

THE VIVARIUM

American Federation of Herpetoculturists Vol. 6 No. 1 \$5.95

Anacondas
Rain Chambers
Herping in Australia
African Rock Pythons

Breeding Monitors

Careers in Herpetology



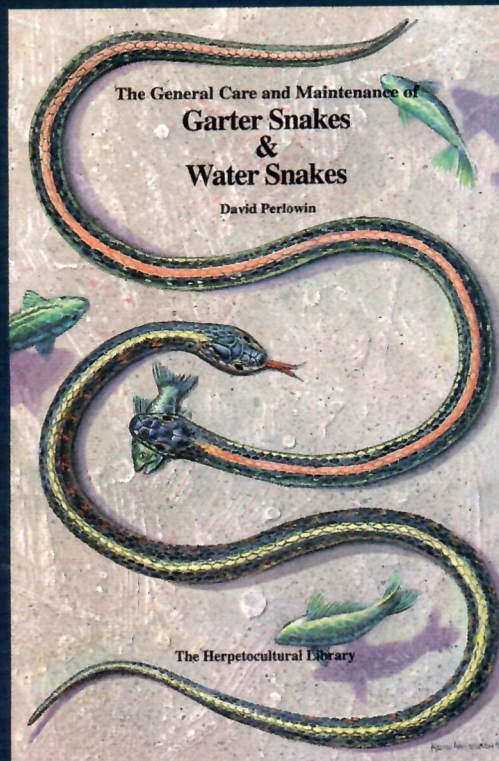
Coming Soon from Advanced Vivarium Systems, Inc.

***The General Care and
Maintenance of Garter Snakes
& Water Snakes*
by David Perlowin.**

Find out why herpetoculturists are showing a renewed interest in these beautiful and easily kept snakes.

Contains photos and illustrations representing a variety of species and morphs, including albinos.

Available June 1994



"Long awaited by those of us who have admired the extensive work of the Barkers with these snakes. We also finally have the opportunity to peruse at our leisure David Barker's eye-opening photography."

Philippe deVosjoli, Publisher

- 11" x 8 1/2"
- 192 pages
- 200 color photos
- Range maps
- Herpetocultural notes

Soft cover: \$39.95

Hard cover: \$59.95

Available August 1994

PYTHONS of the WORLD

Volume I, AUSTRALIA

David G. Barker & Tracy M. Barker



The most complete reference on Australian pythons published to date

Advanced Vivarium Systems, Inc., Post Office Box 408, Lakeside, California 92040

STAFF

Founder and President

Philippe de Vosjoli

Publisher

American Federation of Herpetoculturists

Managing Editor

Sean McKeown

Assistant Editor

Robert G. Sprackland

Publication Manager

Bridget M. Pilcher

Photo Editor

Philippe de Vosjoli

Graphic Design and Production Assistant

Andrew J. Mansker

Advertising

Peggy Lee Dillon

Andrew J. Mansker

CONTRIBUTING WRITERS

Allison Alberts, Ph.D.

Kevin Wright, D.V.M.

Dave and Tracy Barker

Winston Card

Ellin Beltz

Dave Fogel

Randall L. Gray

Doug Mader, D.V.M.

Roy Pinney

William B. Love

COPY EDITORS

Bob Davignon

Randall L. Gray

Wendy McFarland

AFH ADMINISTRATIVE STAFF

Nancy Alemo

Peggy Lee Dillon

OFFICERS

Legislative Action Coordinator

Gaylon Holmes

Legislative Representatives

Louis B. de Armas

Glen 'Jake' Jacobsen

Phil Jones

Richard Strieber

BOARD OF DIRECTORS

Philippe de Vosjoli, President

Jeff Nunan, Vice President

Bridget M. Pilcher, Treasurer

Robert G. Sprackland, Board Member

Dan McCarron, Education Coordinator

Lori Wirth, Member at Large

Manufactured and printed
in the United States of America.

THE VIVARIUM, (ISSN 10472665) is published six times a year January/February, March/April, May/June, July/August, September/October and November/December issues. Subscription price is \$26 for U.S. and \$32 for all foreign countries per year. Published by American Federation of Herpetoculturists, 360 N. Midway, Ste. 203, Escondido, CA 92027 Tel# (619) 747-4948. Second-Class Postage Paid at Escondido, CA and additional mailing offices. POSTMASTER: Send address changes to THE VIVARIUM, P.O. Box 300067, Escondido, CA 92030-0067.

Copyright 1994 by the AFH, P.O. Box 300067, Escondido, CA 92030. All rights reserved. No parts of this publication may be reprinted without the written permission of the AFH.

Prospective authors should write to the editorial board at the above address for guidelines. No responsibility is assumed for unsolicited contributions. Manuscripts, queries, photos, etc., are not returned unless accompanied by an addressed return envelope with proper postage. The Publisher reserves the right to edit or reject any advertisement.

The AFH assumes no responsibility for the quality of the products or the animals advertised herein.

On The Cover: Gould's sand monitor (*Varanus gouldii*). Photo by Jim Bridges and Bob Prince.

FEATURES

- The Path to a Career in Herpetology 22
by Robert G. Sprackland and Sean McKeown
- A Reproductive History of Monitors at the Dallas Zoo 26
by Winston Card
- The Importance of Rain Chambers in Herpetoculture 38
by Kevin M. Wright
- The Husbandry of Juvenile Green Anacondas (*Eunectes murinus*) in Captivity 52
by Peter D. Strimble



COLUMNS

- *HERPETOLOGICAL MEDICINE: Antibiotics and the Herptile Patient 10
by Kevin M. Wright
- AFH INTERVIEW: Wayne Hill 14
by Robert G. Sprackland
- PYTHONS & BOAS: The African Giants 18
by Dave and Tracy Barker
- Q & A COLUMN: ASK THE EXPERTS 24
by Winston Card
- HERP HORIZONS: Herping Down Under: Exploring the Status of Herpetoculture and the Law in Australia 30
by William B. Love



DEPARTMENTS

- AFH PERSPECTIVE - by Dan McCarron 5
- THE VIVARIUM BOOK REVIEW - reviewed by Robert G. Sprackland 6
Aspidites and the Phylogeny of Pythonine Snakes by Arnold G. Kluge
- HERP NEWS FROM AROUND THE WORLD - by Ellin Beltz 8
- AFH BUSINESS 42
- COMING EVENTS 43
- CLASSIFIEDS 48
- ADVERTISER'S INDEX 49



The VIVARIUM is printed
on recycled paper.

July/August 1994

The LIZARD KEEPER'S HANDBOOK

created in partnership with Advanced Vivarium Systems and the American Federation of Herpetoculturists.

This handbook extensively covers a wide range of the most sought after topics in lizard keeping to include:

- ☐ How to find sources of information
- ☐ The right selection of lizard for you
- ☐ Quarantine procedures
- ☐ Vivarium design that is innovative with safety in mind
- ☐ Different types of heating devices and their proper use
- ☐ The importance of lighting and how to properly setup your vivaria with lighting
- ☐ Relative humidity for your lizard(s)
- ☐ Thorough information on feeding your lizard(s)
- ☐ Common diseases and potential disorders

The AFH has endorsed and highly recommends this book to be used as a basic knowledge manual for herpetoculturists and pet industry personnel.

\$9.95 (CA residents add 7% tax) plus \$2.00 shipping & handling.



CREATURES OF ENCHANTMENT

AMERICAN FEDERATION OF HERPETOCULTURISTS



1995 CALENDARS ARE READY!

The 1995 "Creatures of Enchantment" Calendar is now available to the public! An 11" x 14" glossy, full color, reptile & amphibian calendar.

- ☐ 36 beautiful photos
- ☐ Moon phases
- ☐ Informative captions
- ☐ 11" x 14"
- ☐ Room to write in your schedule
- ☐ Durable, glossy card stock
- ☐ Animal care for each month of the year

All proceeds from the AFH calendar will go towards ongoing AFH projects to improve and support the care of amphibians and reptiles in captivity.

\$12.95 (CA residents add 7% tax) plus \$2.50 shipping & handling for the first one or two calendars and an additional .75 s&h for each calendar in excess of two for the US, Mexico & Canada. **All other foreign** add \$4.00 airmail for the first one or two and an additional \$2.00 for each calendar in excess of two.

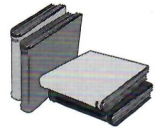
Retailers: To order quantities at discount rates call (619) 747-4948

Send your order to:

AFH Orders
PO Box 300067
Escondido, CA 92030-0067

California residents add 7% tax.
Sorry, we cannot accept VISA and Mastercard.

Herpetocultural Possibilities In Schools



by
Dan McCarron

AFH Education Coordinator

It has been said that education today lacks many of the components that prepare kids for the future. Possible solutions that actually address issues to improve the system are not easily set forth, and are complicated by political and economic agendas.



During the exhibit conference the kitchen staff came out to look at this black pine snake. Many people touched a snake for the first time. Photo by Kay McCarron.

One of the greatest problems our society faces today, in terms of education and personal development, is an experiential disconnection and loss or lack of relationship with the world. One thing that most people agree with is that kids are turned on by nature; one of nature's greatest gifts to kids is animals. Contact with animals dissolves barriers and opens up a world that many adults today have abandoned. It is worth noting that a number of studies have shown that contact with animals can be therapeutic. They are often used in programs to improve the quality of life for many of the elderly in nursing homes. In schools, the classroom can be a most appropriate place to keep small animals to help kids form connections with the natural world. Herps lend themselves perfectly as classroom animals.

With today's advances in herpetoculture, the possibilities are endless. A vivarium that is carefully set up can become a world of enchantment for children. Still on the forefront of herpetoculture in this country is the concept of naturalistic, or what Philippe de Vosjoli has termed, "third wave" vivaria. The idea of bringing naturalistic vivaria into the classroom is to expose students to what is no longer clearly evident in our current society. Indeed, the opportunities for observing and learning from the natural world have become very limited, if not nearly impossible, for most urban Americans. Naturalistic vivaria allow for observations that would require extended periods of time or specialized equipment in nature. These setups can bring miniature ecosystems into a school where

kids and adults can observe complex interactions between, such things as soil, water, plants, insects, and small groups of reptiles or amphibians. The possibilities are very promising and limited only by one's imagination and effort. Other less complex or modular setups are also possible; plants can be potted and placed in the vivarium substrate and serviced as individual units. Of course, not all herps will lend themselves to the naturalistic concept for obvious reasons. Large animals could easily trample plants and herbivores would "eat" the contents of a vivarium.

National Educational Conference

Your Education Coordinator was invited to attend and display various herpetocultural setups that could be used in schools at the National Eisenhower Conference in Washington, D.C., this past January. The conference was a gathering of the most influential people involved in science and math education in the country. The theme of the conference was "Facilitating Systemic Change in Mathematics, Science and Technology Education" and was attended by more than 500 people, including education state department heads, university and private educational researchers, and consultants. When invited to attend, I was asked to bring a few animals and set up several model displays. Thinking of the potential of an opportunity such as this, I quickly accepted, not actually realizing the task ahead of me. I called Ted Peitz of Neodesha Plastics, Inc., and was about to ask him if he would be interested in temporarily lending a few of his company's cages to show several animals at the conference. Before finishing what I was going to ask him, Ted quietly asked what I would need, how many, and where the cages needed to be shipped. Vivarium Research Group, Inc., was also very generous in shipping a beautiful example of their Third Wave Vivaria to be displayed at the conference. My friend, David Perlowin, also sent me three adult leucistic Texas rat snakes to be displayed. Our trip to Washington was a huge success. During the conference, we distributed over 300 copies of the AFH Guidelines on the Keeping of Large Boid Snakes in Schools, and over 100 AFH membership applications. We constantly received compliments on how attractive the setups looked and how beautiful snakes and lizards actually were. I would like to thank Philippe de Vosjoli, Patrick de Vosjoli, Ted Peitz, and David Perlowin for making the conference display a success; without these people I simply would not have made the trip. Also, I would like to thank my wife Kay for going

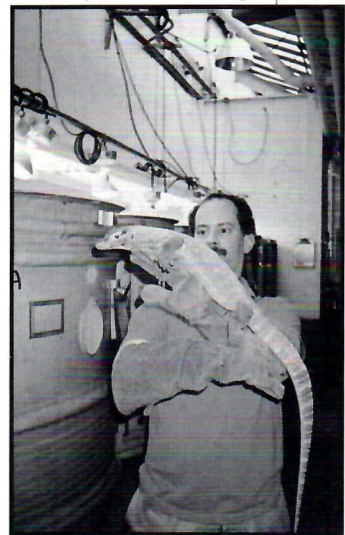
with me and helping me set up everything, and Jon and Wanda Neviaser, two budding herpetoculturists who helped man the displays, take everything down, and pack at the end.

The day after the conference, Roger Rosscoe at the National Zoo was gracious enough to give us a behind-the-scenes tour of the reptile house, which included the Komodo monitors. This by itself was an opportunity of a lifetime. After viewing a group of monitor eggs in an incubator, Roger opened a cage and took out a young, 3-foot (1-m) Komodo for us to meet. It was a real treat. I thank Roger and the National Zoo for all their hospitality.

Herpetoculture Workshop

This summer, the AFH is sponsoring a second annual herpetoculture workshop for teachers in Rock Springs, Wyoming. Last year's workshop was very successful, with 20 teachers attending from around the country. Last summer's workshop was the first of its kind to be offered to teachers nationally. Sean McKeown, Larry Valentine, and Gaylon Holmes were all responsible for making the workshop such a hit. This year's workshop promises to be even better. The 4-day workshop will be open to 30 teachers and will be offered for 2 or 3 graduate hours through the University of Wyoming. One of my hopes and visions for the future is to see workshops such as these offered throughout the country. There appears to be such high interest in herpetoculture by teachers that I am sure any workshop would quickly fill.

In closing, I would like to express how much I have grown during my involvement with the AFH, and how valuable the organization is. The AFH is more than just *The Vivarium*. It is an organization that is involved in causing positive change with measurable results. We are expanding on different fronts every year, always with the intention of representing the best interests of our avocation.



Roger Rosscoe with a Komodo dragon at the National Zoo.



reviewed by Robert G. Sprackland

Aspidites and the Phylogeny of Pythonine Snakes

Arnold G. Kluge, *Records of the Australian Museum, Supplement 19*, 1 December 1993, 77 pp., ISBN 0 7310 11643. Austr. \$36.

"What," you rightly ask, "does this volume have to do with herpetoculture?" If you breed, or intend to breed pythons, plenty. Phylogeny is the science of determining relationships, which ultimately decides which populations belong to which species. Even before this book was published, I heard several collectors asking "what did Kluge do with the water python (*Liasis fuscus*)?" Not surprisingly, there are new groupings, and new genus names as well, making Arnold Kluge's latest contribution significant to breeders as well as other python enthusiasts.

First the strong points. Arnold Kluge is one of herpetile taxonomy's big players, having revised several reptile groups like geckos, pygopodids (Australian legless lizards), boas, and now pythons, as well as being a main inventor of new taxonomic

techniques and theory, so his work has to be taken seriously. Kluge's starting point was to examine the origins and evolutionary history of pythons, e.g., did they originate in Africa, Australia, both, or neither? Looking at all python species, he compared 121 characters such as osteology (bone structure), scales counts, tooth placement, etc. His results confirm other recent studies in placing Australia's woma (*Aspidites ramsayi*) and black-headed pythons (*Aspidites melanocephalus*) as the most ancestral species.

