lived for eleven years and produced two young. Both infants, however, died of cerebral hemorrhages. At the time of her death no overt causes were reported, but it was noted that her teeth showed little wear and her ovaries were not atrophied. A condition known as ringtail is also described although it has not been fatal. This particular case has been emphasized since it is the only well-documented record of a tarsier in a zoo. This paucity of information on managing the animals requires immediate and intense study of a species which has at times been described as closely linked to man.

TABLE 2. SUMMARY OF TARSIER MAINTAINED IN CAPTIVITY

DATA ACQUIRED	SPECIES	SEX	ZOO/OWNER	LIFESPAN/DOD
1850	<i>Tarsius tarsius</i>	?	Amsterdam Zoo	March 1852
1938	<i>Tarsius sylvatica</i>	0.1	Yale University	18 months
1947	"	1.1	Bronx Zoo	June 1948
1947	"	0.1	Philadelphia Zoo	June 1959
1947	"	1.0	Philadelphia Zoo	June 1949
1948	"	1.1	Bronx Zoo	July 1948
1948	"	1.2	London Zoo	approx. 1950
1949	"	1.0	Born Philadelphia	June 1949
1950	"	1.0	Born Philadelphia	June 1950
Aug. 1965	"	5.7	Oregon Regional PC	Soon after arrival
Dec. 1965	"	1.2	Brookfield Zoo	1968, 1968, 1971
April 1966	"	1.0	Born Brookfield	May 1966
?	"	9 animals	Lincoln Park Zoo	8 animals DOA
?	"	6.6	Stockholm Zoo	Two females dead
?	"	2.2	Duke University	?
?	"	1.1(?)	Frankfurt Zoo	?
1968	"	1.0	San Diego Zoo	Arrived dead
Sept. 1968	"	0.1	San Diego Zoo	Sept. 1968
May 1970	"	1.0	Born San Diego	Died same day
June 1971	"	1.0	Born San Diego	June 1971
May 1972	"	0.0.1	Born San Diego	Died same day
Sept. 1973	"	1.0	Born San Diego	Sept. 1973
April 1976	"	1.0	Brookfield Zoo	Oct. 1976
April 1976	"	0.1	Brookfield Zoo	Dec. 1977
1966	<i>Tarsius bancanus</i>	1.0	Max Planck Institute	?
1983	"	3.3	Duke University	All alive
1983	"	3.3	National Zoo	1.1 soon after arrival
Dec. 1983	"	1.0	Born at NZP	10 days
March 1984	"	1.0	Born at NZP	18 days

TABLE 3. Foods offered to captive tarsiers. Data obtained from the literature. Items marked with (*) have been offered to Tarsius bancanus at the National Zoological Park.

FOODS TAKEN IN CAPTIVITY

* Crickets	* Anoles
Mealworms	Gekkos
* Cockroaches	* Mouse pups
Locusts	Preying mantises
Cicadas	Wolf spiders
Katydid	Dragon flies
House sparrows	House flies
Shrimp	Crabs
Salamanders	Skinks

Management of Tarsiers at the National Zoo

The National Zoo received three pairs of tarsiers on 11 November 1983. The animals had been captured by Pat Wright of the Duke Regional Primate Center during her field study of the animals in Sabah. The animals were captured as pairs to ensure compatibility and were acclimated for one to four weeks prior to shipment to ensure that they were adapting to captivity. The animals were transported to the US by air in the passenger cabin so that they could be fed, watered and checked on at regular intervals. All animals arrived at their destination alive. One pair was lost within the first two weeks. The male died of dehydration, possibly a result of the long transport to this country, while the female succumbed to pericarditis and secondary infections. Post mortem examination also revealed a developing fetus.

Each of the remaining two pairs were housed in room measuring 5.1m long x 3.6m wide x 4.5m high. The rooms have concrete floors, ceilings and solid walls. The keeper access door opens 61cm above the floor. The upper half of this door is a one-way mirror, the lower half is louvered for ventilation. A branch network of between 18-21 branches, poles and dowels are used to allow for the animals' leaping abilities. Three types of nest boxes are used in each room: two cardboard ones measuring 61cm x 61 cm x 30.5cm; one wood box measuring 61cm x 25.4cm x 30.5cm; and one fiberglass box measuring 78.7cm x 30.5cm x 35.6cm. Each cardboard box has an opening seven inches square and has at least one set of crossed bamboo poles to allow the animal to rest in the crotch formed by their intersection.

A forced air HVAC unit provides constant temperature and humidity at a 25.5°-29.4°C (usually between 26.6°-27.7°C) and 60-70% relative humidity. High humidity is necessary to avoid possible skin and respiratory problems encountered in dryer conditions.

When the animals were first received, the floors of the rooms were covered with sand for cushioning and to retain moisture. Sanitation concerns caused us to remove most of the sand leaving only a small amount on a one-foot strip at one end of the room. This allowed for better parasite control during the first quarantine period. A substrate of wood chips was later employed after one female gave birth to cushion the infant if it fell from a perch. An earlier youngster, born in December 1983, was found lying on the floor, still alive but cold, ten days after parturition. It had a broken back which may have been prevented had the wood shavings been present in that room.

The light cycle was set on a 12:12 pattern. Initially the night cycle began at 1815 hours and ended 12 hours later. It was gradually moved back 15 minutes every week until it reached our current photoperiod. Night now begins for the animals at 1600 hours and ends at 0400 hours. This allows for increased observation time during quiet periods and prevents observations and keeper schedule from interfering. At 60 watt blue light is used to simulate moonlight and facilitates nocturnal observations.

There are three types of watering devices used: a ceramic crock placed on the floor; a small, one-half cup jar placed in a bracket attached to a tree branch; and a dripper system. The latter item is the device used most frequently by the tarsiers. The device consists of a one-gallon bottle with a plastic hose implanted into the corner of the bottle's base. The free end of the hose is sealed with a plastic aquarium-type control which can be set to allow only a few drops of water to flow per minute. This prevents it from draining in a 24-hour period. The bottle is held up on a branch either by hanging it by its handle or cradling it in a junction of several branches. The hose drops down and is tied to a branch so the tarsier can lick water dripped onto the branch or directly from the valve. The water in the bottle is treated with 6cc of a 1 normal hydrochloric acid solution as a precaution against bacterial buildup. The plastic jugs are rinsed in hot water two times a week and replaced with backup jugs when necessary.

At NZP the tarsiers eat crickets almost exclusively. Anolis lizards are provided weekly but only occasionally eaten. Oriental cockroaches have been accepted and we are currently in the process of producing these in quantity. As crickets are the staple but are extremely low in calcium, phosphorus and trace minerals, we have had to devise a method of providing the tarsiers with these vital dietary supplements. Our approach has been to maintain the crickets exclusively on a granulated alfalfa pellet diet enriched with calcium, phosphorus, trace minerals and vitamin D. This food is constantly available to the crickets which are at liberty in the tarsier enclosures. Tarsiers therefore eat crickets that have the supplement contained in their gut. The zoo currently receives weekly shipments of 4000 crickets for the tarsiers. The average daily food costs for the tarsiers (considering cost of crickets, lizards, supplement) is \$2.00 per animal per day. Keepers spend approximately 1-2 hours per day in feeding, cleaning and other maintenance.

On arrival, the tarsiers were heavily parasitized with cestodes, capillaria, acanthocephalans and a variety of unidentified larvae. Clearly, reducing the parasite load was a high priority as it was essential to reduce as many sources of physiological and psychological stress from the animals as possible. Tube feeding and/or injecting anthelmintics was ruled out as being too stressful and simply presenting the medication to the animals in the hopes that they would take it was too unpredictable. We therefore

prepared a thick, pleasant-tasting paste carrier for the medication and smeared this paste on the hands of the animals just before their activity periods began. The animals would immediately groom off this paste thereby consuming the medication in known quantity for each animal. Essentially all parasites had been eliminated within three months of the onset of this protocol.

Realizing that the tarsiers were extremely sensitive to disturbance and novel situations, we devised a set work and feeding routine to which the animals could adjust. This routine is as follows: The keeper arrives in the building at 0715. The following procedures are followed and in turn recorded either in log book or on a designated chart or checksheet.

- a. Check for location of tarsiers in each room and record site of animal.
- b. Locate and collect fecal deposit, record location, count pellets and weigh total.
- c. Check temperature and humidity of each room in morning and before lights out.
- d. Collect dead crickets from room.
- e. Wash and refill water containers.
- f. Hose floor and mist rooms three times daily.
- g. Remove cricket feed dishes from room. Dishes are replaced after final day's misting.
- h. Clean out three cricket holding containers daily, remove dead crickets, change water, give fresh food, etc.
- i. Swab walls in both rooms two times a week (Mon. & Thurs.) with dilute TBQ solution in 2-gallon bucket of hot water.
- j. Change foot baths (three total)
- k. Check functioning of blue "moon" lights. (It has been found that fecal output drops dramatically if animals have no light sources during night hours.)
- l. Clean and feed anolis and Oriental roach colonies.
- m. Sweep and wash floors in service area two times a week.
- n. Take all trash from building to hospital incinerator.
- o. In addition to this specified care for the tarsiers there are four other rooms in the building housing three species of marsupials that requires daily care.

We have observed the animals with night vision goggles during their night hours. During these observations certain unique traits concerning tarsier behavior have been revealed. The animals are strictly nocturnal. During the day when an animal is resting outside of a nest box they remain in one location unless approached very closely. Even then there is some hesitation about their intended movement. They require some light to see their food and the blue "moon" lights function well for this. There also appears to be a trimodal activity cycle during the course of the evening with the greatest activity occurring when the lights first go out for the evening.

Perhaps the most unusual observation concerns their defecation habits. On two consecutive nights we noticed an extremely small fecal output by animals in one room. It was then noticed that the blue light had been burned out. We replaced the light and the next day the fecal output was enormous. It seems that the animals require a small amount of light to locate prey.

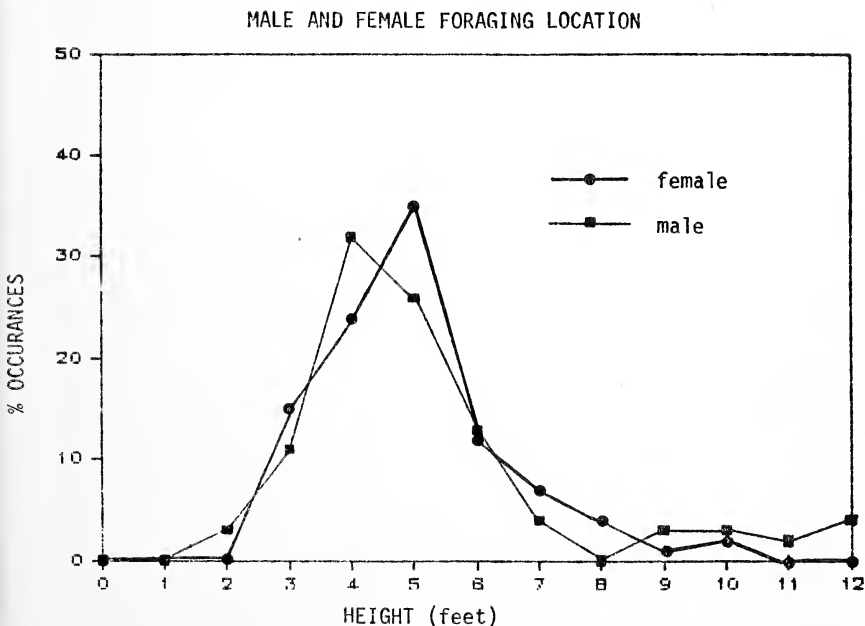
The tarsiers feed predominantly at heights of from 3-6 feet in our setting (See Figure 2). They maintain a somewhat constant interindividual distance while they are foraging. Although branches in the rooms are set at horizontal, 30,45,60 and 90-degree angles, the tarsiers primarily utilize >

vertical and near vertical (90-60 degrees) branches with small diameters (one-half to one and one-half inches). Their activity is concentrated in the four to nine-foot height range of their rooms. They have only rarely been seen to come to the floor for foraging or any other reason.