From there, pythons cluster into distinct groups that often require new genus arrangements. He uses the genus *Antaresia* for the small primarily Australian *Liasis childreni*, *L. maculosa*, *L. perthensis*, *L. stimsoni* complex, taking the name from a controversial paper by Wells and Wellington (1984). Bismarck ringed pythons remain in *Bothrochilus*, while D'Albertis' python is placed into *Leiopython*. Kluge describes a new genus, *Apodora* for *papuana*, leaves *Liasis mackloti* and *L. olivaceus* intact, and places the other Austral-New Guinea pythons (*amethystina*, *boeleni*, *oenpelliensis*, *spilota*, *carinata*, and *viridis*) together in *Morelia*. All other species are in the genus *Python*.

Some die-hards will balk at the loss of *Chondropython* for the green python. However, when comparing these arrangements with patterns of distribution, both data sets converge considerably. From that picture, we get a better understanding of python evolution and relationships, and Kluge's hypothesis of relationships looks like it will be fairly solid for the foreseeable future.

However, prime among the weak points is Kluge's absence of data for "subspecies." The species he recognizes are "accepted in the majority of the recent papers on pythonines," (p. 5) and he therefore makes no attempt to clearly define his species from firsthand examination. Thus, *fuscus* is relegated to *mackloti* because of the work of other authors. While effectively ignoring subspecies and color variations, he does repeatedly note that such taxa require detailed study, particularly in *P. curtus*, *P. molurus*, and *P. sebae*.

Also missing are good illustrations. Papers such as those usually produced by Kluge become important, yet they miss a much broader market because they are so poorly illustrated. The few line drawings show anatomical features he discusses, but how many more people would be attracted to this reference and find it useful as a guide if color photos of live pythons were included?

That said, this is a wonderful, concise contribution to the biology of one of the most popular groups of reptiles, and even gives hints at where python breeders may contribute to clarifying many issues of species, subspecies, and development. For example, no mention was made of the two clearly different color morphs for D'Albertis' pythons, while Kluge recognizes the need to study color and pattern variation from hatching until maturity for almost all the species. As popular as these snakes are, much of this very basic information is still unavailable!

If you are not familiar with detailed anatomy, or the modern principles of taxonomy, this work will contain little of interest. If you are a breeder or taxonomist, and understanding lineages are important, then this is a seminal paper, from which the author hints there are more contributions to follow.

Literature Cited

Wells, R. & C. Wellington. 1984. A synopsis of the class Reptilia in Australia. *Australian J. Herpetology* 1:73-129.



Great selection of Lizards,
Snakes and Amphibians.



Call toll-free to receive our
monthly stocklist, or have
one faxed! Next day
delivery to your door
available on most animals.
We specialize in the rare
and hard to find.

S a i n t

L o u i s

L i z a r d

C o m p a n y

MASTERCARD AND VISA ACCEPTED

Tuesday thru Friday 11.30am to 8.00pm

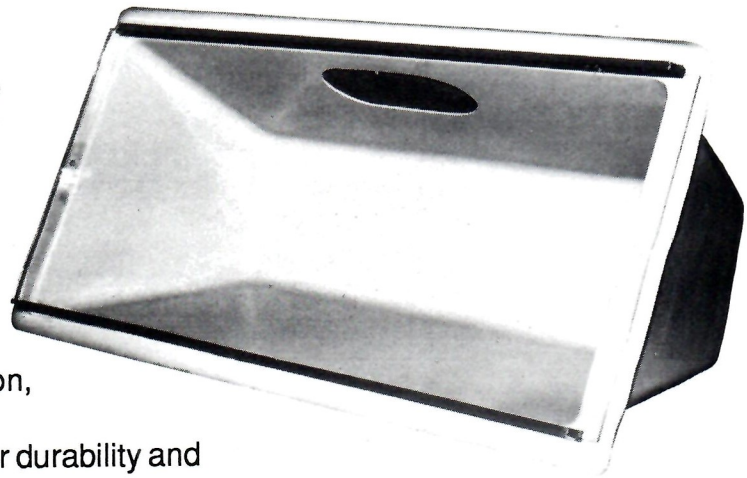
Saturday 11.00am to 5.30pm, Sunday 12.00 to 5.00pm

9849 Manchester, Saint Louis, Missouri 63119

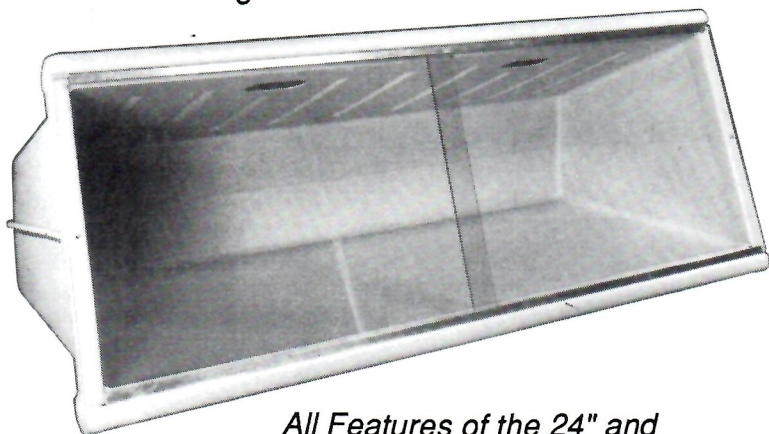
314-962-3939

1 - 8 0 0 - 9 6 2 - 7 2 8 0

Reptile Cages



- Durable ivory ABS plastic construction, unbreakable under normal usage.
- 3/16" thick clear plastic sliding door for durability and unobstructed viewing.
- Sloping front for easy observation.
- No seams; all corners are rounded to facilitate ease in cleaning and provide freedom from mites.
- Odorless and stain resistant.
- Door and cage drilled on each end for padlock or pin for security. Doors and cages are template drilled for interchangeability between cages. Door holes match cage holes no matter how door is inserted.
- Top venting can be used for lighting or temperature control. Cage easily heated by resting on heating pad or using stick on type aquarium heaters.
- Flat back allows standing cage upright for reptile privacy if desired.
- Tapered form allows stacking one inside another to reduce storage area.



*All Features of the 24" and
36" Cages PLUS . . .*

- 1/4" Tempered glass by-pass doors with holes drilled for pins or locking
- Aluminum glass track for rigidity and safety for larger reptiles

As an option we offer dams (litter guards) which are installed at bottom front of cage just behind doors to keep litter from falling in door track when door is opened.

24" Reptile Cage

24" Wide, 12-1/4" High,
12-1/2" Deep
250 sq. in. Floor Area,
Single Vent

36" Reptile Cage

36" Wide, 18" High,
19" Deep
580 sq. in. Floor Area,
Double Vent

48" Reptile Cage

48" Wide, 22" High,
21" Deep
920 sq. in. Floor Area,
Double Vent

72" Reptile Cage

74" Wide, 28" High,
33" Deep
2,200 sq. in. Floor Area,
4 Vents

NEODESHA PLASTICS, INC.

TWIN RIVERS IND. PARK (316) 325-3096

P.O. BOX 371

NEODESHA, KANSAS 66757-0371

VISA/MC Accepted

HERP NEWS

FROM AROUND THE WORLD

by
Ellin Beltz

VENOM EXTRACTOR

"In response to a letter in a recent issue of *The Vivarium*, I am enclosing a copy of my chapter in *Biology of the Pitvipers* which discusses the [venom] Extractor. Many readers are apparently not aware of this source of information, and, although it is somewhat dated, it discusses the issues. It seems books are not as widely read as journals. I would emphasize that although testimonials are interesting, they play into the old trap of ascribing any outcome to be the result of what went before. Since there is no way to know how much venom is injected in any bite, and it is not known what the evolution of the envenomation would have been without use of any treatment, e.g., the Extractor, no conclusions about outcome are warranted. In fact, they should be resisted. In addition, it should be noted that the Bronstein et al. article was published as an abstract only, and no paper, refereed or otherwise, has appeared in print. Thus the methodology used cannot be evaluated. This device appears to do no harm, and I would use one, but not based on any proof of its effectiveness. David L. Hardy, Sr., M.D."

VERNAL POOL OR NOT, IT WAS POPULAR WITH AMPHIBIANS

Marty Marcus writes, "As for Lake Lagunita behind the Stanford University Campus being a vernal pond, I have to disagree with your ecologist friend. Water is diverted from San Francisquito Creek to form the lake. It is impounded because of levees on three sides. In summer, because the University doesn't want the liability risk of someone drowning there, the maintenance dept. opens a valve and drains the lake into the bay. During the springtime they allow boating, and I used to take my students there to observe the wildlife. Western toads (*Bufo boreas haliophilus*) used to breed there in such numbers that if you dipped a coffee can into the water, you'd come up with what almost seemed like more tadpoles than water. Two years ago I went there to catch a few tadpoles to feed to a baby garter snake, and I couldn't find even a single tadpole! The red-sided garter snake (*Thamnophis sirtalis infernalis*) used to be common there also, but no more. I

guess with no toadlets to eat, there wasn't much use for garter snakes to hang around there."

COSTLY CRITTERS

A 36-inch (1 m) pet green iguana is believed to have started a fire which destroyed its human family's home and sent one of the responding fireman to the hospital. It is believed "Iggy" crawled from his cage and knocked over a heat lamp which may in turn have started the fire which was discovered in the early afternoon while the family was out shopping. His owner said, "He would crawl out and sit in the window. I didn't mind. He didn't make a mess." Iggy was killed in the fire. [*The Frontiersman*, March 23, 1994—from Sam Goldman]

A python which had slithered away after being left to soak in the tub unattended cost his owner \$800, an amount which the city of Santa Rosa, California says is not nearly as much as it really cost to search the sewers for the missing serpent. The snake was later found in another part of the house where it was hiding. [*San Luis Obispo County, CA Telegram-Tribune* February 16, 1994—from Dennis Sheridan]

Fourteen people were arrested and more than 200 snakes were confiscated by state and federal wildlife agents in a daybreak sweep of Los Angeles, Riverside, and Orange Counties, California. Authorities reported that 124 native California snakes were taken from one apartment, with "another hundred or so" left behind. Two 16-year-olds were arrested. One had 12 rattlesnakes. The other was busted as he was being released from the hospital following a rattlesnake bite. The arrests culminated 4 months of investigation into suspected illegal California reptile trafficking, violations of Section 40.15(c)(1) of the state's Fish and Game Code. Each one is a misdemeanor calling for a maximum penalty of \$1000 fine and/or 6 months in jail. In addition to the snakes, a desert tortoise, two geckos, and a chuckwalla were seized. [*The Los Angeles Times* "late 1993"—from Raymond Terrence Hoser, Doncaster, Australia]

WE KNEW THIS

Recently a spate of articles have appeared which report that a biologist at the Univer-

sity of Connecticut has discovered that snakes use their forked tongues to follow aromatic trails left by other snakes, or prey items. The biologist stated that high-speed photos show that during each tongue-flick, snakes separate the tips of their tongues so that the ends are separated as far as possible. This permits the snake to test the force of the scent molecules in two different directions and more accurately gauge the direction to follow. [*Deseret News*, March 18, 1994—from David A. Webb; *Washington Post*, March 21—from Daniel Riley] Marty Marcus sent a copy from the *Gannett News Service* with the comment: "What a novel idea. I always thought the purpose of the forked tongue was so the snake could lie to Adam and Eve about what the real effect of the apple would be!"

TURTLE TALES

Recent statistics show that seven million baby red-eared sliders are legally exported annually from the United States to other countries for pets. The International Wildlife Coalition *Wildlife Watch* [January, 1994—from JoAnn Dalcin] reports that the majority of the hatchlings die of starvation or malnutrition and that hundreds of thousands of breeding females are taken from the wild each year. The "turtle farms" then hatch the eggs, and sell the offspring. They add that "most females die soon after due to poor conditions."

Last fall the Florida Department of Environment permitted a 650-foot soil and cement embankment on a small barrier island off the west coast of that state. Last year at least 21 sea turtle nests, belonging to all three species of sea turtles found in the Gulf of Mexico, were documented on Casey Key. The U.S. Fish and Wildlife Service found that this revetment constituted a take under the federal Endangered Species Act. The Caribbean Conservation Corporation is challenging the permit. The first hearing was scheduled for April, 1994. If any reader hears more about this sea wall, I'd appreciate hearing about it. [*In Brief*, Sierra Club Legal Defense Fund, Winter/Spring, 1994—from Marty Marcus]

The *Bangkok Post* reports that naturalists are trying to save two local species of turtles from overharvesting and development

[January 20, 1994—from Giovanni Fagioli]. The paper calls the turtles the "rare Kra-an and Krarian turtles" which we must assume are local names for animals identified as having a red head stripe during the breeding season, being round as juveniles, and able to live in both brackish and fresh water. It states that the turtles were discovered at a Beach in Phattalung, Thailand, where locals gather eggs and are building houses and logging on local breeding sites. If anyone knows just what these animals are, I'd like to know. The photo shows an animal which looks vaguely like a diamondback terrapin in shape, and foot characteristics. The head has a prominent v-shaped marking from the eyes back to the top center.

A researcher from Ohio University at Athens has found that DDT can turn on vitellogenin production in male red-eared sliders, although it doesn't cause the same broad suite of changes that estrogen does. Brent Palmer said, "Certainly, if we can find vitellogenin in males in the wild, that's a sign they've been exposed to an environmental estrogen." However, he is not yet sure if negative vitellogenin findings indicate that no exposure has occurred. He added that his new data "make me wonder if there might not still be an environmental estrogen present." [*Science News*, January 8, 1994—from Jack Corning]

Allen Salzberg sent a clipping from *The New York Times Magazine* [January 30, 1994] which reads: "Sexually Incorrect Sand—Dade County, FL is about to confront the gender issue. Well, the gender/sand/turtle issue. The story begins with sand loss, which is to beaches what hair loss is to middle-aged men. Dade County has been losing, and replacing, storm tossed sand for years. No problem. . . . The problem is where to get the sand . . . 11 million to 12 million cubic yards. . . . Counties north of Dade are not about to give up their sand. Inland sand near Lake Okeechobee might have unwanted land bugs. Deep-water sand is hard to get. Sand from the Bahamas looks good, but at least one problem has been identified. The sand is aragonite (calcium carbonate), lighter than Florida quartz, and tends to maintain slightly cooler temperatures. Sex in sea turtles is determined by egg temperature during development, and the fear is that cooler sand could turn all the sea turtle eggs laid in it into males, which would make environmentalists cranky—and the turtles extinct."

The One World Work Force is seeking volunteers for sea-turtle conservation projects in the Mexican states of Jalisco and Baja California Norte. For information write

OWWF, P.O. Box 3188, La Mesa, CA 91944-3188. [Salt Lake City, UT *Tribune*, March 13, 1994—from David A. Webb]

IGUANA BIG MAC?