Two young have been born, one to each female. Both infants were being reared apparently successfully by their mothers but died (one at 14 days and the other at 18 days) apparently as a result of attacks by the male. Our data shows quite clearly that a few days prior to birth, the female becomes somewhat aggressive towards the male and chases him away from her immediate proximity. Following birth, male-female proximity increases dramatically as a result of continued chase by the female (Figure 3). The male appears to attempt to maintain close proximity and shows great interest in the infant, even attempting to carry and hold it when it is left alone. We believe that in the wild the male may be driven away from the mother-infant pair and would maintain a much greater distance after birth than before. We do not know why the male reacts aggressively towards the infant, but it may be significant that the two infants born here were both males. Adult males of all species studied to date are extremely aggressive towards other males and we may speculate that this applies to infants as well.

Whatever the reasons for a males' aggression towards his offspring, it is clear that the species cannot be managed like other monogamous primates. Provisions will be made in the future to isolate the mother-infant pair from interference from the male while at the same time respecting the fact that removal of the male completely may be deleterious to whatever pairbond system there is.

FIGURE 2. Foraging height preferences for male and female *Tarsius bancanus*. N = 1200 scan samples.



MANAGEMENT AND HUSBANDRY OF THE WESTERN TARSIER AT NZP, *Continued*

TABLE 4. Summary of management parameters for *Tarsius bancanus* at the National Zoological Park.

Temperature:	80° - 85° F
Humidity:	50% - 70% Room floor hosed 3x daily; branches misted 1x daily.
Light cycle:	white lights on - 0400 to 1600 blue (moon) lights on 1600 to 0400
Substrate:	Sand in rear of room to retain moisture Wood chips covering floor prior to birth of young
Branch Nestowk:	Wooden dowels, tree branches, bamboo poles
Keeper Schedule:	<u>0700-0930</u> Check animals, note location, collect fecal pellets, count, weigh, note location, collect dead crickets, hose floor, wash walls 2x/week, change water bottles 2x/week. <u>1200</u> Note animal location, hose floor <u>1500</u> Note animal location, hose floor, mist branches, feed

FIGURE 3. Male-female proximity before and after birth of a single infant. Note the increased proximity after birth. N = 1200 scan samples.

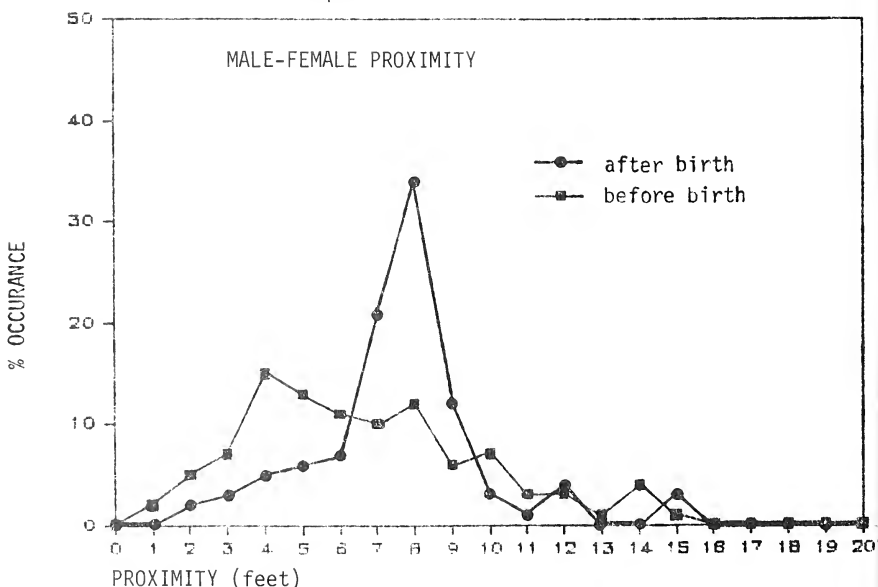


FIGURE 4a. Non-foraging height preferences for male and female before birth of single infant. N = 1200 scan samples.

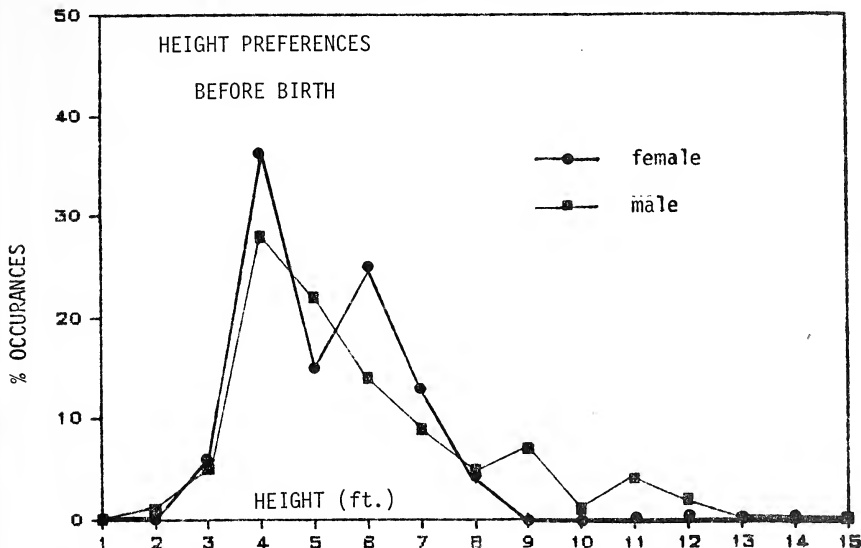
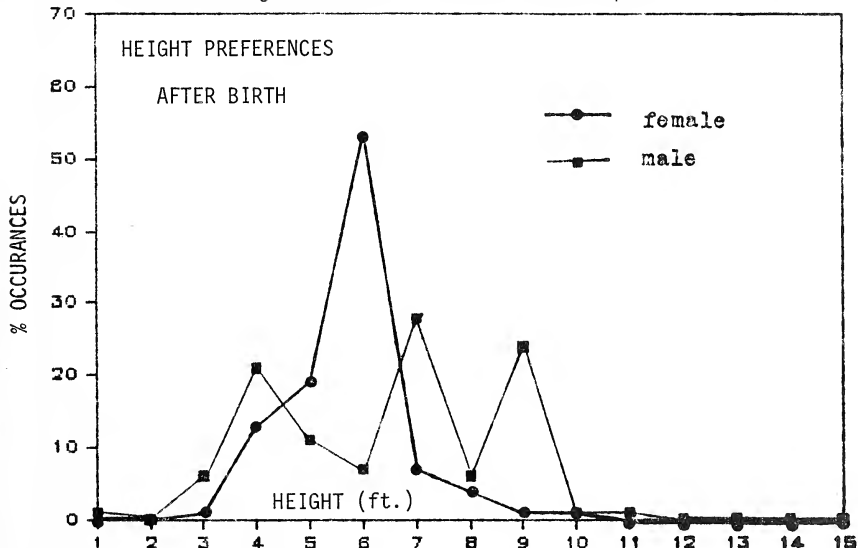


FIGURE 4b. Non-foraging height preferences for male and female after birth of single infant. N = 1200 scan samples.



Clearly, we must understand the social system of the Western tarsier to be able to manage them properly. Over the next few months we will be concentrating on defining social mechanisms so that we can successfully raise the next infants that are born. We feel confident that the nutritional deficiencies that have apparently resulted in the deaths of captive-born tarsiers elsewhere are well on the way towards being solved. We also believe that post-capture mortality rates can be reduced to almost zero by adopting capture, acclimatization, transport and management techniques similar to the ones described in this paper.





ESTABLISHING A PRIDE OF LIONS
AT THE NEW PITTSBURGH ZOO

By
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Pittsburgh Zoo, Pittsburgh, PA

Last October, Phase II of a four-phase reconstruction project officially opened to the public at the Pittsburgh Zoo. Included in the four-acre site was a Siberian tiger forest, Asian and African waterfowl ponds, white rhinoceros display and an African lion and leopard habitat. This paper concerns the logistics involved in the formation of a manageable group of lions using existing stock. As a keeper, I considered this a rather formidable task since my experience with cats was limited to a "one in each cage" philosophy. Safari zoos, so I was told, had been forming and breaking up groups of lions each season for years. To the veterinary and keeper staff at a small municipal zoo like Pittsburgh, the prospect of introducing four full-grown lions of different sex and temperament to one another might prove to be a challenge.

Some months prior to our move from the old cages to new habitats, informal discussions began so that a plan for relocating and introducing the lions to each other and their new environment could be formulated. These sessions usually involved the veterinarian, supervisor and myself (cat keeper). We all agreed that the final outcome should result with minimal physical and psychological stress to the animals. The veterinarian indicated that each cat would be anesthetized for a complete physical exam, including dental work. The supervisor wanted a pair, preferably a trio, on display for the opening ceremonies and I wanted the animals so familiar with each other and their habitat that potential aggressive conflicts would have already been realized.

As you all know, the pride is the basic unit of lion society. An average pride consists of 4 or 5 lionesses plus cubs of various ages along with 2 or 3 attendant males. The zoo's future pride members ranged in age from 5 to 16 years and included: a vasectomized male; a neutered, declawed pet; a dominant female and her hand-reared daughter. Except for housing an adult pair together, the lions were all essentially strangers to one another. Interactions took place at a very minor level--when fussing at a neighbor through a transfer door, answering each others' roars or peering at reflections in the glass case across the hall (See Table 1).

Table 1. Sexual condition, temperament and ages of the Pittsburgh Zoo's African lions.

NAME	AGE (YRS)	SEX	CONDITION	REMARKS
Bobo	16	M	Vasectomized	Subordinate
Rosemary	14	F	Cycling (?)	Dominant
Serpico	5	M	Neutered	Former pet
Buffy	10	F	Cycling	Hand-reared

In the wild, lions occupy territories measured in square miles but most

zoos measure their space in square feet. Our lions would be transported from 12' x 14' cages to brand new off-exhibit housing. The major change in their accommodations would take place when each cat was given access to a large, open-air compound designed to simulate the African savanna. If this sounds familiar to you folks from Woodland Park, it's because the New Pittsburgh Zoo was designed by none other than Jones and Jones of Seattle.

Management of the zoo's cat collection is unremarkable and, I think, typical of other zoos. Pre-determined amounts of carnivore diet¹ are fed 6 days a week with occasional treats of beef liver and bones. The cats are vaccinated against the usual feline infectious diseases and fecal samples are examined bi-annually for endoparasites. Except for dental work and ingrown claws, most medical problems are the result of old age.

Since the off-exhibit holding facilities for lions was limited to 3 cages, only 3 cats were moved initially. The dominant female, Rosemary, was to be transferred at a later date. The following plan was adopted after personal communication with other keepers and curators² and advice from the veterinarian, Dr. Wagner:

- 1) Separate the adult pair (Rosemary and Bobo)
- 2) Individually familiarize each animal with their new habitat
- 3) Introduce the animals in this order: from least aggressive to most aggressive
- 4) Be prepared to intervene should problems occur

By separating the older adults we hoped to break up the pair bond established after sharing a cage for so many years, thus permitting new alliances to be formed. We especially hoped that the vasectomized male would ally himself with the socially inept, neutered male and serve as a model of lion behavior.

In addition to forming new alliances the lions were confronted with such alien features as grass, open sky, electric fences and a small pond. Should any altercations take place, we wanted the animals thoroughly accustomed to the boundaries and limitations set by the uneven terrain, deep moat and electric wire. Each cat was given ample opportunity to explore their new territory at their own pace.

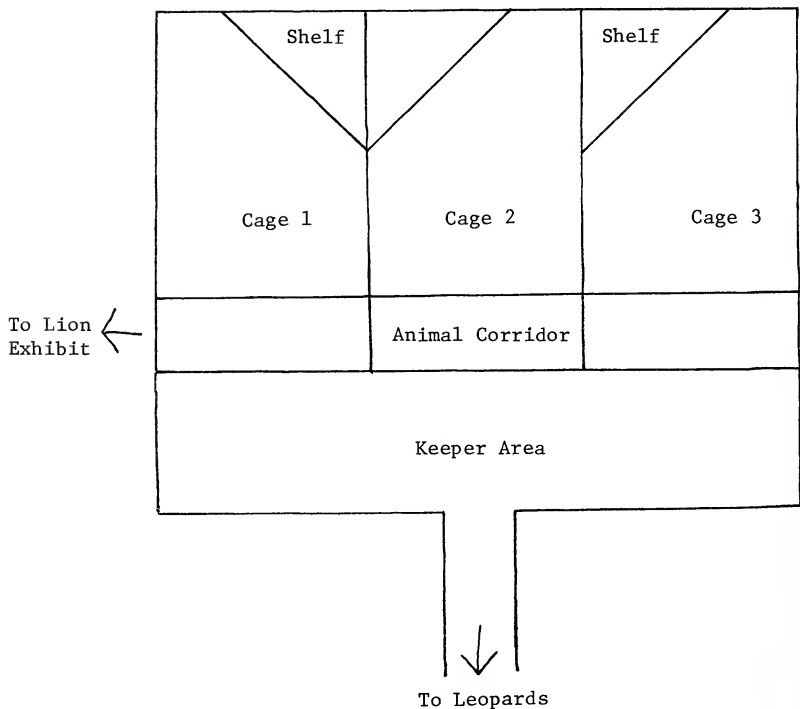
The order of introduction--from least aggressive to most aggressive--was not difficult to decide. First Bobo and Serpico, followed by Buffy and finally, Rosemary. However, correctly identifying the dominant and subordinate animals at any given time required close observation. For example, in the presence of estrus females, the usually content Bobo undergoes a Jekyll-and-Hyde transformation and becomes overzealous in his role as protector. Thus, reproductive status, age, sex, health and temperament all had to be considered before determining the order of introduction.

Lastly, by expecting the worst possible scenario and being prepared to intervene in the face of an all-out battle, we hoped to break up or at the very least distract fighting animals with water, noisemakers and the Cap-Chur rifle.[®]

The off-exhibit holding facility, called the Lion/Leopard Building, is ideally suited for introduction. The lions all transferred readily so

there was no problem getting them to move from cage to cage through the animal corridor. (See Diagram 1) To clean a cage the keeper must transfer the cat to an adjacent animal corridor space or empty cage. At first hostile attitudes were manifested by growling, biting the fence and pawing at the neighboring cat. Soon the duration and frequency of these bouts diminished with time. After 20 days of rearranging animals and assessing their reaction to one another, the two males (Bobo and Serpico) were placed together while still inside the building. Signs of possible acceptance were cheek rubbing and licking through the fence, increased interest in the stranger and an outwardly calm appearance. Much to our relief these two surgically-altered males quickly formed an attachment that continues to this day. They were the first to be given access to the outdoor compound and after 30 days of reigning supreme, a female was added.

Diagram 1: Simple outline of Lion/Leopard Building of the New Pittsburgh Zoo.



During encounters with other cats in the Lion/Leopard Building, Buffy was always very vocal and easily disturbed by the presence of others. Although superior to the neutered male in the use of teeth and claws she, too, was considered socially backward. The veterinarian decided to administer a mixture of Ketamine³ and Rompun⁴ using a blow dart. The dosage did not produce the desired effect and it was nearly 4 hours before she was alert enough to safely maneuver. Both males showed keen interest

ESTABLISHING A PRIDE OF LIONS AT THE NEW PITTSBURGH ZOO, Continued

in this female intruder but she managed to keep them at bay by taking the initiative in spats that lasted 60 seconds or less. An hour later the three cats were observed reclining within view of the public, but at some distance from each other. As time passed, this critical distance diminished to only a few feet.

For security purposes and for better management of the animal collection, all New Zoo inhabitants are locked up at night. Thus, an important part of their management involves training the animals to come into the building where they are rewarded with food. During his first sojourn into the new habitat, old Bobo wandered out of sight of the door, losing his only reference point. He actually became lost within the exhibit. Repeated calling of his name and banging the food trays enticed him to within visual distance and he was able to find his way inside. For the most part, the cats have been cooperative in responding to their "cue": the opening and closing of the exhibit's guillotine door. There were, however, several occasions when one or all refused to respond. After alerting the nightwatchman that the cats were out for the night, they were left to their own devices. The record for holding out goes to Buffy--4 consecutive nights out--and this occurred immediately after her introduction to the two males.

By the time opening day rolled around city officials and zoo visitors were presented with a safari-like view of 3 lions catnapping in the tall grass. With only one more lioness to be added, we breathed a sigh of relief and settled down to await the coming of spring when outdoor conditions would be more suitable for introductions.

Terms like dominant, aggressive, troublemaker, bitch and bossy have been used to describe the nature of Rosemary. This female would be the most difficult to assimilate into the group. Again, several options were discussed:

- 1) do nothing--let nature take its course
- 2) wait for estrus or induce estrus
- 3) administer a sedative
- 4) modify her behavior using progestins

The first option--to do nothing--was discarded because of a past incident between Rosemary and the neutered male. About a year after his arrival, Rosemary did serious damage to his rear foot and leg when she managed to grasp him through the bars of a transfer door. Although recovered from his wound, we feared that his inability to defend himself coupled with his lack of experience might result in further injury. To sit back and let nature take its course seemed unfair in this case.

The second alternative required that estrus be induced artificially since the heat cycles of older females are infrequent and unreliable. Experience has shown that females unwilling to accept strange animals into their presence undergo marked changes in attitude during estrus. Although an estrus condition would put Rosemary in a better mood, it might create havoc with the other members of the group. This idea was by-passed as too disruptive.

The third possibility, the use of a sedative, was disregarded because of the undesirable effect sedation had on the first female. We finally decided that an attempt to alter her mood through the use of progestins would be the best solution.

Progestins affect the activity of brain cells of an area of the midbrain responsible for self and species preservation. Thus, irritating behavior originating in this area can be altered with progestins. Megestrol acetate (Ovaban®) is a synthetic progesterone-like steroid sometimes used in veterinary behavioral therapy to produce changes in sexual behavior, appetite, thirst, sleep, activity and carbohydrate metabolism. Two weeks before Rosemary's expected date of introduction, Ovaban® therapy was initiated. The dose was 40 mg/day for seven days then 40 mg. every other day for a month. Since we are not equipped to clinically evaluate the course of treatment, we had to rely solely on the subjective observations of keepers.

Upon entering the exhibit, Rosemary was advanced upon by all three lions. She warned off her attackers with growling and swatting. If attacked from behind she defended herself by attacking the nearest animal, not necessarily the attacker. A favorite game of the neutered male is to bop unsuspecting lions on the head as they pass beneath a prime resting place. The neutered male seemed to be continually pressing his luck as he badgered Rosemary into fights. Most interactions lasted only a few minutes and the only injuries were simple scratches. Curiously, the vasectomized male never initiated fights but always took an avid interest in them, even coming to the defense of the neutered male. Today battle lines are drawn between the sexes as Rosemary and Buffy tend to take sides against Bobo and Serpico. Extreme care must still be taken when entering and exiting the exhibit due to the confined corridor.

The current status of tolerance and the continuously improving relationship within the group can be attributed to several factors:

- *the generous amount of time allowed by management to work with the animals
- *the intimate knowledge of animal personalities and preferences
- *the sometimes necessary though always reluctant use of drugs to induce behavioral changes.

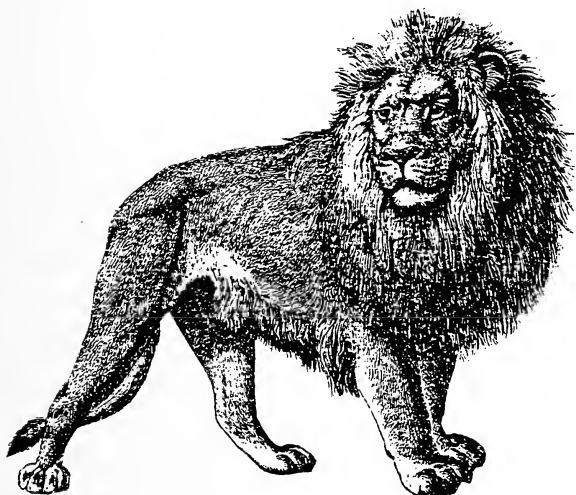
In conclusion, we had expected to measure success (or failure) in the amount of suture material and antibiotics used throughout this period. Since we fortunately did not require the services of a surgeon, one might conclude that we were somewhat successful in creating a pride of lions from four independent animals. To call this group of mismatched lions a true pride is giving a broad interpretation to the term. In captivity they cannot function as a wild pride because they cannot hunt together, freely select mates and reproduce. On the other hand, they are learning to live within their limited environment as a close-knit, compatible group and serve as the best example of lion society we can provide. Problems have cropped up that are most likely due to stress. For example, the night pacing of one of the females may be an outward manifestation of tension and boredom. The males' fondness for each other leaves females in heat frustrated and unattended. The advancing ages of key members of the group must surely affect the character of the pride.

Establishing a pride of lions has certainly benefited the staff and visitors. We have gained tremendous confidence in our ability to work with and manipulate the big cats. Keepers have learned to work as a team and have discovered renewed interest in their jobs. Visitors no longer complain about big cats stuffed into tiny cages. The animals are no longer set before them like a collection of china plates. Rather, visitors have the opportunity to view lions in a semi-natural setting interacting as they might in the wild.

Has the formation of the pride benefited the animals? Their eagerness to enter their exhibit each morning and the steadily improving relationships are the parameters by which we measure their acceptance of the situation. In time we expect to see further expressions of pride behavior and will continue to monitor the progress of the New Pittsburgh Zoo's pride of African lions.

NOTES:

1. International Brand Carnivore Diet®
2. Gerald Aquilina, Buffalo Zoo and Rick Heithaus, Cincinnati Zoo
3. Ketamine dose was 50 mg.
4. Rompun dose was 40 mg.



SLIDING DOOR NESTBOXES AT FRONT ROYAL

By
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Introduction

The importance of nestboxes as an element in the environment of captive animals cannot be overlooked. Martin (1975) states: "Appropriate cage furniture is one of the prerequisites for ensuring the general well-being of captive animals. Even species which do not habitually use nests may require special structures for resting in small enclosures. Nesting and resting facilities and other cage fittings are vitally important." Hediger (1950) concurs in his Wild Animals in Captivity: "Often the home is the only place in which the harmful states of tension due to captivity can, to some extent, die down and change into a harmonious mood, necessary for the animals' health. Often, too, many concessions are made to the visiting public of the zoological garden, at the expense of the home. During its life in the home, the animal sometimes withdraws from the public gaze. This cannot be helped, for many animals need periodic isolation."

Surprisingly, there is little discussion of this facet of captive animal management, either in conference proceedings or the scientific literature. Within the last fifteen years, more zoos are devoting their energies to off-exhibit breeding of threatened and endangered species. The purpose is usually to establish successful multiple generation captive breeding programs; turning zoos into producers, not consumers of wildlife.

This paper will detail four types of nestboxes utilized by the Small Mammal and Hoofstock units at the National Zoological Park's Conservation and Research Center. Various modifications to basic nestbox design have allowed the staff to work and handle animals while reducing the stress associated with the procedure. The nestboxes and their modifications have provided security to those animals using them, resulting in high levels of reproductive success and maternal rearing of young.

The nestboxes to be discussed are currently used for the Golden Lion Tamarin (Leontopithecus r. rosalia), Goeldi's Marmosets (Callimico goeldii), Binturongs (Arctictis binturong), Red Pandas (Ailurus fulgens), Clouded Leopards (Neofelis nebulosa) and Reeve's muntjac (Muntiacus reevesi).