"Dear Abby: Most fast-food places have a policy about pets brought into their establishment: It's OK if the pet is on a leash. My fiancée and I brought our pet green iguana into an establishment in Chula Vista. He was on a leash and wasn't bothering anyone . . . [After we had been served and seated] we were told the other customers were feeling uneasy about our pet. . . . We were asked to sit outside. . . . How come . . . we were given the cold shoulder because of our unusual pet?—A.B. in San Diego. Dear A.B.: Even though some reptiles make good pets, they can frighten some people who have not had proper exposure to reptiles. The management was obviously concerned about its other customers when it objected to the presence of your somewhat unusual pet. It's ironic that with all the people who have been nipped by fluffy, adorable furry creatures, they haven't learned that looks can be deceiving and snap judgments by appearances are unfair.—Abigail Van Buren" [Tacoma, WA *The News Tribune*, March 16, 1994—from Marty Marcus] Additional contributor Andy Zaayenga commented "Personally I would never bring my iguana into a fast food joint. He is used to much better food." [Editor's note: *There are three good reasons not to take green iguanas or other herps to a restaurant. First, the lizard could become concerned about becoming part of the faire—after all, you never know what is in "fast food." Second, such behavior shows insensitivity to people who don't like reptiles, which may result in local ordinances being passed restricting the keeping of reptiles. Finally, some lizards may carry Salmonella, and proper hygiene dictates that restaurants, unwashed hands, and lizards don't mix!*]

Thanks to these and other contributors including Daniel Riley, Lt. Buckingham, Michael Lundgren, Alan Beck, Matthew and Laurie Aikawa, Dennis Sheridan, Gary Gomez, Rod Sutton, Mike McNeil, and David A. Webb. Believe it or not, I actually ran over my allotted space and still have some stuff left for next time. Don't let this stop you from becoming a contributor! Send clippings with the publication name/date slug and your name firmly attached (photocopied preferred) to me in care of the AFH at the address on the masthead.



COLD BLOODED DESIGN
DESIGN
T-SHIRTS

REPTILES
RULE

BLACK & WHITE DESIGN NO. T-12
HOW TO ORDER T-SHIRTS
Specify No. T-12 and size: M, L, XL, XXL. \$15 ea. + \$3.50 S/H. Add \$1 S/H ea. additional shirt. International orders add \$5 S/H per shirt. U.S. funds only. CA residents add sales tax. All T-Shirts are Hanes Beefy-T, 100% cotton and pre-shrunk.

SEND TO
COLD BLOODED DESIGN
386 East "H" St., Ste. 209-405, Chula Vista, CA 91910

BYRON BARNES

CAPTIVE BRED RARE & UNUSUAL REPTILES

- Texas Alligator Lizards
- Albino & het. ruthveni
- Lampropeltis p. knoblochi
- Locality matched alterna

Call or write for complete list of available species.

P.O. BOX 690423, S.A., TX. 78269
PHONE & FAX (210) 698-1268

THE GOURMET RODENT

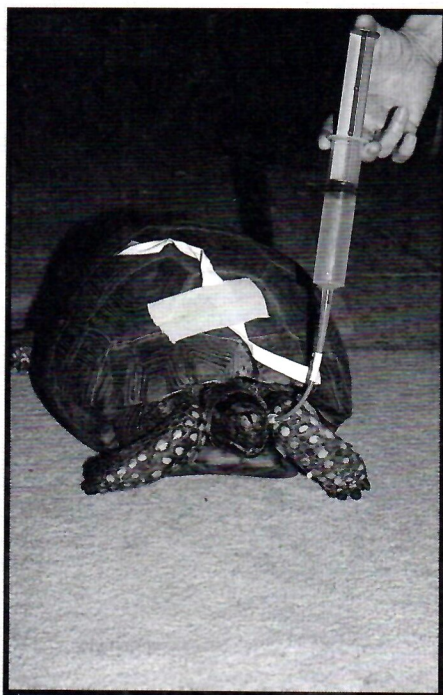
RATS AND MICE FOR YOUR HERPS

BILL BRANT
6115 SW 137th Avenue
ARCHER, FL 32618
(904) 495-9024
FAX (904) 495-9781

ANTIBIOTICS AND THE HERPTILE PATIENT

by
Kevin Wright, DVM

Amphibians and reptiles are subject to a variety of syndromes and diseases that are associated with bacterial pathogens. Among the more common conditions associated with bacteria are infectious stomatitis (mouth rot), respiratory disease such as pneumonia, skin diseases such as dermatitis (blister disease), and the extremely grave condition septicemia (blood poisoning, also called red leg in amphibians). Many of these conditions are associated with stressful conditions such as poor husbandry or recent shipping (e.g., importation or interstate transport). These stressful conditions lower the ability of the herptile's immune system to ward off pathogens, such as bacteria, thereby increasing the likelihood of a herptile developing an infectious disease. When a herptile displays signs of ill health (e.g., wheezing, lethargy, blisters, mucopurulent material in the oropharynx [mouth and throat]), wheezing, lethargy, blisters, it is highly unlikely that the herptile is able to mount an immune response sufficient to combat the infection, and appropriate an-



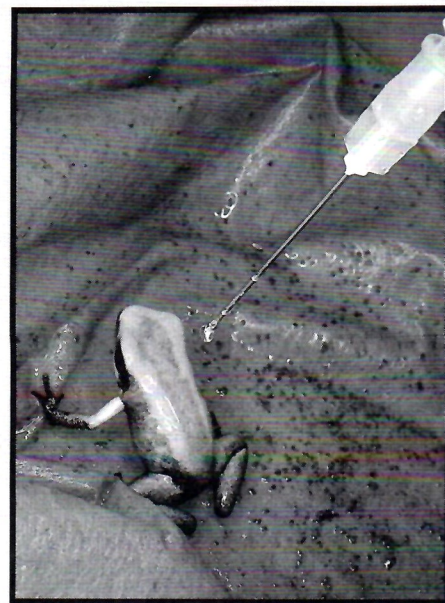
The pharyngostomy tube is an excellent method of administering oral medications, food, and fluids, to the debilitated chelonian patient like this yellow-foot tortoise (*Geochelone denticulata*).

timicrobial therapy must be instituted. Quite often the herpetoculturist must administer the antibiotics prescribed for the herptile, and for this reason it is extremely important to understand the importance of the timely and proper administration of an antibiotic.

There are several routes in which an antibiotic may be administered to the herptile patient—topical, oral, subcutaneous, intramuscular, intracoelomic, and intravenous. In the reptile patient, topical administration is useful for a minor lesion such as a small debrided abscess or minor laceration, and also as adjunct therapy for externally manifested systemic diseases such as septic blister disease. In the amphibian patient, topical therapy may have systemic effects because the highly permeable nature of the amphibian's skin and its associated vascular network tends to promote the uptake of some substances such as certain antibiotics (e.g., gentamicin sulfate). For a small amphibian, topical administration of an antibiotic may preclude the need for manual restraint and thereby reduce the stress on the patient.

Topical therapy includes the administration of antibiotics that are inhaled. Nebulization is the process in which the antibiotic is rendered into a fine mist for passage through the airways of the respiratory tract. This is an excellent adjunct therapy for the treatment of respiratory tract infections, but the equipment is expensive and may not be readily available for home use.

Oral administration of antibiotics is possible but the dosing regimens of herptiles are poorly documented. Due to the variety in the gastrointestinal tract anatomy and the digestive physiology of herptiles, there is a corresponding variability in the uptake of an orally administered antibiotic. This variation is noted between the two classes of herptiles (Amphibia and Reptilia), between the orders within each class, and even between members of the same species kept at different temperatures or fed different diets. Given the number of variables that may effect the final distribution of an ingested antibiotic within a herptile's body, and therefore that drug's actual efficacy against the causative bacteria, many veterinarians prefer to avoid oral antibiotics if other administration routes are prac-



Topical administration of ivermectin in a bicolor poison dart frog (*Phylllobates bicolor*).

tical. Furthermore, oral antibiotics often call for a higher degree of manual restraint than other routes as herptiles can be quite resistant to attempted manipulations of the mouth.

The distribution of a given drug following its administration by either the subcutaneous, intramuscular, intracoelomic, or intravenous route is more predictable than either the topical or oral routes. The subcutaneous route is the least predictable of these four methods as the absorption of a drug from the subcutaneous space (i.e., that potential gap between the skin and the underlying muscle mass) is dependent on the vascularity of the dermis and associated muscle tissues. Some drugs that quickly achieve therapeutic levels following intramuscular administration may take several times longer to be utilized if administered into the subcutaneous space.

Intramuscular administration of antibiotics is probably the most common route used in the herptile patient. This route has been the subject of the pharmacokinetic studies in the literature, and is the most well understood method of administration for the commonly used antibiotics. Because muscle tissue has a high density of capillaries as a rule, most antibiotics that are placed within the center of a muscle are rapidly absorbed into the bloodstream. Intramuscular injections are usually ad-

ministered into a muscle in the anterior half of a herptile's body. The blood from the posterior of a reptile must first pass through the kidneys before being transported elsewhere in the body, while a similarly administered drug makes its first pass through the liver in the amphibian patient. Since many antibiotics are metabolized and subsequently excreted by either the kidney or the liver (or both), a higher concentration of the drug reaches the site of infection if the drug circulates through the body at least once prior to excretion. Antibiotic absorption and distribution are still variable between species and may be affected by temperature and other external conditions, yet the effects of an intramuscularly administered antibiotic appear to be more predictable than other routes discussed.

Intracoelemic (within the body cavity) injections are an uncommon route of antibiotics administration. One reason for using the intracoelemic route is the fact that a particular antibiotic may be too irritating for intramuscular injection. A surgery that

Table 1

Common abbreviations used in prescriptions.

SID, q 24 hrs	.....	once daily
BID, q 12 hrs	.....	twice daily
TID, q 8 hrs	.....	three times daily
q 48 hrs	.....	every other day
q 72 hrs	.....	every third day
PO	.....	orally
SQ, SC	.....	subcutaneously
IM	.....	intramuscularly
IV	.....	intravenously
IC	.....	intracoelemically

is suspected to be accompanied by a high level of bacterial contamination (e.g., colon surgery) may warrant a course of an intracoelemically administered antibiotics. There is a rather good uptake of fluid by this route, so it is quite routine to concurrently administer fluids to the ill or dehydrated herptile via intracoelemic injections. With aminoglycoside antibiotics such as amikacin and gentamicin, simultaneous fluid therapy may prevent complications such as kidney damage.

The intravenous route is an underutilized tool in herptile medicine due to the relative inaccessibility of veins in many species, and the perceived high-risk nature of the procedure by the veterinarian and the client. However, a veterinarian may place a intravenous catheter into the jugular vein of a chelonian, and vascular access ports have been used with some success in other species of herptiles. Venous access is necessary for certain types of chemotherapeutics/agents that could cause

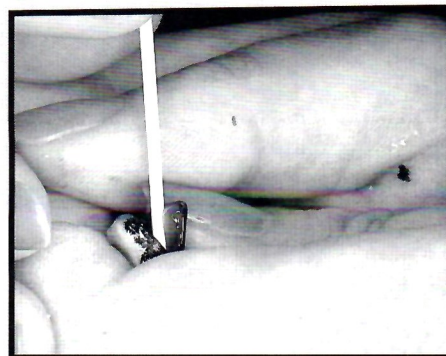
bruising and irritation of the muscle if administered intramuscularly. Intracardiac (within the heart) injection is a specialized form of intravenous administration that may be used to quickly elevate the antibiotic concentration to a therapeutic level in the critically ill septic patient.

Antibiotics that are commonly prescribed for the herptile patient include amikacin, gentamicin, piperacillin and other third-generation penicillins, third-generation cephalosporins, and enrofloxacin. Due to the diverse chemical composition of these antibiotics, each one has a different dosage and dosing regimen that will deliver the optimal therapeutic concentration within the herptile's body. Failure to administer the drug in the proper route and at the proper time interval means that the antibiotic will either fall below the desired level or elevate to potentially toxic levels. At the nadir (low point) of the antibiotic concentration, the infection may resurge and cause a corresponding decline in the patient's condition. If the antibiotic reaches too elevated a level, it may act as a toxin within the patient. Aminoglycosides have been documented as causing irreversible renal failure when dosed at inappropriately high levels. Thus it is important to administer the drug at the prescribed time (e.g., 8:00 P.M. every third day) and in the prescribed manner (e.g., intramuscular). If the herptile patient continues to decline despite the delineated therapeutic regimen, then the diagnosis and treatment should be reevaluated.

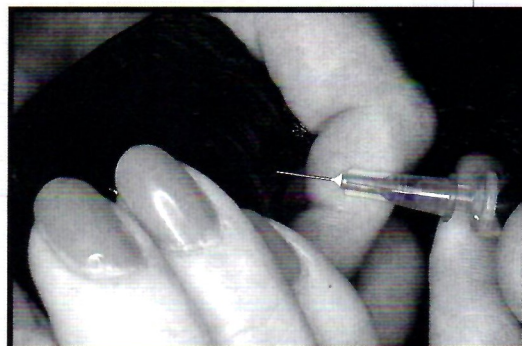
Amikacin and gentamicin are effective against a number of the bacterial species that have been associated with disease in amphibians and reptiles. However, these drugs have limited efficacy against anaerobic bacteria (i.e., those bacteria that grow in the absence of oxygen). This is significant because anaerobic bacteria have been isolated from many clinically ill reptiles. Piperacillin and the other advanced penicillins and cephalosporins may be used in some cases due to their ability to fight anaerobic infections, as well as their enhanced ability to kill certain aerobic bacteria (e.g., *Pseudomonas* sp.). Enrofloxacin is another excellent drug for combatting herptile infections, and it may be the drug of choice for certain conditions. The choice of antibiotics is not as clearly defined as some recent publications indicate. The condition of the patient dictates what antibiotics will be most likely to prove effective, as well as what supportive therapy must be instituted. Quite often a different antibiotic than those mentioned in this article will be cho-



The jugular vein is readily visualized in this leopard tortoise (*Geochelone pardalis*).



A small gauge intravenous catheter is used to administer oral medication to this bicolor poison dart frog (*Phyllobates bicolor*).



Intracoelemic injection in an axolotl (*Ambystoma andersoni*).

sen because that antibiotic is highly effective against the particular bacterial isolate associated with that herptile's clinical signs. Herptiles showing signs of advanced septicemia (e.g., extremely weak, reddened ventral scales or abdominal skin) are often treated with antibiotics that are synergistic. These antibiotics work together to produce a more effective combination than either by itself (e.g., amikacin and piperacillin). However, this is contraindicated for all but the most severe infection. It is the responsibility of the veterinarian to pick the drug that is most effective for the patient's condition while having the fewest side effects. Indiscriminate and ill-conceived antibiotic use has been popularized in recent years in part by the increased accessibility of antibiotics to

MEDICAL HERPETOLOGY

by Steve Grenard

with bibliographic research by David H. Katz

DO YOU KNOW...