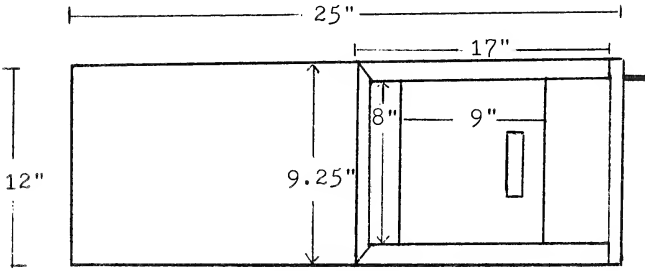
Tamarin/Marmoset Nestboxes

The nestbox design we use for the Golden Lion Tamarin and Goeldi's Marmosets is a multi-door rectangular box (Fig. 1). One-half-inch (2cm) thick plywood is used to construct the nestbox. The three sliding doors may be of wood or metal construction. The nestbox is mounted six feet (1.8m) off the floor on a side wall of the cage. Keyhole-shaped holes drilled into the back of each nestbox allow for rapid, yet secure, mounting to bolts sunk into the wall. Branches and vines in each enclosure surround the nestbox making it one of the focal points of the enclosure.

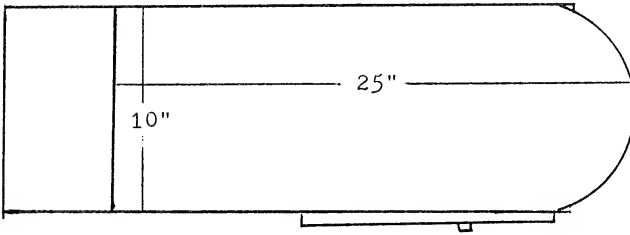
The three sliding doors are located at the front of the nestbox, on the top and on one side of the nestbox. The front door is mounted in a track made of wood strips. This track is 17 inches long and 9.25 inches high (43cm x 23.4cm). The door measures 9 inches long and 9.5 inches high (22.8cm x 21.5cm). A wood handle is secured to the door and the doors, wood and metal, have been perforated for ventilation.

SLIDING DOOR NESTBOXES AT FRONT ROYAL, *Continued*

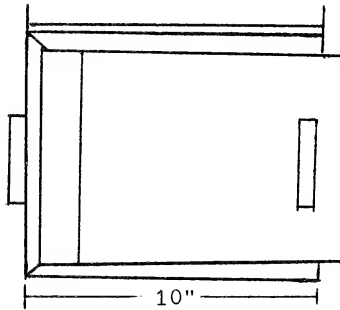
FIGURE 1



FRONT VIEW



TOP VIEW



SIDE VIEW

SLIDING DOOR NESTBOXES AT FRONT ROYAL, Continued

An identical door is built into the side of the nestbox at a right angle to the front door. On the top of the nestbox there is a track which allows a metal or plywood cover to move back and forth. This "door" measures 10 inches wide and 25 inches long (25.4cm x 63.5cm).

The nestbox itself measures 25 inches in length, 10 inches wide and 12 inches deep (63.5cm x 25.4cm x 30.4cm). The interior of the nestbox is undivided, allowing a great deal of space for the tamarin or marmoset groups.

Golden Lion Tamarins at CRC take great delight in the sliding capabilities of the doors on the nestboxes. Juvenile tamarins have been observed to enter the nestbox and shut themselves in or "hide" from their cagemates. Indeed, once the tamarins have eaten their afternoon diet the entire family group will retire to the nestbox and shut the door for the evening. On more than one occasion, keepers who are unfamiliar with this behavior have received a shock while making a late afternoon or evening check to find apparently no tamarins in the cage.

Female Golden Lion Tamarins often utilize the large area on top of the nestbox when they give birth. Aside from the feedboard, the nestbox provides the only flat surface in the enclosure other than the floor itself. Juvenile tamarins use the entire box as a playground, entering through the front door and exiting through the top. Often the keepers will observe a juvenile disappear into the nestbox then cautiously stick its head out the top of the nestbox to observe its cagemates.

While providing the tamarins and marmosets with a "safe" or "home" area in the enclosure; the nestboxes provide the staff with an important management tool. When an animal needs to be restrained for medical treatment, identification or transfer, we use their natural inclination to enter the nestbox as a means of reducing the stress associated with the procedure.

Instead of spending long periods in attempts to net individuals, with an increased risk of injury to the animal, we attempt to trap them in the nestbox. Once an individual tamarin/marmoset, or as many as two or three enter the nestbox, the keepers will close the doors securely. The nestbox can be removed from the wall. This procedure allows us to weigh the animals if necessary, first weighing the animal and the nestbox, then only the nestbox and subtracting the difference for the weight of the animal. If the animal is to be moved or shipped out, a shipping crate can be placed directly in front of one of the doors. Then using a small net and sliding the nestbox top back along its track, the animal can be transferred into the shipping crate; usually with no handling by the keeper.

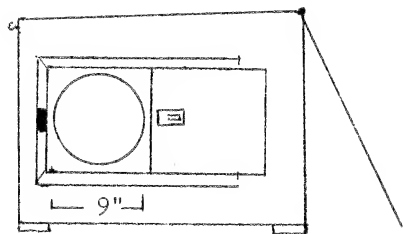
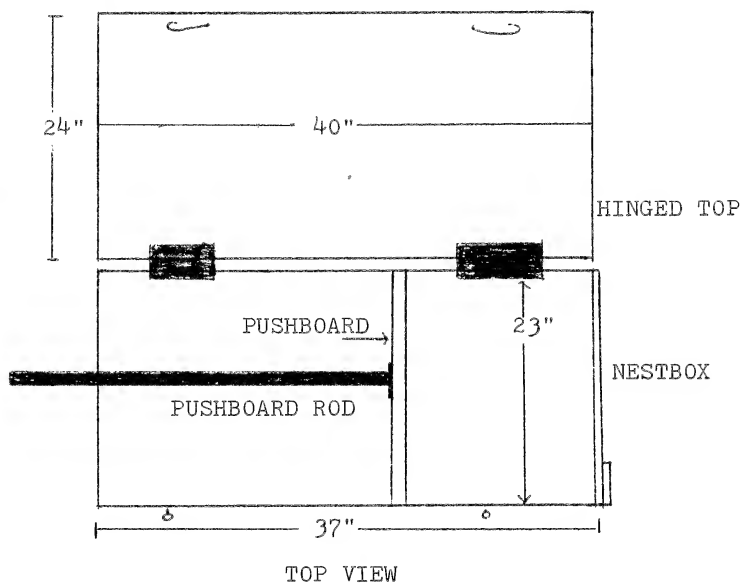
Finally if the animal must be netted for a physical examination we will use the above procedure except that a second net is placed in front of the opened nestbox door. Once the animal is forced out of the nestbox into the net, it can be physically restrained.

After six years at CRC it has been proven to me that our tamarins are stressed less if the procedure involved catching them in the nestbox; as opposed to simply trying to net them in the enclosure. At the same time, the tamarins do not become box-shy due to being caught in them.

Binturongs and Pandas

The nestbox design (Fig. 2a, b,c) we use for binturongs and red pandas

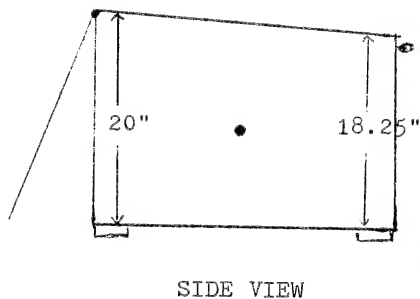
FIGURE 2a



ENTRANCE HOLE/SLIDING DOOR

FIGURE 2b

FIGURE 2c



SLIDING DOOR NESTBOXES AT FRONT ROYAL, Continued

has undergone the most modification of any nestbox used at CRC. From a basic unit, constructed for shelter and hay storage, it has been modified to accomplish several specific management objectives.

This nestbox is constructed using one-half-inch (0.1cm) plywood. It is 37 inches long and 23 inches wide (94cm x 58cm). The side panels are 20 inches at the back of the nestbox and slope down to 18.25 inches high in the front (50.8cm x 46cm). The nestbox cover is hinged at the back; it measures 40 inches long and 24 inches wide (101cm x 61cm). Eye hooks allow the top to be secured when necessary. One side panel has a nine-inch diameter hole cut in it as an entrance. The interior of the nestbox is a single large compartment; metal or wood "feet" on the bottom four corners allow us to hose under the nestboxes without it rotting out the bottoms.

Our first modification of this nestbox was to put a track and door over the entrance hole (Fig. 2b). A hinged clasp on the door enables us to secure this sliding door; when combined with the secured nestbox top, the nestbox can function as a catch cage. This allows us to move the animal in the nestbox or weigh the animal in the nestbox and then release it. Another handy use is allowing an animal to recover from anesthesia in a secured nestbox. When there is a shortage of sky kennels or unanesthetized animals are in the same enclosure this nestbox modification is a big help. We will also use these nestboxes to shut in animals we are not planning to work on; thereby reducing the number of animals stressed by the procedure. The nestboxes are even used to feed animals in when they are intimidated by cagemates. Instead of having keepers stay in an enclosure to insure that each animal eats only its food, a subordinate animal can be fed in a nestbox and left there until it is finished eating.

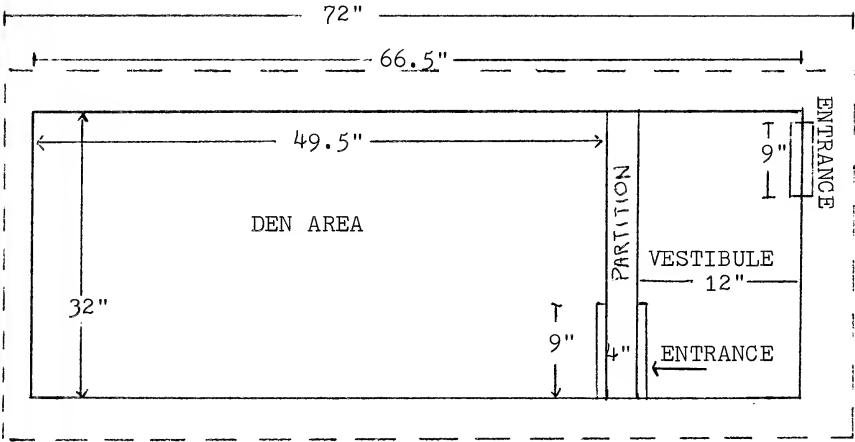
With our binturong in particular we realized that another modification to the basic nestbox design would aid us in crating procedures. Our binturongs are very willing to enter a nestbox for a banana reward. Once in the nestbox, however, they were reluctant to leave it to enter a sky kennel. Our modification in this instance was to make a hole in the side panel opposite the entrance hole (Fig 2a, c). This hole was only large enough to allow a threaded metal rod to pass through it into the nestbox. Inside the nestbox we placed a cut-to-fit plywood press board with a receptacle for the threaded rod. Once a binturong is shut in the nestbox, we are able to put a sky kennel in front of the nestbox entrance, open the sliding door, then literally push the binturong out of the nestbox and into the sky kennel. The push board is designed to be flexible. When it is needed it is put in the nestbox. When not needed it is removed and stored. The staff at CRC has benefited from these nestbox modifications as have the animals we use them with.

This squeeze nestbox is also useful at CRC for crating our red pandas. In our red panda enclosure the nestbox is used for hay storage, as the receptacle for gruel and fruit bowl, for sleeping in by the adults and as dens for females with cubs. Additional modifications have been made on a one-time basis to some of the nestboxes. To provide air circulation in one nestbox, holes were drilled in all sides of it; our "swiss cheese" nestbox. Another had been fitted with a red plexiglass top for observational purposes.

A larger nestbox (Fig 3), for use in the outside corncrib cages, has been used for both binturongs and red pandas. The dimensions for this nestbox are 66.5 inches long, 36 inches wide and 24.5 inches high to 19 inches high rear to front respectively (169cm x 91cm x 61.2 cm x 48.2cm). The

SLIDING DOOR NESTBOXES AT FRONT ROYAL, *Continued*

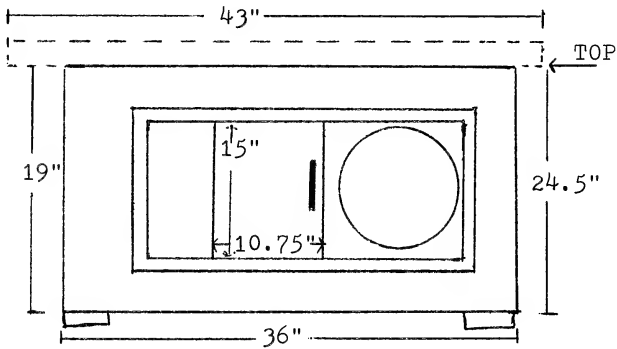
FIGURE 3a



DOTTED LINE=OVERHANGING LID

TOP VIEW

FIGURE 3b



SIDE VIEW

SLIDING DOOR NESTBOXES AT FRONT ROYAL, Continued

overlapping hinged roof measures 72 inches long and 43 inches wide (182cm by 109cm). The inside of the nestbox is divided into a small vestibule area and a large den area. The outside entrance and the den entrance are offset to maintain a higher internal temperature. Both entrance holes measure 9 inches (22cm) in diameter. The vestibule dimensions are 12 inches long, 32 inches wide and 19 inches deep (30cm x 81cm x 48cm). The den measures 49.5 inches long, 32 inches wide and 19 inches deep (125cm x 81cm x 48cm). Again the outside entrance to the nestbox is fitted with a sliding door on a metal track. The dimensions of the door being 10.75 inches wide by 15 inches high (27cm x 38cm). The door is metal, and has a clip which will secure the door when it is shut. It is also enclosed in a track on the nestbox side panel. This nestbox is insulated, providing greater warmth during the Virginia winter. The exterior is painted a dark brown to absorb solar radiation. The interior construction is 4-inch (7.5cm) plywood on the baffle as well as all three exterior walls, the roof and floor.

Leopard Nestboxes

For our four breeding pairs of Clouded Leopards we have constructed large 62.25 inches high, 36 inches wide, 32.5 inches deep (158cm x 91cm x 82.5cm) plywood nestboxes (Fig 4a,b,c,) with video monitoring capabilities. One side of the nestbox has an entrance hole 10 inches (24.5cm) in diameter (Fig. 4a). The hole is flanked by metal tracks 36 inches (91cm) long which hold a 12 inch wide, 17.5 inch long (30cm x 44cm) sheet metal door in place. Cable attached to this door runs out of the enclosure to the keeper area. When a female with cubs is using this nestbox, the keeper can quickly and easily slide the door shut, proceed with cleaning the cage, putting in fresh food and water then reopening the nestbox for the female once the keeper has exited the cage.

The other side of the nestbox is fitted with a 24-inch by 24-inch (60cm x 60cm) hatch door (Fig. 4b). This door is hinged at the top and secures at the bottom with butterfly closures. The top of the nestbox (39.75 inches long x 32.5 inches wide [100cm x 82cm]) is hinged at the back and has eyehooks at the front to secure it to the nestbox. For these nestboxes we have attached 6-inch (15cm) "lips" of 0.5 inch (0.1cm) plywood on all sides of the top not adjacent to the enclosure wall. This is a precaution in case the female moves any of her cubs on top of the nestbox. The adult leopards take advantage of this lip to hide behind if suddenly surprised by unknown visitors.

The bottom and sides of the nestbox have plywood skirts attached so that exploring cubs, upon leaving the nestbox, do not trap themselves behind or underneath the nestbox. These nestboxes also stand on wood feet to prevent rotting when the cage is hosed out.

The inside height of the nestbox, available to the leopard, is actually 46.25 inches (117cm). The remaining 18 inches (46cm) is for video camera and microphone hookups as well as the incandescent and fluorescent light fixtures necessary for the video monitoring. Cables for the monitor and lights run through metal conduit into the back of the nestbox. Directly below the monitor and lights is wire mesh screen (mesh dimensions; 1 inch x 1/2 inch weldmesh), placed there to prevent the female from damaging the equipment or breaking any of the lights. A small square is cut through the wire for the camera lens. Among the other behavior we have observed on the monitor is the fact that when we shut the female and cubs into the nestbox by using the sliding door and then clean the cage; the female remains remarkably calm. Usually nursing or grooming will continue, the female ignoring the keeper cleaning the cage.

SLIDING DOOR NESTBOXES AT FRONT ROYAL, *Continued*

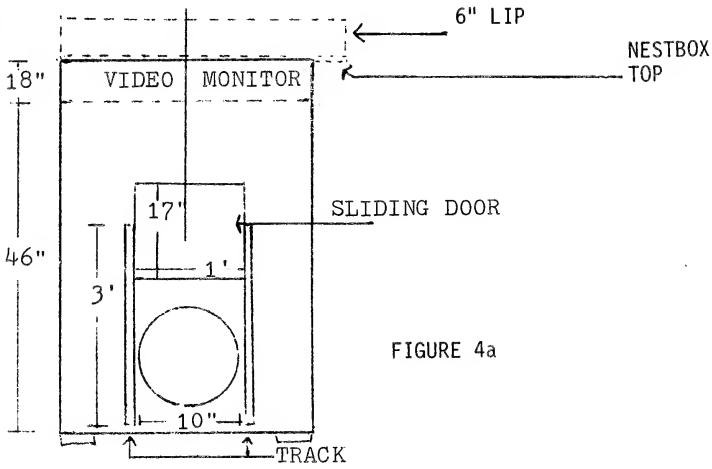


FIGURE 4a

ENTRANCE HOLE SIDE

FIGURE 4b

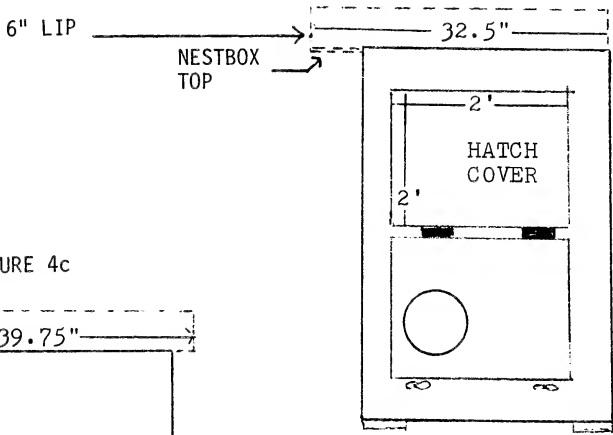
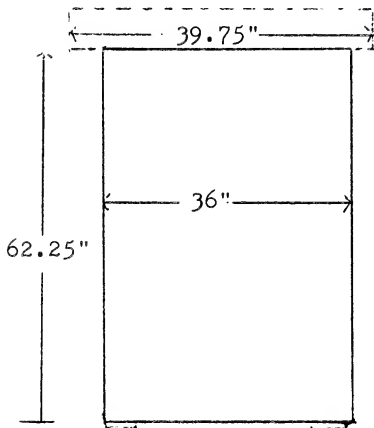


FIGURE 4c

HATCH COVER SIDE



FRONT VIEW

SLIDING DOOR NESTBOXES AT FRONT ROYAL, *Continued*

During the year, when the female is not rearing a litter, all doors on the nestbox remain open so the leopards cannot hide there during the cleaning. Additionally, when females have litters, a smaller nestbox of the biturong/red panda design is put in the cage for the leopard as an alternative nest site.

Muntjac Nestboxes

The houses used at CRC for Reeve's Muntjac basically are enlarged nestboxes (Fig. 5). The muntjac yards are chainlink enclosures with one or two houses per yard. Each house has a single entrance through the chainlink and this entrance has a rope operated sliding door on it. In all, the house has three, 12-inch by 18-inch (30cm x 45cm) sliding doors, all rope operated; the other two are located at the entrance to the den area and at the keeper service area. The nestbox dimensions are 8 feet long, 4 feet wide and 4 feet high (2.7m x 1.4m x 1.4m). The interior of the nestbox is divided into a vestibule area and a den. The vestibule is 2 feet long by 4 feet wide (0.6m x 1.4m), the den area being 5.5 feet long by 4 feet wide (1.9m x 1.4m). The hinged top, with eye hooks at the front for securing, has a ventilator unit mounted in it for air circulation in the summer months.

Ceiling-mounted heat lamps provide supplemental warmth during colder months. They are thermostatically controlled and are set to turn on when the ambient temperature fall to 40°F. With the arrangement of the sliding doors, the animals can be shut in the den area or in the vestibule area, either in the nestbox or out of the nestbox. Pelleted feed for the muntjac is put in the vestibule area to accustom the animals to entering the nestbox. The service area side of the nestbox's den area has a 3-foot high by 2-foot wide (1.0m x 0.6m) hinged door. This door is secured with butterfly closures. This door is used to check on pregnant females or females with fawns when they are in the house. Additionally it is used for servicing the nestbox or changing bedding.

As with all other species previously mentioned, the muntjacs utilize the nestboxes extensively. During routine rounds most muntjac are frightened out of the nestboxes when they hear the keeper coming. The females in particular will use the nestboxes for birthing. Many females choose to give birth in the nestbox which makes the keepers' job easier. Females can be shut out of the den area when keepers check and treat the newborn fawns.

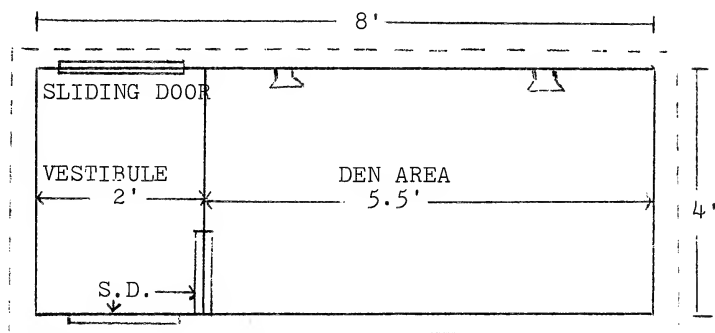
The fact that the muntjac are fed in the vestibule also allows keepers to isolate and examine individuals when necessary.

Discussion

I hope to have demonstrated, through the previous examples, that nestboxes in zoological gardens can be utilized for more than rest and shelter. With slight modifications a nestbox can become an important management tool in the maintenance of exotic wildlife. Almost every account in Crandall (1964) mentions nestboxes and their importance: "Sleeping boxes," he states, "are essential for the well-being of marmosets." Brood boxes are mentioned in red panda enclosures, shallow, open-topped nestboxes for binturongs and unheated shelters for Reeve's muntjac.

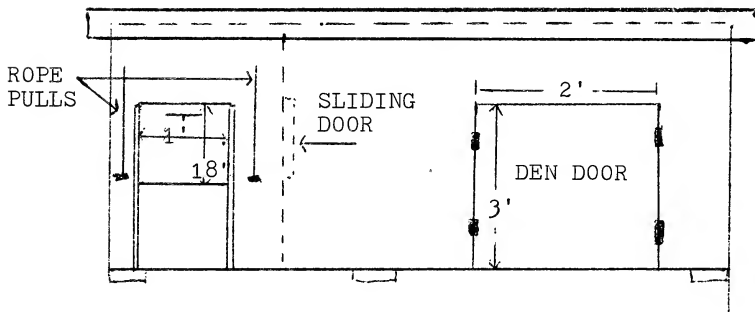
The modifications discussed in this paper have aided the CRC staff in weighing, moving, restraining, transferring to shipping crates or separating animals of the species discussed. With regards to the binturong,

SLIDING DOOR NESTBOXES AT FRONT ROYAL, *Continued*



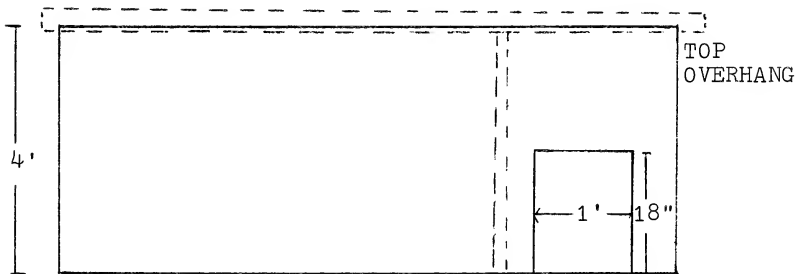
TOP VIEW

FIGURE 5



SERVICE AREA VIEW

FIGURE 5



ENCLOSURE VIEW

FIGURE 5

SLIDING DOOR NESTBOXES AT FRONT ROYAL, Continued

red pandas and muntjacs the nestboxes also become associated with food rewards, easing the animals' acceptance of the nestbox.