- Unique components of pit viper venom, called ACE inhibitors, are used to control high blood pressure in millions of people.
- For 30 years crocodilians have been used as models for open-heart surgery, including procedures involving artificial valves and dacron patching of heart muscle defects.
- Some lizards can regenerate damaged brain tissue; researchers are seeking their secrets to help victims of strokes, car accidents, and other catastrophic conditions.
- People pricked by the fangs of dried rattlesnake heads suffered the signs of snakebite.
- Epidemics of debilitating, sometimes fatal, intestinal disease seen in American children during the 1960s were traced to pet turtles.
- Salamanders can regenerate body parts, including toes, legs, and even spinal cord tissue.
- A variety of drugs used by people suffering from gallbladder and pancreatic diseases contain an ingredient first isolated from a treefrog.

These are just a few of facts that Steve Grenard illuminates in his classic literature review. This text sets the standard for people interested in the relationship between herpetology and medical science. Read what the experts say about Medical Herpetology:

"...it contains some fascinating information that was certainly new to me. The references alone are an important contribution." Sherman A. Minton, Jr., M.D., Ind. Univ. Sch. of Medicine.

"...a wealth of interesting and even fascinating material, and I am not aware of any book that contains even a fraction of it. If you want the truth, I wish I had thought of it myself." H. Bernard Bechtel, M.D.

"...120,000 of the most important words a serious herpetologist can have in his reference library. It will also interest biologists, physicians, veterinarians, pharmacists, and biochemists." Norman Frank DVM, Publisher, Reptile & Amphibian Magazine.

"...this is a splendid contribution to herpetology." Prof. Hobart M. Smith, Univ. of Colo., Boulder.

"...Medical Herpetology is the most referred to volume in my library of 2,500 books! I'm overwhelmed by the wealth of factual material crammed into every paragraph. Herpetologists everywhere will want this bible." Roy Pinney, author and photographer.

160 pg., soft cover, \$19.95 + \$2.50 P/H, Visa/MC

CONTACT: NG PUBLISHING INC., RD 3, Box 3709A-V,
POTTSVILLE, PA 17901; PH (717) 622-6050, FAX (717) 622-5858

The HAMMOCK FOUNDATION

Proudly Presents

Offspring - Summer and Fall 1994

All species listed are expected. They are either already born-hatched or eggs are incubating or females are definitely gravid or pregnant.

Argentine Boas	Malaysian (Red) Bloods
Brazilian Rainbow	Papuan Pythons
Dumeril's Boas	Borneo Blood Pythons
Emerald Tree Boas	Olive Pythons
Bolivian Red-Tails	Ringed Pythons
Surinam Red-Tails	Mexican Beaded Lizards
Chondropythons	<i>Sanzinia madagascariensis</i>

For Inquiries:

Michael W. Hammock
P. O. Box 3
Blaine, TN 37709
(615) 828-3250

Reptile Specialties

SPECIALIZING IN:

• Chameleons

(Farm-raised Imports & Captive-bred)

We sell only the finest quality animals!

Ask for "Farm-raised"

• Custom Built Cages and Terrariums

CALL TODAY!

Tel# (818) 352-1796

Fax# (818) 353-7381

10051 Commerce Ave., Tujunga, CA 91042
Currently shipping throughout the U.S. and abroad.

the lay public. This action carries grave consequences. The appearance of resistant strains of bacteria is the most worrisome development to follow inappropriate antibiotic therapy, but further immunosuppression of the patient and the development of secondary fungal infections in the patient are likely possibilities.

Antibiotic administration in the herptile patient is an essential component of the treatment of various diseases. Unfortunately, when dealing with the herptile patient, there has been a tendency by some to avoid a thorough veterinary work-up, and antibiotics may be prescribed without appropriate documentation of the patient's condition. Once a diagnosis has been made, it is important for the herpetoculturist to follow the dosing instructions to ensure that the antibiotic is reaching therapeutic levels and maintaining those levels as needed to eliminate the source of infection. Following the instructions on the prescription label and communicating your concerns to the attending veterinarian is the best way to give the herptile patient a chance of recovery.



INTERNATIONAL GECKO SOCIETY

The International Gecko Society (I.G.S.) is a nonprofit organization dedicated to the study of geckos and dissemination of information about them. The I.G.S. is global in scope with worldwide membership.

MEMBERSHIP INCLUDES:

DACTYLUS an illustrated quarterly publication featuring captive care and reproduction, taxonomy, book reviews and historical pieces. Membership annual fee is \$20. Write to: I.G.S., P. O. Box 370423, San Diego, CA 92137-0423 USA

"BOAS & PYTHONS"

"Their Care & Handling" Videotape

TOPICS

- Care & Handling • Food & Feeding
- Housing & Provisions
- Diseases & Parasites
- Intro. to Captive Breeding

Script Reviewed By Experts At
BROOKFIELD ZOO
& THE UNIVERSITY
OF ILLINOIS

\$24.95 + \$2.50 P & H

VISA/MC/DISC ORDERS:
 (217) 442 - 4707 (9-5 Mon-Fri CST)

OR

Send Check or Money Order to:
 Cunningham Photo
 807 W. Williams
 Danville, IL 61832

Dealer Prices Available

**ALL TAPES VHS UNLESS OTHER-
 WISE SPECIFIED BY CUSTOMER**

Produced by McElhaney
 Productions, Hoopeston, IL 60942

AFH Legislative Hot Line Phone (619) 747-6289

The AFH Hot Line is available to AFH members concerned or involved with legislative issues. In addition, the 99 page AFH Legislative Packet is available to members for \$16.00. It contains extensive information and arguments for the rights of herpetoculturists and will come in handy for any one challenging legislative matters.

LORIO REPTILE SUPPLIES, INC.

Professional Herpetological Products
 P. O. Box 892 • Langhorne, PA 19047

*Dedicated to Excellence in Herpetology
 and Customer Satisfaction*

For a free price list call:

1-800 -SNAKES-2
762-5372



BEASTS & BABES

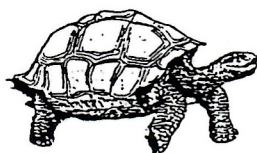
*We're climbing new heights to supply you with the
 best imported beasts & cutest captive-born babes
 available! Call today to see what new & unusual
 reptiles, amphibians and spiders are in our shop.*



GLADES HERP INC.

P. O. BOX 50911 • Ft. Myers, Florida 33905 U.S.A.
 HOURS: 11:00 a.m. - 5:00 p.m. Monday - Saturday
 PHONE: 813-693-1077 • FAX 813-693-1901

CENTRAL FLORIDA REPTILE FARM



Largest Stock of Turtles and Tortoises in Florida
 Captive-Born, Breeding Stock, and Imports
 If you can't find it anywhere, we have it.

Buy • Sell • Trade—Call Now For Price List
 Located 30 Minutes from Orlando
 10% Discount for Turtle and Tortoise Club Members

4800 Kumquat Street, Cocoa, FL 32926,
 Voice (407) 639-3325 Fax (407) 639-4513
 Charles & Marilyn Abbot, owners

Prophet and Gloss

An Interview With Wayne Hill

by
Robert G. Sprackland

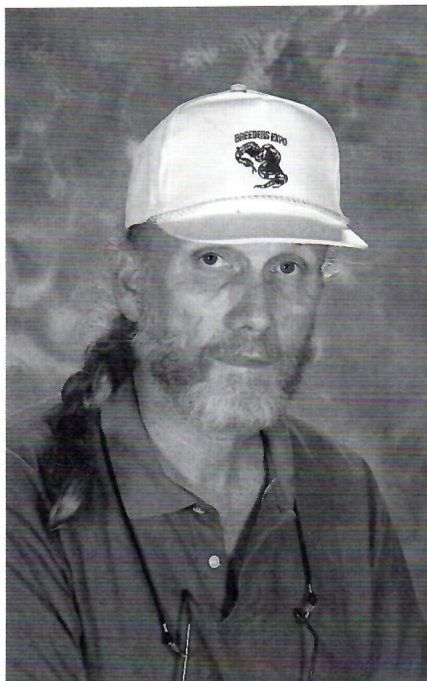
Herpetoculture has a rich cast of colorful characters contributing to its prestige and increasing popularity. Among the well-known is Wayne Hill, founder and long-time editor for the newsletter of the League of Florida Herpetological Societies, and founder and driving force behind the annual National Reptile Breeders' Expo held in Orlando, Florida. In these roles, he has spoken out as a prophet of the value—both monetary and political—of a well-organized, respectable, and unified herpetocultural community. Hill has worked hard to legitimize profit from breeding reptiles. I first heard of Wayne when we both were attending the Northern California Herpetological Society (NCHS) Conference in Davis, California, in 1991. His style and mannerisms elicit mixed reactions from people, and his presentation at the conference was folksy and unabashedly direct: you don't need a degree in psychology to know **exactly** where Wayne stands on any issue.

Wayne consented to an interview for *The Vivarium*, and I put forth a variety of questions that reflected both my curiosity about his work, and concerns other people had brought up. Wayne is an interesting personality, with strong views that are often well-documented by facts that easily illuminate his position. It quickly became apparent that Wayne sees himself as a friend to herpetoculturists, that he sees economic self-interest as the motivation to improve and increase captive breeding. He believes this captive breeding effort is the best way for herpetoculturists to reduce the collection of specimens from the wild. Only by making herpetoculture a profitable activity, he explains, will people in reptile-rich countries be encouraged to preserve and carefully harvest their wildlife, while motivating breeders to treat their stock as valuable, income-producing resources.

THE VIVARIUM: Give us some background, Wayne. Who are you, and how did you get into the Florida organizing scene?

HILL: I studied political science at six different colleges and universities, earning degrees at Polk Community College and the University of South Florida. However, it wasn't until 20 years later that I got to put this knowledge to use by fighting legislation on behalf of herpers.

I worked overseas as a logistics specialist for years, and spent a lot of time in the desert. Jesus and Mohammed also spent time in the desert. Jesus and Mohammed came back with religion, I came back with the League. I felt that Florida's herp societies were too small and fragmented, that organization on a statewide level was necessary if we were going to have input into proposed bills and impending legislation. I had been a gubernatorial worker when I was younger, so I have pretty good knowledge of how politics really work.



Wayne Hill

In 1980, I began to breed reptiles full time as a career, and began groundwork to organize the herp communities of Florida. I supported myself by breeding reptiles and supplying rodents to tourist attractions in Florida.

THE VIVARIUM: So how did the League get started?

HILL: I started doing a newsletter for the Florida state societies. Each would send news, and I'd collect and collate the material. I took a 30-member reptile club and used sound communication to turn it into a 1300-member league of 12 herp societies across the entire state. In 1987, we had 30 members and \$60 in the bank. By 1993, we had 1300 members and over \$100,000! I have been the only editor of the newsletter, and organized the League into

a political action group. During that time, not one piece of legislation that the League opposed has passed into law.

The League has been able to influence legislation because we are united by one monthly newsletter, allowing members to react quickly and with clout. LFHS member Eugene Bessette sits on a committee established by Florida's Fresh Water Fish and Game Commission to review their regulations in the state. Another member, Curt Harbsmeier, is a practicing attorney generating proposals for county and city ordinances pertaining to regulating the keeping of wildlife. We also finance legal battles on behalf of members who have been unfairly affected by city ordinances prohibiting the keeping of reptiles. The strength of our unity is that LFHS is proactive, not reactive.

THE VIVARIUM: What do you think about the role of the U.S. Fish and Wildlife Service (USFWS)?

HILL: The USFWS sometimes works against us, the herpers. I'll give you an example. A guy in Florida discovered some live turtles in a shipment that were not specimens he had ordered. They turned out to be an endangered species, probably from a Bengal meat market. He couldn't tell the USFWS because he had no permits for these herps and they'd confiscate the entire (legitimate) shipment. So he kept them and eventually sold them to several turtle people. Two years later, someone turned him in, and Fish and Wildlife went after him and all the clients. Now, the dealer didn't order the turtles in the first place and didn't want to keep them. The confiscated turtles have been held by the USFWS where they've been dying off. Several ended up at a zoo that didn't really want them, but were obliged to help out.

I asked a USFWS agent why all this happened, and he replied, "If we left those turtles with the public, people might breed them and then the government wouldn't know which animals were legal and which animals weren't." In other words, the government is afraid we'll breed endangered species!

THE VIVARIUM: That turtle story has been confirmed by two other well-known Florida herpetoculturists. From the point of view of USFWS agents I've spoken with, they need laws that are enforceable on a practical level, and they cannot sort legal from illegal animals in a shipment, that being a job for the courts. When you said that "USFWS works against us," I wonder if there is a way you

could suggest to get them to work better with herpetoculturists?

Hill: The USFWS is viewed by private herpers as strictly law enforcement, despite the fact that the agency has a variety of functions. Many times the power to interpret and enforce the law actually becomes the power to make the law. What is best for the animal is lost in this type of bureaucracy. The thinking of the USFWS has been dominated by what it takes to make the law easy to enforce.

I would like to see all captive breeding of reptiles and amphibians come under the U.S. Department of Agriculture (USDA) on both the state and federal levels, similar to tropical fish and ostrich breeding. The USDA views itself more as a Chamber of Commerce for an industry, at times even promoting the industry with tax dollars. They also serve as mediators when problems occur with foreign markets.

With the focus of the USFWS being primarily on law enforcement, many of its agents have taken the attitude that if what you are doing as a herper is not illegal, it must at least be immoral, when that is hardly the case.

THE VIVARIUM: *There is no question that the League has been the model of success for a regional herp society, but your major global contribution has been the Expo. Some of us in other parts of the country still haven't been able to attend, so tell us about this creation.*

HILL: For any herper who's been living in a cave for the last five years, let me say that the Expo is the National Reptile Breeders' Expo in Orlando, Florida, and is held each August. I chose August because it's a slow tourist month and people can easily get hotel rooms, kids are out of school, and because it's after most of the reptiles have hatched for the year.

We have 350 tables of exhibits, and internationally known speakers present papers one evening. Attendance has been around 5000, mostly serious herpers. A \$10 entrance fee keeps curiosity seekers out. The Expo is not designed to be an educational or entertainment event, but an industry showcase where breeders can display their work to fellow herpers. Camaraderie, not competition, is the mood of the event, and it is the biggest fund raiser of the Central Florida Herpetological Society (CSFH), one that enables us to give \$8,000 to \$10,000 in scholarships and grants each year.

Only captive-bred herps are allowed at the Expo. Last year we also permitted imported, ranched captive-bred green iguanas and boas with appropriate CITES II paperwork. I think it is important to encourage captive breeding in areas where habitat destruction is a major on-going problem.

Continued on page 17

Custom Cages



14 Dry Run Road
River Falls, WI 54022
1-800-766-6354
1-715-425-8888

High Quality Reptile Housing

SPECIALIZING IN NEW & EXOTIC CAPTIVE BRED BURMESE PYTHONS

PETE FITZGERALD

R • E • P • T • I • L • E • S

94 Expected Offspring

BURMESE PYTHONS:

- TRIPLE HETERO (albino, green, labyrinth)
(First Time Ever Produced - limited numbers available)
- HETERO FOR ALBINO LABYRINTH
- DOUBLE HETERO (albino, labyrinth)
- ALBINO GREEN
- DOUBLE HETERO (albino, green)
- GREEN
- ALBINO



Please Call or Send S.A.S.E. For Free Price Sheet.
PETER FITZGERALD / OWNER
JOHN PISTORINO / OWNER

PETE FITZGERALD
P.O. BOX 117
CEDARHURST, N.Y. 11516
(516) 239-3534

PRE-REGISTER NOW!