In regards to reproductive success, I believe our nestboxes have contributed to a high level of success. With each of the species discussed in this paper, females have chosen to give birth either in or on the nestboxes instead of somewhere else in the enclosure. In most instances other birthing locations have been available---if they were nestboards, hollow logs, feedboards or tall grass areas; still the females chose the nestboxes in which to give birth.

Both of these aspects, reproductive success and ease of handling, have occurred with less stress experienced by the animal in question. The reduction in stress still allows the species to feel comfortable in the nestbox, while knowing they may be restrained or moved from the nestbox if necessary.

For zoological gardens, whose major goal is the exhibition of exotic wildlife, nestboxes in enclosures may not seem such a good idea. However, the well-being of each animal, how it reacts to the other animals in the enclosure, the keepers and the public, may improve with the addition of nestboxes. The obvious advantage is for those zoos with off-exhibit breeding areas, or major zoological breeding centers throughout the world.

Acknowledgements

Many thanks to Larry Collins, Mammologist, and Arthur Cooper, Animal Unit Foreman, for their review of and comments on the manuscript. I am indebted to Rebecca Conway for manuscript preparation.

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DEATH OF AN ALPHA GUINEA BABOON:
(Paipo papio)
THE EFFECT ON THE OFFSPRING

By
Lynne Villers, Keeper
Indianapolis Zoo, Indianapolis, IN

Introduction

Discussions of the effects of mother loss to an infant are not new to the scientific community. Some have dealt with a temporary separation of infants being less than one year old from their mother in a captive situation (Hinde and Spencer-Booth 1971 - Dolhinow and Murphy 1983). Others have looked into the effects of orphaning on infants. Orphaning case studies have been described in the field (Altmann 1980 - Mohnot 1980) with general concensus that infants under one year of age have an extremely poor chance of survival. However, what if the individual(s) are over one year? How are the offspring of different ages affected by the death? Also what if the mother is of a high social status at the time of her death?

These questions had an opportunity to be addresses when the alpha female in a troop of Guinea Baboons (Papio papio) died at the Indianapolis Zoo.

Background

Before discussing the effect the mother's death had on the offspring, it is important to know the type of environment that existed, and if the individual offspring were developing normally prior to this death. Table 1 lists the individuals that were present in the troop at the time this study was conducted. Included are the adult male and female ranks, offspring, birthdates and social unit grouping. The alpha female had no apparent problem in maintaining her ranking the two years she lived at the Indianapolis Zoo.

A long-term study on infant interaction was started two years prior to the alpha female's death and is still in progress. The purpose of this study it to document the interaction of the infant to its mothers, peers, siblings, adult males, adult females, juveniles and infants, as well as their interactions to the infant. Physical developments are also documented. A target animal is observed from birth to two years of age. Data is recorded at least twice a week in 10-minute timings per individual per session. Besides the data on the target individual, the date, time, weather conditions and casual observations on other members of the troop (esrtous cycling, breeding, spats, unusual events, etc.) are also noted. Data from the infant interaction study was incorporated in this study. Therefore, the three surviving offspring had data and/or casual observations on them recorded prior to and after the death of their mother.

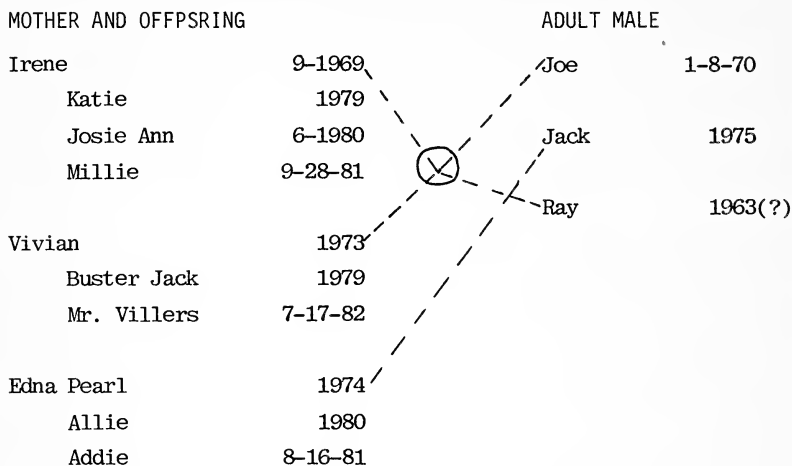
Grapha 1-A to 1-H indicates the percentage of time the average infant within the troop and Millie, alpha female's youngest daughter, spent in proximity to the other members of the troop. Proximity is defined here as any member of the troop that comes within three feet of the target animal. Proximity does not define the type of interaction that might have occurred.

The youngest daughter appears to have developed normally from birth to one year of age (Graph 1-A to 1-H) (Altmann 1980, DeVores 1965, Villers 1982). The middle daughter also appeared to have developed normally (Altmann 1980, DeVore 1965, Villers 1981, 1982). Casual observations on

DEATH OF AN ALPHA GUINEA BABOON: THE EFFECTS ON THE OFFSPRING, Cont'd

TABLE 1 TROOP RELATIONSHIPS AND BIRTHDATES

(Prior to death of alpha female)



Adult males and females listed according to social rank within the troop.

----- Signifies the social units within the troop (2)

the oldest daughter seem to indicate that she also had developed normally. Since the oldest daughter was approaching two years of age at the time that the troop arrived at the Indianapolis Zoo, she was not included in the infant interaction study.

Immediate Effects

On the morning of 30 September, 1982, Irene (the alpha female) was found dead in the night quarters; the apparent result of complications during labor. At the time of her death, Katie was approximately 3½ months old; Josie Ann 2 years, four months; and Millie, 12 months. The morning of Irene's death, Millie remained close to her mother and attempted to groom her. Josie Ann and Katie remained on the opposite side of the quarters scattered amongst the other troop members. However, the adult females remained on the same side of the quarters as Irene's body, but not near it. Attempts to move the entire troop to the opposite side of the quarters in order to remove Irene's body failed. At that point the entire troop was let out into the outside yard. The two older sisters dashed out with the others, and the youngest was the last out. Joe, the alpha male, and the three sisters were the first ones into the watch-point, a recess in the back wall of the exhibit which allows the baboons a clear view of the night house. Much barking and screaming was heard from the troop.

DEATH OF AN ALPHA GUINEA BABOON: THE EFFECTS ON THE OFFSPRING, Cont'd

When Irene's covered body was removed from the night quarters the troop went into hysterics. Millie and Katie tried to keep up with Joe, who was running along the exhibit line. Josie Ann, on the other hand, hung back. Millie kept following Joe around during the early morning hours, basically going back and forth between the watch-point and the access door of the house. The sub-troop also did the same thing, but not with Joe and Millie. Any noise from the backside of the exhibit agitated the entire group, causing them to dash over and investigate. Josie Ann kept trying to solicit the 2½ month old infant of the beta female. When that female began to threaten her, Josie Ann solicited for help. Katie came over and the beta female immediately submitted. Katie also had the sub-troop female and her oldest daughter submit to her when they tried to grab the beta female's infant. Katie protected the beta female and her infant.

Millie, the youngest sister, attempted to cling ventral-ventral to Katie and Josie Ann for only a few seconds. Josie Ann and Katie showed no interest in Millie, being generally indifferent to her.

When fed their morning diet less than two hours after the removal of Irene's body, Josie Ann came over with the other troop members and ate immediately. Millie came over later. Joe, the alpha male; Katie, the oldest sister; and the beta female were the last to come over and eat.

When I went into their night quarters to clean, Joe sat in the watch-point facing the quarters. Millie and Katie later joined him. They were agitated, but not to the extent that they were when they first sat there. Josie Ann was not in view.

By late morning the same activities as described above were occurring--the pacing, vocalizing, etc., but they were more subtle.

During the afternoon hours the troop settled down. Millie stayed near Joe, Josie Ann remained by herself, and Katie went back and forth between the beta female with her infant and the alpha male, Joe. There was some playing between the youngsters, but it was short in duration and reduced in frequency. Generally, there was an underlying sense of confusion and awkwardness.

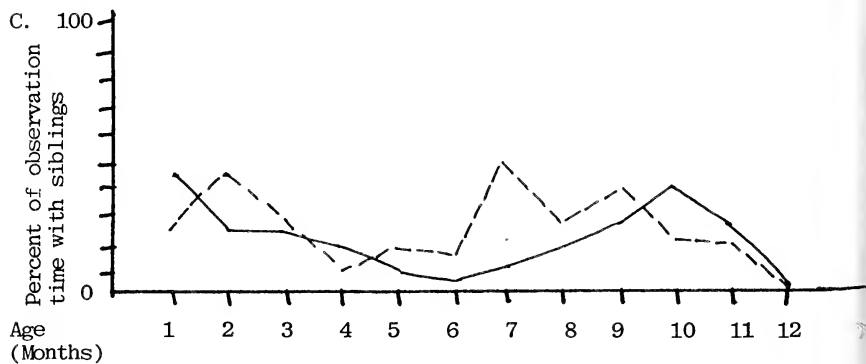
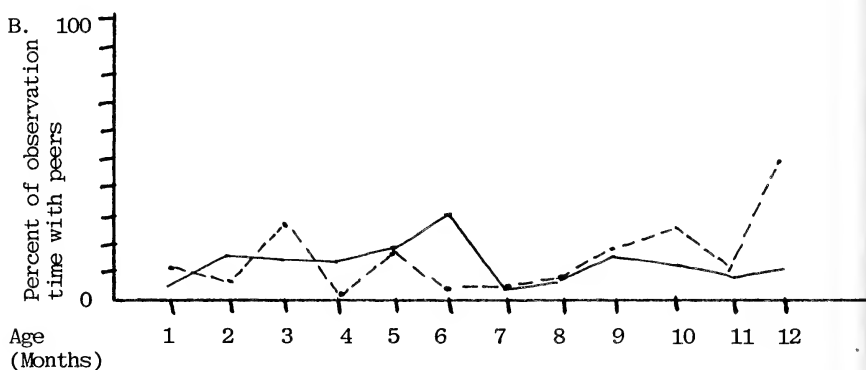
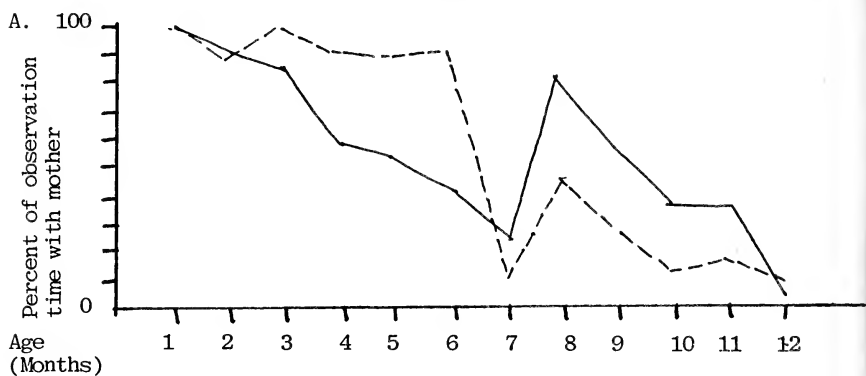
Millie didn't come in that evening when the troop was fed and locked in their house for the night. Millie at this time had still been riding in on her mother. The troop, therefore, had access to their inside quarters and the outside yard that evening. Millie finally came in and ate on her own. Only Joe and Katie showed any visible apprehension about going in to eat, and once again were the last ones to start eating. The three sisters slept scattered that night.

The next day, 1 October, general troop activity seemed more normal, except for two sisters. Josie Ann stayed on the periphery of the exhibit, spending most of the time by herself. Millie stayed near Joe. Neither sister played much with the other youngsters in the troop. That evening at feeding time Millie came into the night quarters on her own.