AVOID LONG LINES SEND \$10 TO
NATIONAL REPTILE BREEDERS EXPO

P.O. BOX 3277. WINTER HAVEN, FL. 33885

**WORLD'S LARGEST REPTILE SHOW
350 TABLES SOLD!**

AUG. 13 & 14, 1994

AT THE ORLANDO TWIN TOWERS HOTEL
AND CONVENTION CENTER, ORLANDO, FL

SCHEDULE OF EVENTS:

FRIDAY, AUG 12

12:00 NOON-9:00PM EXHIBIT SET-UP (EXHIBITORS ONLY)

SATURDAY, AUG 13

10:00 AM- 5:00 PM EXHIBITS ON DISPLAY FOR SALE AND VIEWING

SATURDAY, AUG 13

7:00 PM -MIDNIGHT LECTURES/SLIDE SHOWS
HOLIDAY INN ACROSS FROM TWIN TOWERS

SUNDAY, AUG 14

10:00 AM- 5:00PM EXHIBITS ON DISPLAY FOR SALE AND VIEWING

LECTURES/SLIDE SHOWS WILL BE PRESENTED BY:

DR. WALTER AUFFENBERG (U.S.A.)

DR. BILL BRANCH (SOUTH AFRICA)

DR. PETER PRITCHARD (U.S.A.)

DAVE BARKER (U.S.A.)

BRIAN CANTLE (AUSTRALIA)

THEO HENZEN (SURINAM)

HOTEL RESERVATIONS 1-800-327-2110

EXPO INFO 813 294-2235

THE VIVARIUM: Will there still be a role for the importer of wild-caught herpetofauna?

Hill: Herptile importers are important to the industry because they provide new species to private breeders, and introduce new blood lines to established breeding stock. Of greater importance, residents of some third world countries are learning to harvest animals from undeveloped habitat, rather than slash and burn it, plant domestic crops, or graze cattle. Harvesting, if it is done responsibly, gives the local people an income and a reason to keep their natural areas undeveloped. Despite this, many animal rights groups will move to totally eliminate reptile importation in the next 5 to 10 years. I am not investing in import companies, but I buy breeding stock from them on a regular basis.

THE VIVARIUM: Sadly, many dealers and legions of pet stores help to perpetuate the idea that reptiles are poorly treated in captivity. This causes the animal rights folds to believe people shouldn't be allowed to buy them. What are your feelings about this?

HILL: Animal importers have a bad reputation for not caring for their animals. As in every other industry, a few bad individuals perpetuate the image. The importers I know spend more on food for the animals and salaries for employees to feed them and clean their enclosures than on all other expenses combined. There are good business reasons for protecting the investment in their animals because the reptiles are getting more expensive and harder to obtain each year. Many importers are genuinely concerned for the welfare of the animals.

I agree that any pet store that sells herps should include in the price the cost of a care book or information sheet on the proper care of the animal. In fact, there are excellent sheets produced free by the Chicago Herpetological Society. If a shop doesn't give you this kind of authoritative information, you shouldn't be rewarding them with your business.

THE VIVARIUM: How do you see academic herpetologists contributing to herpetoculture?

HILL: There needs to be more of an awareness and appreciation of captive breeding by the academic community in general. Publishing seems to be the only common denominator between these groups. As always, the old adage "publish or perish" is affecting the academic community. Today, some academics are publishing for the greater herp community, not just the academic community. The Expo and various herp societies have helped popularize these books. Increased sales have encouraged

Continued on page 40

ERRATA: The 5.6 issue of **The Vivarium** inadvertently misspelled "sulcata" in the following ad. Our apologies to Reptile Breeders, Inc.

Reptile Breeders, Inc.

- Geochelone sulcata
- Boidae
- Colubridae

Wholesale only (large volume).
Foreign accounts are welcome.

24691 Venablo Lane

Mission Viejo, CA 92691

USA fax (714) 855-9938

NEKTON[®] NEKTON[®]

NEKTON-REP

A COMPLETE VITAMIN
SUPPLEMENT FOR
REPTILES & AMPHIBIANS.



Other fine products for Reptiles & Amphibians from Nekton

TONIC-R

- contains the nutritional requirements an animal's organism needs.
- is an effective aid to preventing vitamin and mineral deficiencies.
- helps support the organism in times of stress.
- is an excellent aid to treatment in illness.
- the ideal diet for hand raising.

MSA

- supplies breeding and young animals with essential trace elements and minerals.

REP-COLOR

- contains supplementary Canthaxanthin and Apocarotenal.
- develops deepest color and brings out faded colors.

For more information
call or write:

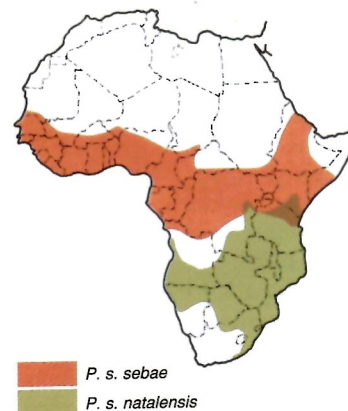
NEKTON U.S.A., INC.

14405 60th Street North
Clearwater, Florida 34620
Phone (813) 530-3500
FAX (813) 539-0647

NEKTON -PRODUKTE
W.-GERMANY

the African GIANTS

by Dave and Tracy Barker



In late 1989 we mailed survey forms to the reptile departments of American zoos in attempt to gain some understanding of the total number and species of pythons in public collections. While our survey requested information on all pythons, we were particularly interested in the numbers and species of large pythons maintained in U.S. zoos.

Following the tradition established by Clifford Pope in his 1961 classic, *The Giant Snakes*, we used his designation in "giant pythons" to refer collectively to Asian rock pythons, *Python molurus*, reticulated pythons, *P. reticulatus*, African pythons, *P. sebae*, and scrub pythons, *Morelia amethystina*. We requested specific information about the three subspecies of the Asian rock python (Indian python, *P. m. molurus*, Burmese python, *P. m. bivittatus*, and Sri Lanka python, *P. m. pimbura*) and the two subspecies of the African python (African rock python, *P. s. sebae*, and lesser African python, *P. s. natalensis*).

Fifty zoos responded to our survey, including all but two zoos with significant col-

lections of reptiles. In these zoo collections was a total of 99 "giant" pythons. Burmese pythons were the most widely represented form, with a zoo population of 48 specimens. Second in numbers was the reticulated python with a total of 26 specimens.

We were surprised to find so few giant snakes in zoos. We found that most zoos had only one or two specimens and most were making no attempt to reproduce any of their giant pythons. (Indeed, we were repeatedly told that the majority of zoos were trying hard not to reproduce them.) We were surprised to learn that only two taxa comprised nearly 75% of the total holdings of giant pythons. But most surprising to us was that in zoos we found only three specimens of the African rock python, *P. s. sebae*, and no specimens of the lesser African python, *P. s. natalensis*.

Looking in *Slavens and Slavens Reptiles & Amphibians in Captivity, Breeding, Longevity & Inventory*, editions 1989 and 1990, we found one more specimen of an African rock python in a U.S. zoo that had not

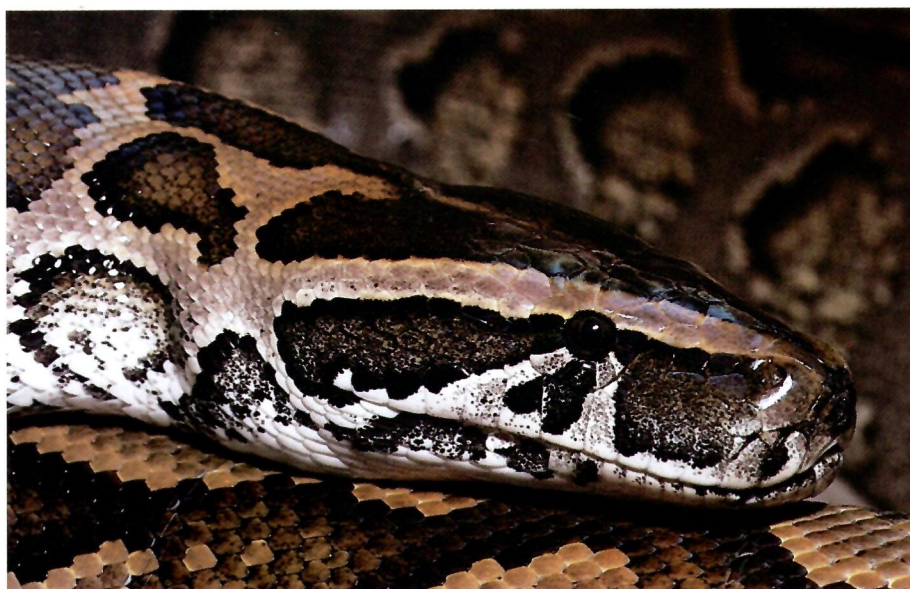
shown up on our survey. This inventory listed only six specimens of African rock pythons and three specimens of lesser African pythons in North American private collections.

Now, while there were certainly many small private collections with *P. sebae* that had not reported their holdings to the *Inventory*, the *Inventory* is a good indicator of the relative abundance of a species in captivity. And all indications were that the African rock python and, especially, the lesser African python were both among the very rarest forms of pythons in captivity in the United States.

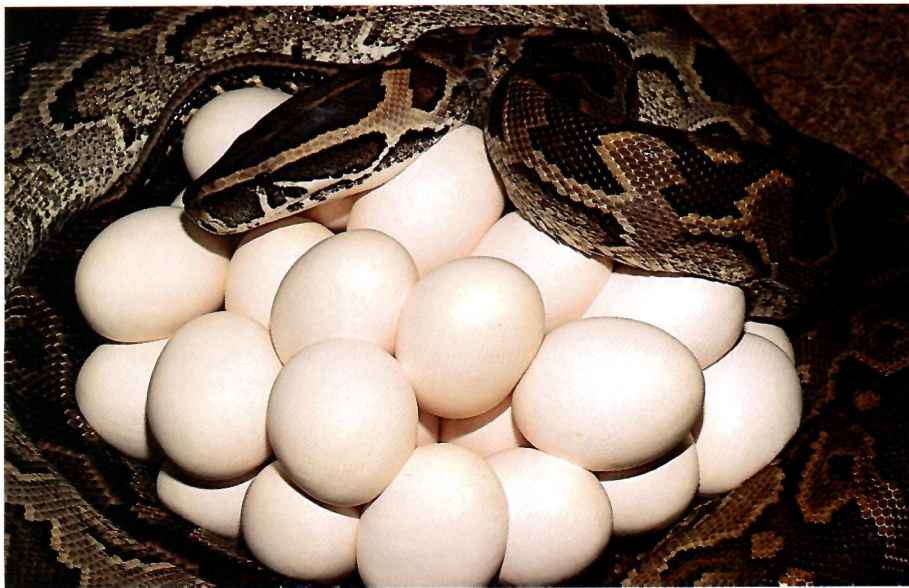
We had always considered the African rock python to be a common species. Certainly this is a widespread species in Africa, found from equatorial sub-Saharan Africa south nearly to the southern tip of Africa. When we checked with other python breeders and fanciers who were not listed in the inventory, we found only a very few specimens scattered around, with very few keepers, and none were breeding the species. When we checked with importers we learned that, while the species was available, they found very little demand and, relative to other python species, imported few African pythons. We had assumed that African pythons were a larger presence in captivity than in fact they were.

We made the decision to work with this species. In the late spring of 1990, we obtained specimens of both subspecies with the intended purpose of eventually reproducing them and documenting the maintenance and husbandry techniques necessary for this species in captivity.

We obtained a group of six hatchling *P. s. sebae* from Ghana, captive-hatched and exported by Greyhead Enterprises of Accra, Ghana. In the past, we have known a few African rock pythons that were sweet-tempered and gentle as well as several that were dark-natured, suspicious, and violent. So, it was with caution that we first approached



African rock python (*Python s. sebae*). West African specimens of African pythons are particularly beautiful, retaining their hatching colors and pattern throughout life.



African rock python (*Python s. sebae*). Fifty eggs seem an impossibly large clutch for this female.

these hatchlings. It was a pleasant surprise to learn that they were all cautious, deliberate, and pleasant animals. In fact, they are among the nicest baby pythons that we have ever raised, and even now, four years later, not one of these animals has ever even halfheartedly made an attempt to bite or strike at us.

At the same time, we acquired one male and two female specimens of *P. s. natalensis* from southern Tanzania. These three animals, young adults at the time of their acquisition, were as flighty and prone to bite as any python ever in our care. In these past few years they have nicely settled into captivity, but they must be worked with caution for they will never pass up a chance to bite a keeper.

There are several characters that will differentiate the African rock python, *P. s. sebae* from the lesser African python, *P. s. natalensis*. Both subspecies tend to have pale sides and dark backs, but there's considerable difference in the blotching of the subspecies; *P. s. sebae* has irregular-shaped, large, pale blotches down the length of the back, often fused to form thick, irregular-width, longitudinal striping; *P. s. natalensis* tends to have smaller and rounded pale blotches. The overall appearance of the back appears more dark in *P. s. natalensis* than *P. s. sebae*. The scalation of the top of the head of *P. s. sebae* includes large plate-like scales, including internasals, prefrontals, several large frontals and supraoculars; the scalation of the top of the head of *P. s. natalensis* consists of a small pair of internasals and the rest of the scales are small, even granu-

lar. There are numerous pattern differences between the forms: *P. s. natalensis* has a stripe on the bottom of its tail and irregular blotches on top whereas *P. s. sebae* has a well-defined stripe on top of its tail and irregular mottling on the bottom. The chin of *P. s. natalensis* is flecked with black while the chin of *P. s. sebae* is white and without markings; *P. s. sebae* has a well-defined triangular blotch below the eye while *P. s. natalensis* has a small dark spot or no marking at all. Although somewhat difficult to quantify, perhaps the most notable difference between the forms is that *P. s. sebae* is a truly large python with adults averaging 13–18 ft. (3.7–5.5 m) in length and with a known maximum length of 32 ft. (981 cm) for an Ivory Coast specimen killed and measured in 1932. In contrast, *P. s. natalensis* is a smaller animal, most adults being 8–10 ft. (2.4–3.0 m) in total length, with a maximum length of only 14–15 ft. (4.3–4.6 m).