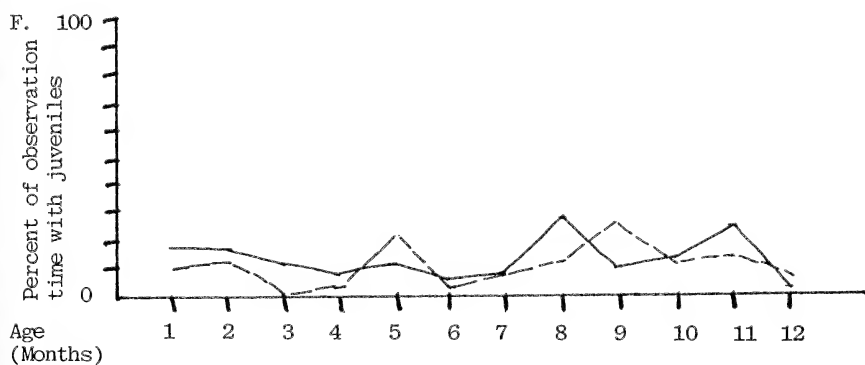
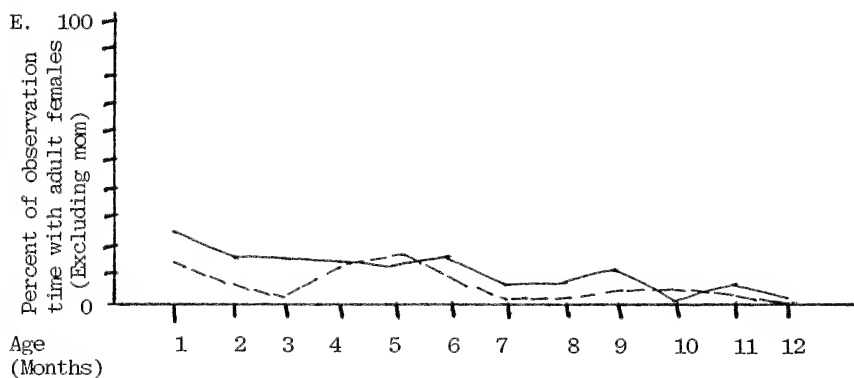
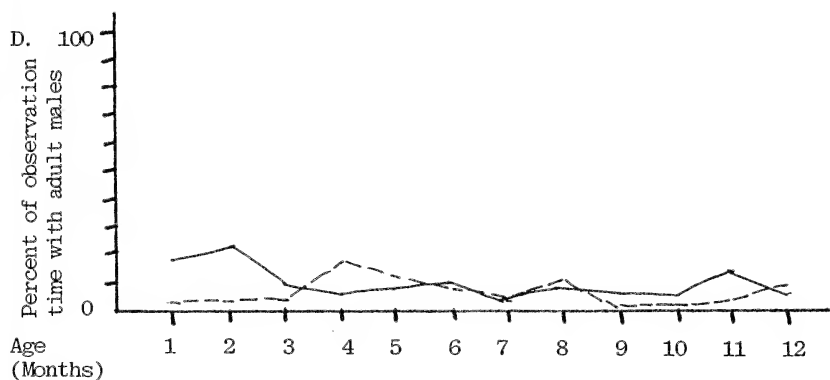
Long-Term Results

A discussion of the long-term impact of Irene's death on her offspring will cover the subsequent seven months. This is because in the eighth month after the alpha female's death, the alpha male, Joe, died.

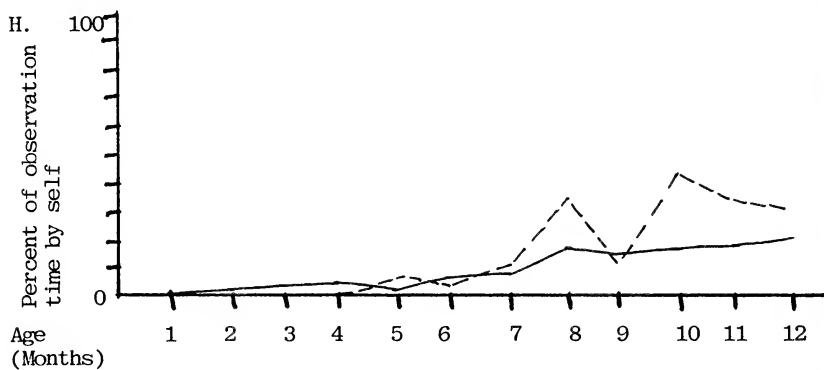
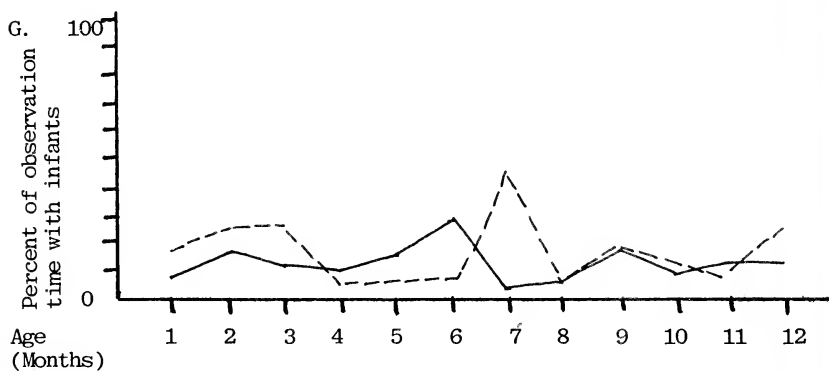
GRAPH 1 PROXIMITY OF TROOP MEMBERS TO AVERAGE INFANT AND MILLIE



DEATH OF AN ALPHA GUINEA BABOON: THE EFFECTS ON THE OFFSPRING, *Cont'd*



DEATH OF AN ALPHA GUINEA BABOON: THE EFFECTS ON THE OFFSPRING, *Cont'd*



_____ Average Infant n=5 from birth to 5 months
 n=4 from 6 to 7 months
 n=2 from 8 to 12 months
 - - - - - Millie - youngest daughter

Katie, the oldest sister, was able to retain her mother's alpha ranking until the end of October, the first month after Irene's death. One day the sub-troop female, who was in estrus, began to challenge Katie. Katie began to seek out the beta female when this sub-troop female would approach. The following day the sub-troop female returned to her sub-troop, while the youngsters of the troop had fights all that day. This was especially true of Katie and the beta female's oldest son, Buster Jack. At this point, the beta female, Vivian, began to exert her dominance over Katie.

Katie had begun kidnapping Vivian's infant three weeks prior to Irene's death. One week after Irene's death she stopped kidnapping the infant (she kidnapped the infant only one more time one month later).

The next month, November, Katie stayed near the alpha male Joe. Also during this month the new alpha female, Vivian, and Joe began to interact more. Both Josie Ann, the middle sister, and Katie attempted to fit into this social unit. Josie Ann and Katie, along with Buster Jack, would prevent Millie from getting near Vivian's infant, Mr. Villers. Vivian joined in this activity one month later in December. At that point, Vivian, Buster Jack, Katie and Josie Ann functioned more as a cohesive unit, even to the point of ganging up on the alpha male Joe. Katie began sleeping with Vivian.

During the 4th month, January, Katie began protecting Millie from Josie Ann when their play got too rough. Katie also began to groom Millie. In February, the 5th month, Millie started to groom Katie. However, during the 7th month (April), Katie was more aggressive towards Josie Ann, Millie and the sub-troop female's oldest daughter and she had spats with that female and with Buster Jack. She also had a tendency to stay near Joe. Katie was pregnant and in her second trimester at the time.

For Josie Ann, the middle sister, during the first month following the alpha female's death, she played mostly with Millie, the youngest sister. Whereas prior to this, Josie Ann was more gregarious with other youngsters in the troop, especially with the youngest daughter of the sub-troop female. When not with Millie, Josie Ann remained by herself. She also briefly began to kidnap Mr. Villers, Vivian's infant, during this month.

During November, as stated earlier, Josie Ann joined Katie, Buster Jack and Vivian in preventing Millie from grabbing Mr. Villers. This same type of interaction also occurred the following month. Josie Ann also showed a marked increase in interest in Mr. Villers. She would retrieve Mr. Villers and return him to his mother Vivian. Josie Ann became more of a member of Vivian's social unit during December. Vivian, now the alpha female, began disciplining Josie Ann. Josie Ann increased her play with the youngest daughter of the sub-troop's female, while Millie would stay on the periphery of it. However, Josie Ann increased her grooming behavior towards Millie.

The following month of January, Katie began disciplining Josie Ann when play with Millie would get out-of-hand. When the youngest daughter of the sub-troop female and Millie would be near each other, Josie Ann would initiate play with the other female and not Millie. Josie Ann remained in Vivian's social unit.

February showed an increase in cohesion between the three sisters. Millie increased her grooming of Josie Ann and Katie, while Josie Ann started supporting Millie during rough play with the other youngsters. The increase in bonding between the three sisters was also seen during the 6th month, March.

Even though during April Katie had a low tolerance for Josie Ann, Vivian would support Josie Ann with the sub-troop females.

For Millie, changes in proximity to other individuals is shown in Graphs 2-A through 2-G. Again an average was taken from individuals with living mothers within the troop at the respected ages. While at times the graphs appear to show Millie, the youngest sister, following within the normal range, the graphs do not show the type of interactions that occurred. These interactions were markedly different after Irene's death. Prior to the first month after Irene's death, Millie spent periods of time in play with a number of her peers. After Irene's death her play consisted of very short bouts mostly with her favorite playmate, the youngest daughter of the sub-troop female. Millie stayed on the periphery of most play bouts, being near the individuals, but not engaged in play herself. It wasn't until March (6th month) that she began to really initiate play again.

With her siblings there was a steady increase in proximity (Graph 2-C). The first month was a generally apathetic reaction to Millie by Josie Ann and Katie. However, when interactions occurred during the following month of November, they were not on the positive side. She was prevented access to Vivian's infant by Katie, Josie Ann and Buster Jack and the following month by Vivian. Yet gradually Millie began grooming Josie Ann, and in January (4th month) Katie protected Millie from rough play with Josie Ann. During the 6th month (March), Josie Ann began coming to Millie's aid with rough play. At this time, it appeared that the bonds between her and her sisters were reforming even though Katie became testy with her and Josie Ann the following month, April. At this time, Millie started going to Josie Ann when she was startled by spats and upset.

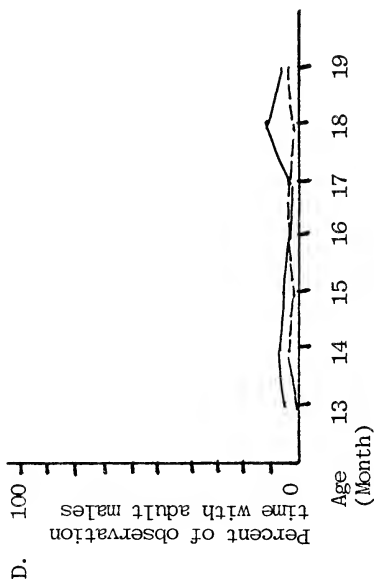
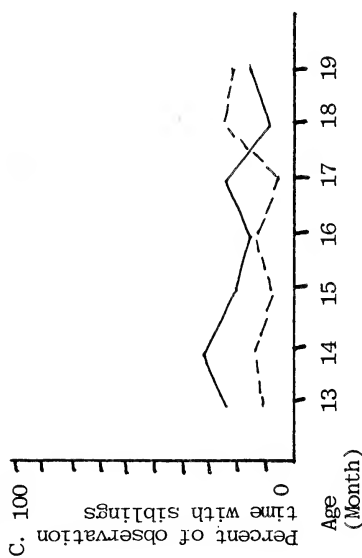
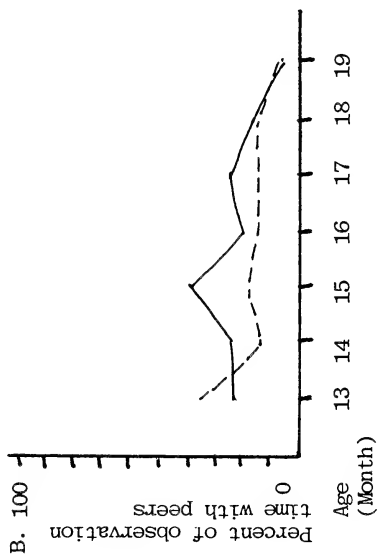
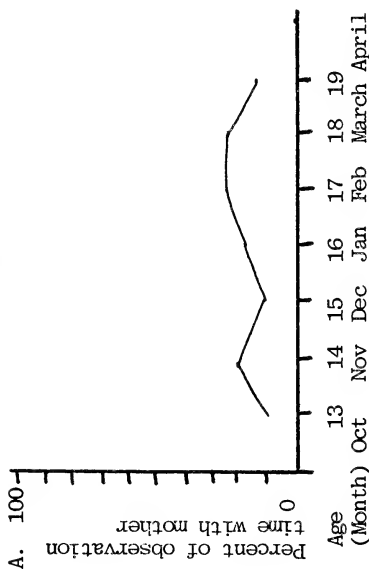
Even though her proximity to adult males was very low (Graph 2-D), her interaction was almost entirely with the alpha male, Joe. Of all the adult males in the troop, Millie had the closest bond with Joe. This has also been seen in the field (Altmann 1980). Until the time that Millie would go to Josie Ann when upset, she went to Joe.