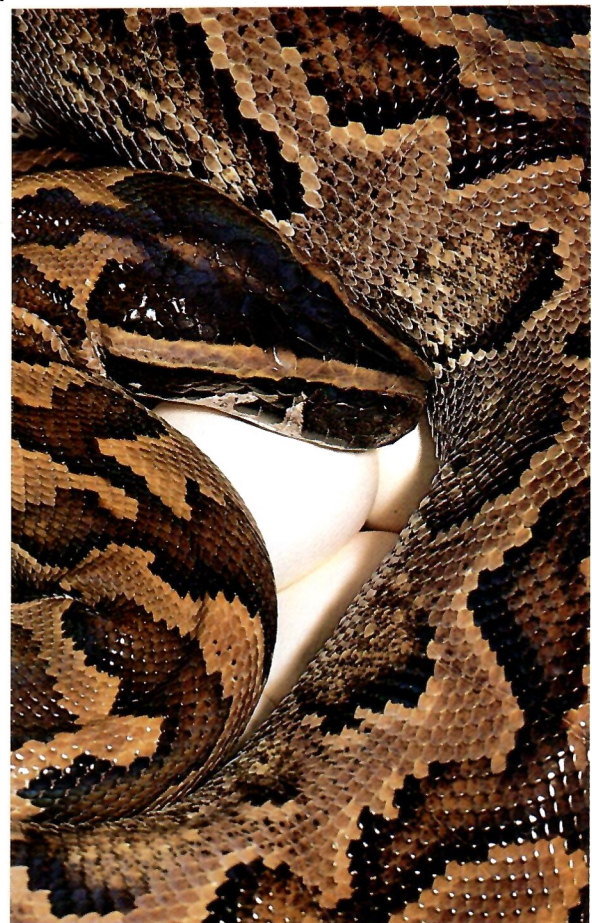
Both subspecies have done well for us, and we can report no special maintenance requirements for either. We have



African rock python (*Python s. sebae*). This youngster is taking his first breaths. Clearly visible on the end of his snout is the egg tooth used to slice open the egg.

kept them in the same conditions and used the same maintenance techniques as is common for reticulated pythons and Burmese pythons. We have freely handled the African rock pythons since they were tiny. They like to continually move and crawl when they are picked up, making them more difficult to handle than other giant python species. It's not a big deal now that they're grown up and are too large to hold. When unconfined, they move and explore almost continually. They are very trusting of their regular keepers, and they often hiss loudly when they are aware of people unrecognized or new to them.

One difference of importance to keepers of the African python from the other large pythons has to do with their method of grabbing prey. African pythons, both subspecies, at least in captivity, will often strike past of-

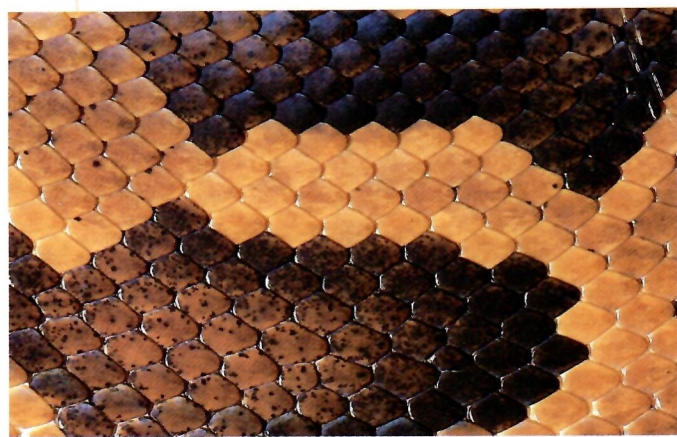


African rock python (*Python s. sebae*). Our African rock pythons remained very calm when we took their eggs away to be artificially incubated.

fered prey items, contact and begin to constrict the prey with their necks, and once firm contact is made, turn their heads and then bite their prey. In other words, African pythons often sort of "lasso their prey" before they bite it. When young, our African pythons almost exclusively fed in this manner, but now, accustomed to their feeding routine, they will often directly accept prey.



African rock pythons (*Python s. sebae*) have fewer and larger head scales than do the lesser African pythons.



African rock python (*Python s. sebae*). The skin is beautifully iridescent.

This lassoing is a different behavior from any other large python species. The neck of a hungry African python is sensitive, sort of a feeding trigger. It's important for keepers to realize that, sometimes in certain circumstances, contact with the neck will initiate a feeding response.

One of our three lesser African pythons, a female, came to us with a chronic respiratory infection. We tried several different treatments, but despite our attempts, she died after 18 months. We have not had any other health problems with any other African pythons and we consider them to be a very hardy species.

Our African rock pythons grew up very quickly. In July 1990, they averaged 3.2 oz (90 g). In July 1991, they averaged 22 lb (10 kg). By July 1992, the four females in the group averaged about 42 lb (19 kg), the two males about 34 lb (15.5 kg), and we felt it possible that they would reproduce that winter.

In November 1992, the males ceased feeding, and in December, we introduced the males together. After 30 quiet minutes, very physical combat began, and continued until we separated the males, about 20 minutes later. No biting was observed, but there was head raising, topping and throwing,

body wrapping and constricting, tail wrapping and spurring, lots of pushing and shoving, all the components of a good wrestling match. Ever since that match, last winter and this winter, both males appear to try to initiate combat with their keepers when their enclosures are opened. They aren't feeding during that time, and they don't bite, but they raise their heads, and glide up to their keeper, and seem to enjoy some pushing and shoving. They do not do this outside the breeding season, and females have never done it. Actually, it's kind of fun. We've also noticed this behavior in male Burmese pythons during the breeding season. Maybe we've just been hanging around pythons too long.

In November, we stopped feeding the females of both subspecies. The African pythons are kept under our normal winter conditions; we shorten the light cycle in our building to 9 hours of light, and allow the temperatures to drop to nighttime lows of 79–80°F (26–27°C) and daytime highs of 85–86°F (29–30°C). The females have a FlexWatt™ heating pad under their cage measuring 11" x 18" (27 x 46 cm) providing them a nighttime warm spot of 86°F (30°C). In the middle of the winter they seem to deliberately avoid this spot, but in late winter they increasingly begin to sit on it. During the day the females have a basking light that provides the voluntary option of several hours of 89–92°F (32–33°C) basking. Again, in the winter they bask very little; they increase the amount of basking time as spring draws near.

We introduced the female African pythons to the males in late December. Copulations are observed from that time through February. In 1992, the female *P. s. natalensis* and one of the four female *P. s. sebae* did not ovulate. One female *P. s. sebae* with ovaries full of 46 large follicles died when her ovaries were ruptured by a combatting male. She had been with one male on repeated occasions. When we placed her with the second male, she was physically and violently mistreated by this animal who, we hypothesize, apparently recognized and reacted to the scent of the first male. We have never before observed this to happen with any python.

One female *P. s. sebae* ovulated on 20 February 1993, the other on 24 February. During the period of ovulation, the females had a huge midbody swelling that lasted for nearly 24 hours. Sixteen and 17 days later, respectively, these two females shed their skin. They were given a tray of damp sphagnum, on which they coiled and eventually laid their eggs 38 and 37 days after their shed. Both females laid their eggs 54 days after ovulation.

The first clutch consisted of 50 adhered fertile eggs weighing 18 lb (8.2 kg). After laying, the female weighed 43.5 lb (19.8 kg). The second female deposited a clutch of 51 eggs, consisting of 29 fertile eggs weighing 9.5 lb (4.3 kg) and 22 infertile eggs weighing 3 lb (1.4 kg). After laying, the second female weighed 46.5 lb (21.1 kg).

Seventy one healthy babies hatched after 78–79 days incubation at 90°F (32°C) in slightly damp vermiculite. The babies weighed 2.8–3.6 oz (80–102 g), averaging 3.2 oz (90 g), and were about 22–23 in. (56–58 cm) in length (we didn't take exact measure of length).

This past breeding season (1993–1994) we repeated the conditions of the previous year, and this year the same two female *P. s. sebae* reproduced, as did the female *P. s. natalensis*. One female *P. s. sebae* ovulated on 25 February 1994, the other on 3 March. Eighteen days and 17 days later, respectively, these two females shed their skin. Again, they were given a tray of damp sphagnum, on which they coiled, often up-side-down, and laid their eggs 36 and 34 days after their sheds. This year, the first female laid her eggs 54 days after ovulation, the second female 51 days after ovulation.



African rock python (*Python s. sebae*). This is the midbody swelling, often referred to as lumping, that occurs during ovulation.

Both females deposited clutches of 55–60 adhered fertile eggs. Both clutches weighed 18 lb (8.2 kg). The first female weighed 44 lb (20 kg) after laying, the second weighed 46 lb (20.9 kg) after laying. Both females are approximately 13 ft. 6 in. (410 cm) in total length. The two males are similar in size; we measured one on 30 April 1994 at 11 ft.

7 in. (353 cm) in total length, weighing 45 lb (20.4 kg). We have never observed *P. s. sebae* females to do thermoregulatory shivering. Both females have been easily and quietly removed from their clutches, without protest.

The off-white eggs appear uniform in size and shape; measurements of 13 eggs in the two clutches ranged from 2.9–3.1 in. (7.4–7.9 cm) in length (average 3 in. (7.6 cm)) and 2.3–2.5 in. (5.8–6.3 cm) in diameter (average 2.4 in. (6.1 cm)). At the time of this writing these eggs have not hatched.

The last copulation of our pair of *P. s. natalensis* occurred on 17 February 1994, and the female *P. s. natalensis* ovulated on 21 February. Ovulation was made apparent by a huge midbody swelling that lasted for nearly 24 hours. She shed her skin 18 days later. At that time, a Styrofoam fish-shipping box half full of slightly damp sphagnum moss was placed in her cage for use as a nest box. She laid a clutch of 18 fertile eggs in the nest box 38 days after shedding, 55 days after ovulation. After laying, she weighed 13 lb (5.9 kg) and measured 8 ft. 3 in. (251 cm) in total length. At that time we measured the male at 7 ft. 10 in. (239 cm) in total length, weighing 7.5 lb (3.4 kg). We did not observe the female *P. s. natalensis* to do thermoregulatory shivering. She very aggressively defended her clutch of eggs.

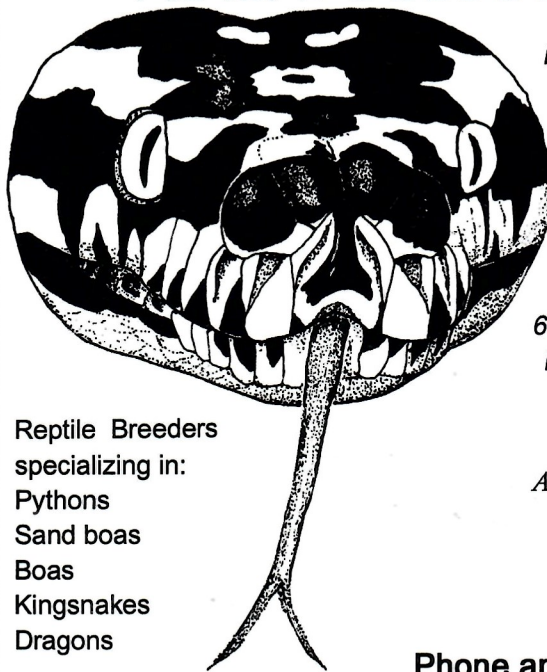
The clutch of *P. s. natalensis* eggs weighed 5.6 lb (2.55 kg). The one egg not adhered to the rest weighed 5.6 oz (158 g). Measurements of five eggs ranged from 3.4–3.9 in. (8.6–9.9 cm) in length, averaging 3.6 in. (9.2 cm), and 2.1–2.3 in. (5.3–5.8 cm) in greatest diameter, averaging 2.2 in. (5.5 cm). At the time of this writing these eggs are incubating at 90°F (32°C) in slightly damp vermiculite.

We have greatly enjoyed working with African pythons, but they certainly are not for everyone. Our African rock pythons, *P. s. sebae*, are wonderful friendly giants, but they continue to grow. They are too large for any but serious big-snake fanciers. Our own lesser African pythons, *P. s. natalensis*, have not been the friendliest snakes, but many *P. s. natalensis* can be very well behaved and friendly snakes. We're impatiently waiting to see if our captive-bred babies can't be raised to be more calm and better behaved. Their temperament is of no real concern to us because they are such a reasonable size. These pythons are interesting, poorly known, and rarely seen in captivity, and we will be working with them for some time to come.



Vida Preciosa International, Inc.

V.P.I. PYTHONS



Reptile Breeders
specializing in:
Pythons
Sand boas
Boas
Kingsnakes
Dragons

We sell Non-Contact
Instant Temperature-sensing Equipment,
With or Without Laser Sights

The Largest and most Diverse
Python Collection in the World

Dave and Tracy Barker
Tracy Thompson
Kurt Walker

Selling only the finest
Captive-Hatched stock.

65 Years combined experience
Breeding 22 forms of pythons

WE BUY AND BROKER
CAPTIVE HATCHLINGS
AND PRIVATE COLLECTIONS



V.P.I., Inc
P.O. Box 300

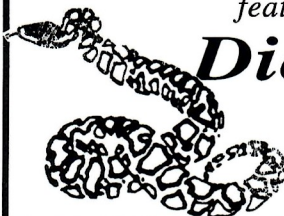
Boerne, TX 78006

Phone and Fax: (210) 537-5000

Send \$2.00 for Price List
se habla español

Producing quality Pythons, Boas, Tortoises, and other select reptiles

Send \$3.00 for a price list, which includes all future lists,
featuring several color photos.



Dick Goergen

P.O. Box 225
Alden, NY 14004
(716) 681-4518



The Bean Farm



Complete line of quality mail order dry goods

Specializing in Flexwatt Heat Tape,
Books, Lighting, & Health Products

Write or call for FREE catalog!

32514 N.E. 77th
Carnation, Washington 98014-6701
Phone (206) 861-7964 FAX (206) 333-4205

THE REPTILE RESOURCE INC.



CAPTIVE-BRED NO IMPORTS
BUY, SELL, TRADE
(MAIL ORDER)

• BOAS • LIZARDS
• PYTHONS • COLUBRIDS

7507 SOUTH TRAIL #64 SARASOTA, FL 34231 MARC BIRKNER (OWNER)

Call or write for price list
(813) 925-9238

THE PATH TO A CAREER IN HERPETOLOGY

For some it's the path to a dream. For others, it's just years of drudgery. Is it for you?

by

**Robert George Sprackland
and Sean McKeown**

There are more possible careers in herpetology today than ever before. Is there a place in this line of work for you? What does it take to become a curator, professor, reptile veterinarian, or zoo keeper?

The terms "amateur" and "professional" are contested emotionally by many people, and getting a consensus definition (even among *The Vivarium's* editors) is difficult. For this article, "professional" will refer to a person earning a living from the pursuit of an activity. "Amateurs" may make some money from their interest, but it is not their principal source of livelihood.

Herpetological careers can arguably be divided into several main categories.

Academic herpetologists usually work in universities, large museums, or other research-based organizations. Whereas 25 years ago many of these positions were filled by naturalists, most today are not. These positions typically require a Ph.D.

University herpetologists may be further broken down into teachers or researchers. The great majority are teachers, although the two are not exclusive. Surprisingly, herpetology is the secondary, rather than the primary responsibility for over 90% of herpetology professors at American universities. Their main function is to teach a variety of biology courses to undergraduates, to supervise and direct graduate students, and to publish technical articles in peer-reviewed journals. In contrast, a curator or collection manager with a major museum has less interaction with people outside his or her department or with students. Their work is split between preserved collection management/administration and specimen-oriented research. Much of their day-to-day work has to do with systematics and the evolution of a species or groups of species.