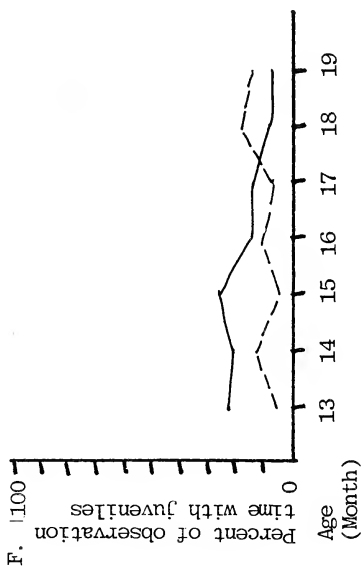
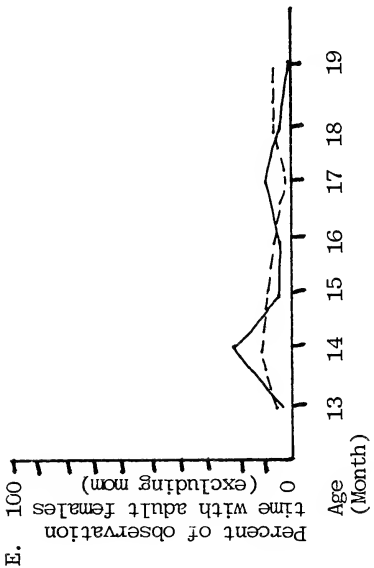
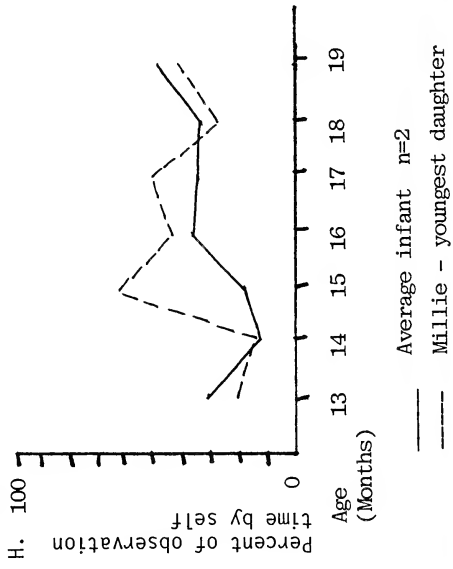
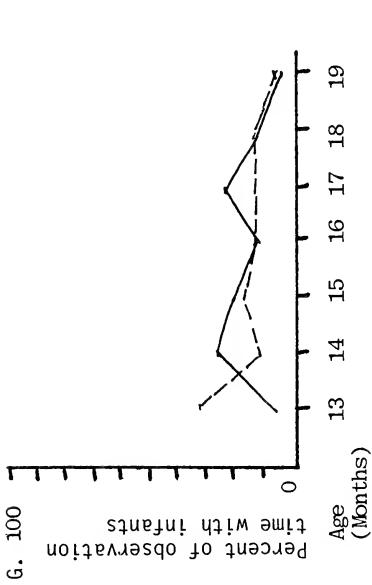
With the adult females she also mainly interacted only with one, Vivian. Prior to the 4th month, January, Millie would come near but generally would not interact with Vivian. After January, however, when Millie had more direct contact with Josie Ann and Katie, who were near Vivian, Vivian began disciplining Millie.

Basically with the juveniles of the troop, when proximity occurred (Graph 2-F) it was on a one-to-one basis. Proximity to infants waned after the first two months and then remained fairly level (Graph 2-G).

The time Millie spent by herself has changed dramatically (Graph 2-H). During October and November, even though her interactions with others had changed, she was still near others. The 3rd month (December) showed the largest increase. This may be partially due to the fact that it was December. During the winter months, infants will increase the time spent with their mothers. It gradually decreased to the 6th month (March). Millie never really slept with anyone during the seven-month period and was, and still is, the last one to exit the house when the troop is put outside.

GRAPH 2 PROXIMITY OF TROOP MEMBERS TO AVERAGE INFANT AND MILLIE





Conclusion

There is definitely an immediate effect on the offspring to a mother's death, and there is a definite long-term impact as well. The immediate effect of Irene's death was anticipated--an increase in distress, agitation, vocalization and aggression. Also a decrease in play and decrease in general interaction was expected.

Even temporary separation from the mother can have long-term effects on the infant (Hinde and Spencer-Booth 1971). But it appears that the older the offspring the less severe the effect. After losing the alpha ranking, Katie got herself into another social unit more quickly than Josie Ann and Josie Ann more quickly than Millie, who never fit in as well.

After Irene's death the cohesion between the sisters was totally gone. It wasn't until four months later that the bonds were being reformed and even so, it never reached any form of a separate social unit.

Besides the loss of cohesion, they also lost their social status. Katie, Josie Ann and the Millie were the lowest ranking females, which is still true at the time this paper was written.

It was hoped that the three surviving offspring would have increased the bond between them and not have it totally dissolve. Also the hope was that the youngest sister would have been adopted by her older sisters. However, that was never realized.

Further research needs to be conducted along the lines of documenting long-term impact of a mother's death on the offspring, especially when the offspring in baboons are over one year of age.

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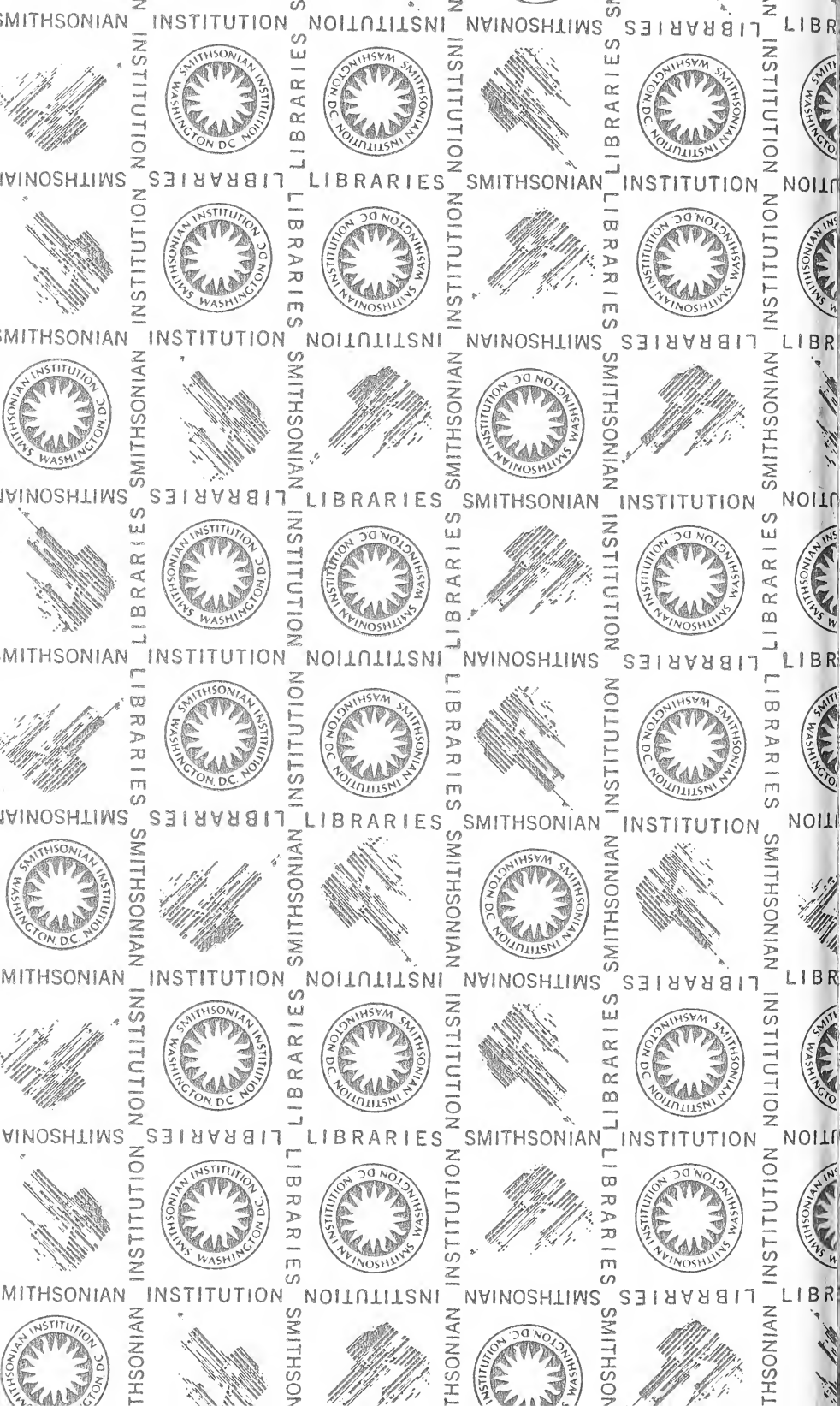
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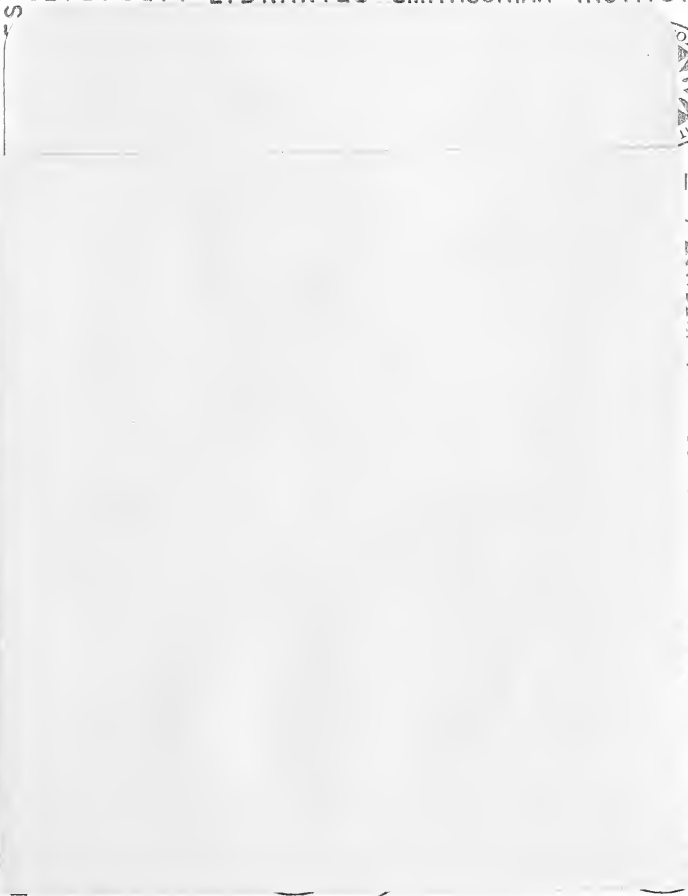


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