Other academic herpetologists work in a community college setting where the emphasis is on teaching rather than research and teaching. A greater number of these positions are held by naturalists. The minimum educational requirements for community college instructors are a master's degree and

a community college teaching credential, although many also possess a Ph.D. degree. Naturalist herpetologists also include curators, assistant curators, senior keepers, and reptile keepers in zoos, nature centers, regional natural history museums, rangers and park naturalists, and others involved in studying, conserving, or educating about natural populations of reptiles and amphibians. These positions generally have a minimum requirement of a bachelor's degree and prior experience. At the curator or supervisory level, many incumbents possess a master's degree or a Ph.D.

The term herpetoculturist can broadly include anyone keeping live reptiles and amphibians, with the central goal being captive husbandry and reproduction. Requirements vary, with many positions, such as breeders and dealers, needing as much business and management training as herpetological background. Obviously the groups are not exclusive, and there are large gray areas. Fine, this simply gives the individual more latitude in choosing a place and a path. Let's examine the career paths for the first two categories.

Preparation

Before walking that path, you should develop a self-assessment. Why do you want to get into the profession? If you want to breed 40 species of colubrid and boid snakes and sell them, the academic route might be too peripheral and unrewarding for you. If you desire to understand how and why species evolve, have good skills in math and statistical analysis, and have a keen interest in the rapidly moving area of stabilizing scientific names, the academic route is a virtual must.

But neither should the amateur believe only professionals can contribute to the science of herpetology. Many authors, from noted Swiss Zoo Director R. Honegger to chemistry professor and monitor lizard expert Hans Georg Horn have written extensively in support of the contributions of those who do not make their living based on professional training in zoology. In fact, it is this detrimental belief that keeps many highly competent breeders and unpaid naturalists from writing up their observations for publications such as this one, when those contributions might prove quite valuable.



Robert G. Sprackland in the field at Loch Ness.

University And Museum Herpetology

Assuming you've examined the costs and reasons for going the university route, how do you find a suitable school? The best way is word of mouth from friends or from herpetologists you have met. A school is more than a reputation, it is people. Do the people study the subjects you are interested in? Are they essentially wildlife management oriented or is their emphasis in anatomy, ecology, or evolutionary biology? The next question is whether you can work together with your major professors, or are your personalities and philosophies from different planets? Scientific objectivity notwithstanding, in a Ph.D. program if there is a personality clash, your chances of success are just about nil.

Scan the major academic herpetology journals, including *Herpetologica*, *Journal of Herpetology*, and *Copeia* to see who is doing herpetology that is of interest to you. These journals are written by potential teachers from universities around the world. Each article lists the name and academic address of the author, and you can write to find out about the possibility of studying with the authors. This is an excellent way to find out which schools emphasize lizard ecology, frog taxonomy, or salamander development.

Contrary to a few claims here and there, nobody graduates college with a bachelor's degree in herpetology. As an undergraduate (your initial 4 years), you may earn a bachelor's degree in biology, zoology, or ecology, with an occasional peripheral major, such as evolution or physiology, showing up as well. It depends on the school you attend and the course sequence you follow. Assuming you enter this route, plan on

spending about 4 to 5 years in pursuit of a bachelor's degree, possibly more. Articles published in the *Chronicle of Higher Education* over the past several years tell of a national average of nearly 7 years for today's students to finish their bachelor's degrees, up significantly from two decades ago. This delay is partly because more students now have to work in order to pay the ever spiraling fees for tuition and books, and partly because required science, math, and statistics courses are so demanding that very few students can take them all, and pass, in just 4 years.

As an undergraduate you will need to take basic biology, chemistry, and physics (1 year each), plus mathematics, usually through calculus, plus upper level courses in biology. Among the offerings are such essentials as ecology, comparative anatomy, evolution, general zoology, general botany, and a natural history field course, plus the lab that goes with each. Few undergraduates take specialty courses such as herpetology because there are always prerequisites, each with its own prerequisites, thus ensuring that herpetology remains an upper-level class. You must also take distribution classes in humanities, arts, and languages (though this can often be substituted with computer courses). This ostensibly makes you well rounded; most of us who went through this believed it was just a ploy to ensure employment of professors in those fields. If you take a B.A. course in the U.S., you generally have a bit more flexibility in the courses you take, while the B.S. track is more rigid. In the final reckoning, it really doesn't make much difference which degree you get. If you plan to go to graduate school you will need excellent grades, at least a 3.0 GPA (B average) and in a variety of classes.

For additional information about herpetology opportunities in universities and museums, get a free copy of "Careers in Herpetology," published by the American Society of Ichthyologists and Herpetologists, U.S. National Museum of Natural History, Washington, D.C.

Graduate School

If you want to become a university professor, or work as a curator for one of the better accredited American Zoo and Aquarium Association (AZA) zoos, plan on going to graduate school. Master's degrees usually take 2 years of full-time study after a bachelor's degree. It is at this stage you are most likely to take one or more herpetology courses. Some master's programs are entirely done by classes and examinations, suited to people interested in teaching, and for whom an M.A. will be the final degree goal. Others will produce a thesis, often with the intent of using this time to see if

they really want to go on to a Ph.D. and a career in research.

You can go directly from a B.A. into a Ph.D. program; there are no rules against this, but beware. If you don't finish a Ph.D. program, you may have spent 3 years and many thousands of dollars and have only a B.A. Many schools have provisions to award good students, who for one reason or another decide not to finish Ph.D. require-



Chaffee Zoological Gardens Curator of Reptiles Sean McKeown is frequently involved in conservation programs with other zoos, such as here with a Komodo dragon (*Varanus komodoensis*) at the Taronga Park Zoo in Sydney, Australia.

ments, with a master's degree. This humane action is not yet the rule; some schools offer it, others don't. If you elect to zip straight into a Ph.D. program, check for this escape clause carefully.

What is in store for a Ph.D. student? To start, another year or two of classes! Then you take a gruelling examination that sometimes spans several days, and may cover any aspect of biology or zoology, dating back to your first undergraduate course. This ordeal, called comprehensive examinations, is almost universally regarded as the worst experience you will have as an academic. Afterward, you will conduct a research project and write up your results into a dissertation. "Ph.D." means Doctor of Philosophy, doctor being an ancient term for an expert qualified to teach and evaluate other experts (in short, a professor), and philosophy means "lover of wisdom." Ask a Ph.D. holder what the degree signifies, and you'll get answers from the terse "it means I've been trained as a researcher," to esoteric answers that indeed sound as if they've come

from a medieval source. Overall, a Ph.D. pegs you as a person competent to find problems, attempt solutions, and present accounts of this procedure in a professional manner to other experts. As in any other activity where humans are engaged, the finished products are as different as the people themselves. However, if you want to be a university professor, don't leave home without one.

Research Careers

Research jobs will require you to do research at the university, a field station, or in a foreign country. This is often in addition to teaching. Research funds are rarely offered by the institution where you work, so you must learn the skills of writing grants (grantsmanship). If you expect to get tenure (the medieval aspect of academia), giving you a virtually iron-clad permanent job barring a few illegal activities, you must publish in refereed journals, those that send manuscripts out for review by other experts.

Do You Belong In A Zoo?

Are you an animal behavioralist or do you have real skills with live animals, their management, care, and breeding? Are you keenly interested in conservation and biodiversity? Do you readily share important new findings? Can you work well in an organizational setting and interface well with coworkers, the public, state and federal agencies, and foreign wildlife departments? If your answers to these questions are yes, perhaps a zoo career is for you.

Today's zoos are conservation organizations that genetically manage rare wildlife and educate the public about animals and ecosystem diversity. Zoos with major herpetile collections have a curator or department head. The curator functions as a scientist and usually also does some field work in his or her area of specialty. A curator oversees the management of the collection, the acquisition of animals, writes articles, lectures to zoo docents (volunteers), works with state and federal wildlife officials, and presents information at management conferences. The basic qualifications to be a reptile curator are a bachelor's or master's degree in zoology, biology, wildlife management, animal science, or related field followed by several years of work at an American Zoo and Aquarium Association (AZA)-recognized zoological park as an assistant reptile curator, reptile department supervisor, or senior keeper. Additionally, the successful candidates must have written journal articles on reptile management and breeding and possess good record keeping and photography skills. A number of curators

Continued on page 41

Ask the Experts

by Winston Card



Winston's interest in herps developed at a young age while growing up in Gainesville, Florida, a town with a rich herpetological history. His earliest experiences with reptiles began while watching alligators cruising along the edge of Newnans Lake just outside of Gainesville. Later, while enrolled at the Santa Fe Community College Teaching Zoo, his interest was turned into an obsession by Eugene Bessette, owner of Ophiological Services. Winston spent two years under Eugene's tutelage before moving on to spend several years in the reptile department at The Central Florida Zoo. At present, he is senior reptile keeper at the Dallas Zoo. Among his most recent accomplishments are the first captive reproduction of the Gray's monitor (*Varanus olivaceus*), development of a radiographic sexing technique for Gila monsters (*Heloderma suspectum*), and publication of a variety of technical papers in *The Journal of Chemical Ecology*, *Journal of Herpetology*, and *Herpetological Review*. Winston is also studbook keeper for six species of rare Asian monitors held in North American zoos.

If you have a question you would like answered please send your question to Attention: Q & A Column, P.O. Box 300067, Escondido, CA 92030. We reserve the right to edit all submitted materials.

Q. I have recently acquired a varied collection of snakes with the hopes of breeding them. Do you have any suggestions on how I might incubate the eggs, assuming I get any.

Jacksonville, FL

A. Incubation parameters vary depending on the family, and sometimes the species. Without more information on the species composition of your collection it's difficult to give specific advice. However, I will attempt to relay some general information concerning reptile egg incubation.

Several incubation media are available, including sphagnum moss, perlite, and vermiculite to name a few. My personal preference is vermiculite. For vermiculite a 1:1 mixture by weight with water is recommended for most reptile eggs. Four to five inches of incubation medium should be placed in a clear air-tight container, such as a sealed gallon jar or glass aquarium. Eggs

should remain partially exposed above the medium to allow for proper air exchange and visual monitoring. The container should be opened once a week or so for a few minutes to allow for fresh air exchange. As a general rule, only enough eggs to cover half the surface area of a container should be placed together.

On occasion clutches of eggs will adhere together after oviposition. Too vigorous an attempt to separate adhered eggs may cause more problems than it solves. Masses of adhered eggs can be safely incubated together provided a large enough container is used. Simply leave a third of the surface area of the egg cluster exposed. Enough air should pass through the spaces between the eggs to allow for proper ventilation.

The best method for incubating reptile eggs is the more controlled environment that an incubator provides. Most snakes eggs will incubate at about 82°F (28°C). Python eggs generally require slightly higher temperatures of around 87°F (30°C) depending on the species. Some the brooding species of pythons have been successfully incubated at temperatures as high as 90°F (32°C), but recent studies indicate that survivorship of young decreases at temperatures above 87°F (Packard and Phillips, in press; I would suggest that the reader refer to this paper for a more indepth discussion of reptile egg incubation). Eggs that begin to mold during incubation should be removed (if possible) to prevent contamination of other eggs in the clutch.

In the November/December 1993 issue, Volume 5, Issue 3, of *The Vivarium*, Allison Alberts describes a simple, inexpensive incubator that will probably work for a variety of reptiles. However, some species require a more controlled environment; this is especially true of most pythons. If your collection consists of such species, you might consider investing in one of the commercially available incubators. These can usually be purchased through one of the commercial herpetological supply companies or at a local feed and seed store.

References

Packard, G. C. and Phillips, J. A. In press. The importance of the physical environment for the incubation of reptilian eggs. In *Captive Management and Conservation of Amphibians and Reptiles*. Editors, Murphy, J. B., Adler, K. and Collins J. T. SSAR contributions to herpetology.

Q. My ball python has not accepted food since I purchased her five months ago. She is not gravid, as best I can tell. My vet has recommended force feeding her. Is this the best advice I can get?

Waco, TX

A. A recent phone survey conducted over several years at the Dallas Zoo indicate that this is a common problem. We receive, on the average, 6000 phone calls a year in the reptile department (David Roberts and Ardell Mitchell, pers. comm.). A large percentage of those calls concern this very subject.

In general this problem is encountered more often with wild-caught specimens than it is with captive-hatched specimens. This condition can often be attributed to captive environmental stress. If you are sure your specimen is not gravid, try some of the following suggestions that have proved successful for many of our callers.

Provide an enclosure that the animal can feel secure in, such as a 10 or 15 gallon aquarium. Cover the cage floor with a sheet of newspaper. Also, cover the sides of the enclosure so the animal is visually isolated. Provide the animal with a hide box and water bowl. Thermoclines of 80°F to 88°F (28°C to 31°C) should be maintained in the enclosure to allow for proper thermoregulation. Do not handle the animal until it is feeding. Once the snake has had a chance to adjust to captivity, it should begin to feed on its own. However, if the snake still refuses to accept food, you may need to take more drastic measures.

Collect enough leaves to fill the enclosure about half way. Disinfect the leaves in a 10:1 solution of bleach and water for at least 24 hours prior to use. It may be necessary to place a weighted object on the leaves so that they are completely submerged. Place the leaves in full sun light on a window screen for another 48 hours to dry, this will evaporate the bleach solution and help eliminate any remaining contaminants. Place a small water dish on the floor of the enclosure. A small plywood shelter placed over the water dish, allowing enough room for the snake to drink, will help keep leaves from filling the dish.

Introduce the animal into the enclosure and leave it alone for a few days. Once the snake has had time to adjust to its new environment, place a pre-killed mouse on top of the dried leaves and leave it overnight. If the pre-killed mouse is refused, place a live mouse on top of the leaves, also, place a small amount of food for the mouse in the cage. If the live mouse is not accepted after a few hours, remove it. **NEVER LEAVE** live rodents unattended in a cage with any



Pueblan milk snake (*Lampropeltis triangulum campbelli*) ovipositing a clutch of eggs. Photo by Don Boyer. Courtesy of the Dallas Zoo.



An example of what can happen when live rodents are left unattended with snakes. Photo by Robert Cabello.

reptile overnight. This will eventually result in the injury or death of one or more of your specimens (see illustration). It may be necessary to try other food items, such as hamsters, gerbils, or chicks before finding something your snake shows an interest in. Once the snake has accepted a few meals in this manner, began to remove the cover around the enclosure a little at a time over the course of several days. The layer of leaves should also be removed slowly, as dramatic changes in the animal's environment will likely result in a loss of appetite and you will be back where you started.

In addition you may want to refer to some of the references listed below for more detailed life history and husbandry information, as the scope of this column does not

allow me to elaborate much more on this subject.

Suggested References

de Vosjoli, P. 1990. The General Care and Maintenance of Ball Pythons. Advanced Vivarium Systems, Lakeside, CA.

Peterson, K. 1993. Husbandry and breeding of ball pythons (*Python regius*). The Vivarium 5(1):18-21.

Ross, R. A. and Marzec, G. 1990. The Reproductive Husbandry of Pythons and Boas. The Institute for Herpetological Research. Stanford, California. 269 pp.

Van Mierop, L. H. S., and Bessette, E. L. 1981. Reproduction of the ball python (*P. regius*) in captivity. Herpetol. Review 12(1):20-22.

Q. I am expecting my female eyelash viper to have a brood of young in the

near future. I've heard babies of this species can be difficult to feed. Is there anything I can do to increase my chances of successfully raising some of these little jewels.

Canton, OH

A. There are several techniques that should be helpful. Juvenile eyelash vipers (*Bothriechis schlegelii*) caudal lure (Antonio, 1980). That is, the young will sit in a coiled position while twitching their tail tips in the manner of a small grub. Small frogs and lizards are attracted to this motion and are subsequently captured and eaten by the snakes. A predatory strike can be induced by lightly touching the tip of a snake's tail with a food item held on the end of a long pair of forceps.

Tree frogs (*Hyla* sp.), and some lizards (*Sceloporus* sp., *Anolis* sp.) are readily accepted if presented in the above described manner. If these food items are not readily available or you have some phobia about feeding frogs and lizards to your snakes, it may be necessary to scent-manipulate domestic food items such as pinkie mice with natural food items. There are several methods that can be used. Simply washing a potential food item with water and then rubbing a frog or lizard over its body will sometimes suffice. However, if this fails to elicit a feeding response, place the newborn mouse in a small plastic container with a frog or lizard for an hour or so to accomplish a more thorough scent transfer. For stubborn individuals it may be necessary to scent potential food items with the internal body fluids of a natural food item.

If you intend to use wild-collected frogs or lizards as food items, these should be frozen for at least 48 hours to eliminate some of the potentially harmful parasites that can be transferred.

Note: It is strongly recommended for any individual interested in keeping venomous snakes to understand and abide by state and local laws. It is also important to strictly abide by established methods for safe transfer and maintenance.

Suggested References

Antonio, F. B. 1980. Mating behavior and reproduction of the eyelash viper (*Bothrops schlegelii*) in captivity. Herpetologica, 36(3):231-233.

Blody, D. A. 1983. Notes on the reproductive biology of the eyelash viper (*Bothrops schlegelii*) in captivity. Herpetol. Review 14(2):45.

Murphy, J. B. and Campbell, S. A. 1987. Captive maintenance. In Snake Ecology and Evolutionary Biology. Eds., Seigel, R. A., Collins, J. T., and Novak, S. S. Macmillan publishing company, New York.



A Reproductive History of MONITORS AT THE DALLAS

by
Winston Card

Members of the family Varanidae are distributed throughout Africa, Asia, and Indo-Australia, with the majority of the 42 recognized species, about 25 (Cogger, 1992), occurring in Australia. This group has adapted to a wide variety of habitats, from desert to rain forest. A few wide-ranging species, such as the Gould's monitor (*Varanus gouldii*) and the Asian water monitor (*V. salvator*), can be found in a variety of habitats throughout their range (Mertens, 1958; Pianka, 1972; King and Green, 1979), but most species occur in specific environments. Many Asian species have adapted to an arboreal existence, with long claws and in some cases prehensile tails (Greene, 1986).

Only 23 of the 42 currently recognized species of *Varanus* are reported to have reproduced in captivity (David, 1970; Peters, 1971; Visser, 1981, 1985; Bartlett, 1982; Boyer and Lamoreaux, 1983; Bredl and Schwaner, 1983; Barker, 1984; Eidenmuller and Horn, 1985, 1986; Bredl, 1987; Horn and Visser, 1989; Mitchell, 1990; Chippindale, 1991; Horn, 1991; Slavens, 1992; Bayless and Renolds, 1993; Walsh et al., 1993). Few

by Murphy (1971), Boyer and Lamoreaux (1983), Barker (1984), Mitchell (1990), and Card (1993). In this article, I will discuss methods believed to contribute to reproductive success in these species.

General Management

Varanus acanthurus, *V. gilleni*, *V. prasinus*, and *V. beccarii* were maintained in glass-fronted, fiberglass enclosures measuring 45 X 32 X 45.4 in. (115 X 81 X 117 cm). A single male *V. gouldii* was maintained on exhibit in a glass-fronted, metal terrarium measuring 24 X 24 X 127 in. (61 X 61 X 71.5 cm). Females were maintained individually in bathtubs measuring 14 X 24 X 50 in. (36



Hatchling Gould's monitor (*Varanus gouldii*). Photo by Dave T. Roberts. Courtesy of the Dallas Zoo.



Male pygmy mulga monitors (*Varanus gilleni*) engaged in combat. Photo by Lyndon A. Mitchell. Courtesy of the Dallas Zoo.



Hatchling green tree monitor (*Varanus prasinus*). Photo by Lyndon A. Mitchell. Courtesy of the Dallas Zoo.

have reproduced beyond the first generation. Twenty-two taxa have been maintained at the Dallas Zoo during the past 28 years (Mitchell, 1990), and 6 have successfully reproduced. Those include the spiny-tailed monitor (*V. acanthurus*), the pygmy mulga monitor (*V. gilleni*), the green tree monitor (*V. prasinus*), the black tree monitor (*V. beccarii*), Gould's monitor (*V. gouldii*), and Gray's monitor (*V. olivaceus*) as described

X 61 X 128 cm). A single male *V. olivaceus* was maintained on exhibit in a glass-fronted, rock-in terrarium measuring 16 X 16 X 8 ft (5 X 5 X 2.5 m). A single female was maintained off exhibit in a wood and concrete enclosure measuring 6 X 2 X 3 ft (184 X 61 X 92 cm). All enclosures have good drainage and wire-mesh tops for ventilation. An assortment of hollow fiberglass logs, cork-bark slabs, natural logs, branches and rock crevices provide refugia. Live plants and delicate cage furniture fare poorly with these species. Rain systems are provided for *V. olivaceus*, *V. prasinus*, and *V. beccarii*. Animals are provided with a 20-watt fluorescent ultraviolet light (Sylvania 350 BL) and a 75-watt incandescent bulb. Skylights provide a natural photoperiod. Artificial light durations are altered to correspond to the natural photoperiod of Dallas, Texas. Thermoclines of 75°F to 88°F (24°C

to 31°C) are maintained in each enclosure year-round.

Most monitors are opportunistic predators in the wild and will consume a wide variety of vertebrates, invertebrates, carrion, and, in one species, fruits and seeds (King and Green, 1979; Greene, 1986; Auffenburg, 1988; Losos and Greene, 1988). This varied diet may result in infestation by a wide variety of endoparasites. For example, fecal examinations of newly imported *V. prasinus*, *V. salvadorii*, and *V. griseus* revealed

moderate to heavy infestations by trichomonads, strongyles, spirurids, ascarids, and coccidia (pers. comm. D. Pernikoff). The immune systems of short-term captives may be depressed allowing infestations to progress. Diagnosis of potentially harmful parasites can be accomplished by taking a fresh fecal sample to a veterinarian for analysis.

With the exception of *V. olivaceus*, all varanids at the Dallas Zoo are fed small live rodents, crickets, wax worm larvae, and mealworms. Vitamin E (Spring Valley; Mission Hills, CA) in oil-filled capsules and Osteoform (Vet-a-mix; Shenandoah, Iowa) are occasionally added. Food items are broadcast into enclosures to elicit foraging behavior. It is believed that this activity helps to prevent stagnation in long-term captives (Huff, 1991). Live rodents that are not consumed by the end of the day are removed to prevent possible injury to the monitors.

Natural diet for *V. olivaceus* consists of a few species of primarily oily fruits high in protein (*Dracontomelum*, *Grewia*, *Spondias*,

Canarium, *Caryota*, *Pandanus*, *Aglaia*), molluscs, and crabs (Auffenberg, 1988). Captive specimens refuse to eat most of the commercially available fruits that have been offered at the Dallas Zoo (strawberries, plums, melons, avocado, egg plant, tomatoes, kiwi) although some specimens will accept grapes. They readily except rodents in captivity, but some individuals maintained exclusively on rodents for long periods of time have developed visceral gout. This condition can also be associated with chronic dehydration. In an attempt to offset the captive dietary imbalance, 100 ml of mixed-fruit Gerber 2nd foods (Fremont,

1991) were not present on the radiographs of two male *V. dumerili* examined by Davis and Philips (1991). Further, no radiopaque tissue can be detected in the radiographs of *V. bengalensis*, *V. exanthematicus*, *V. griseus*, *V. mertensi*, *V. niloticus*, *V. rudicollis*, *V. salvator*, or *V. timorensis* (personal observation). It is also not known at what point mineralization occurs during ontogeny, but preliminary observations of a group of captive born *V. gouldii* at the Dallas Zoo indicate that the ossifications are not mineralized in hatchlings.

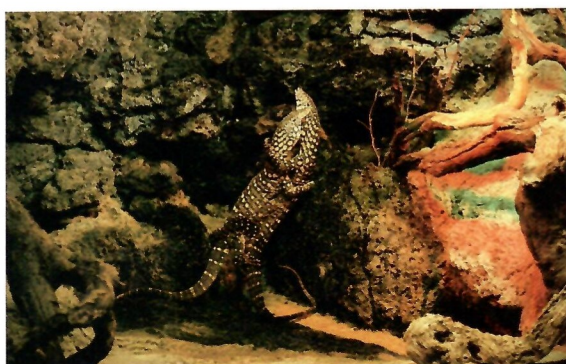
The sexually dimorphic pelvic girdle of helodermatids (Gila monsters and beaded lizards) offers another basis for distinguishing males from females (Card and Mehaffey, in press), but while apparently applicable to adults of all species of *Varanus*, very accurate measurements of the ischium bone are required.

Sex determination is often based on agonistic or submissive behaviors displayed by individuals housed together, but these behaviors can be misleading. A presumed pair of adult perentie monitors (*V. giganteus*) were maintained together for several

years at the Dallas Zoo. These individuals often engaged in behavior thought to be courtship. Everted hemipenes were only observed in one animal during this time. These specimens were later radiographed and determined to be males. The smaller of the two was removed and reintroduced several months later, along with a sub-adult female. The two males began to combat almost immediately by assuming a bipedal stance.

Currently all specimens are maintained individually and are introduced for short periods during the captive reproductive season. This does not always necessarily coincide with the natural reproductive season. Introductions for all species are initiated in February coinciding with lengthening photoperiods in Dallas. Specimens are introduced bi-weekly for several days until courtship or copulation is observed. Pairs are then left together until breeding activity stops. Aggres-

Continued on page 44



A pair of male Perentie monitors (*Varanus giganteus*) engaged in combat. Photo by Winston Card. Courtesy of the Dallas Zoo.

MI.) and 10 ml of organic vegetable oil are injected into adult mice twice weekly.

Reproduction

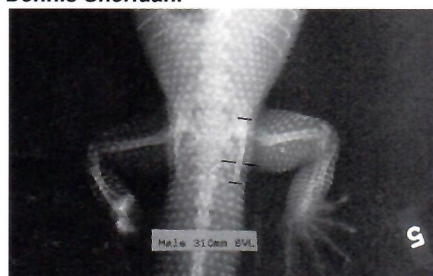
The first obstacle to a successful reproductive program with any of these species is acquiring accurately sexed pairs of animals. Sexual dimorphism is not apparent in varanids, and methods currently utilized for sexing these animals, such as probing (Frye, 1991), are inconclusive. Fiberoptic laparoscopy has been used with success in Dumeril's monitor (*V. dumerili*, Davis and Philips, 1991), but requires anesthesia. The method of injecting sterile saline into the base of the tail to evert a hemipene (Stewart, 1989), can be potentially harmful if not done properly and is not entirely reliable. This method is not recommended for the inexperienced herpetoculturist and should only be attempted by a veterinarian. Shea and Reddacliff (1986) noted the presence on radiographs of two or three "ossifications" in the retracted hemipenis of *V. komodoensis*, *V. varius*, and *V. gilleni*. These "ossifications" or "hemibacula" (Bohme, 1988,



Gila monster (*Heloderma s. suspectum*). Photo by Dennis Sheridan.



Radiograph of the pelvic region of a male Grays monitor (*Varanus olivaceus*) showing "hemibaculum." Photo by Dave T. Roberts. Courtesy of the Dallas Zoo.

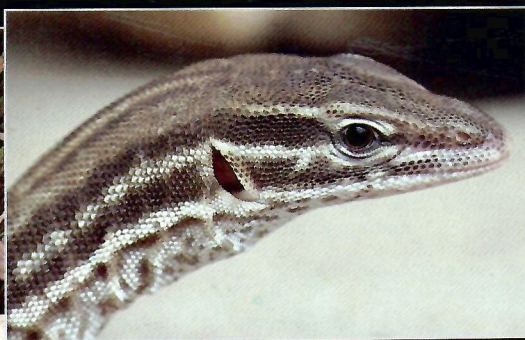


Radiographs of the pelvic regions of a male and female Gila monster (*Heloderma suspectum*). Note the size differentiation of the ischium. Photo by Dave T. Roberts. Courtesy of the Dallas Zoo.

MONI



Ridge-tailed monitor (*Varanus acanthurus*). Photos by Jim Bridges and Bob Prince.



Gray's monitor (*Varanus olivaceus*). Photo by D. T. Roberts.



Gould's sand monitor (*Varanus gouldii*). Photo by Jim Bridges and Bob Prince.

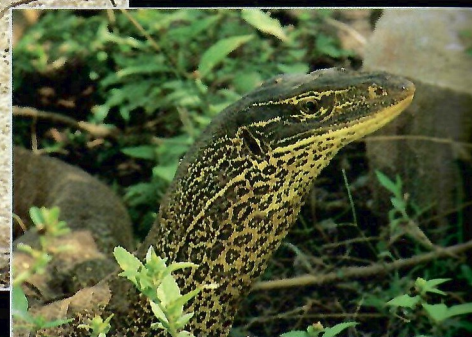


Photo by Dennis S.

ATORS



Black tree monitor (*Varanus beccari*). Photos by Jim Bridges and Bob Prince.



Perentie monitor (*Varanus giganteus*). Photo by L. A. Mitchell.



Green tree monitor (*Varanus prasinus*). Photos by Jim Bridges and Bob Prince

HERPING DOWN UNDER

Exploring the Status of Herpetoculture and the Law in Australia

by
William B. Love

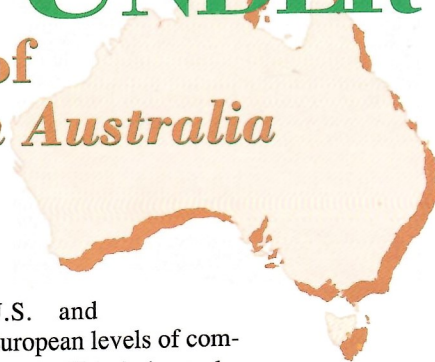
"One of the park's dreams is to somehow find a male green iguana for our several adult females," the keeper explained as I edged closer, focusing on the snakelet's "fierce" black head. It belonged to a captive-bred hatchling inland taipan, *Oxyuranus microlepidota*, the world's deadliest land snake. Trent Russell was keeping a wary eye on the distance between my lens hand and its nose as I momentarily paused in near disbelief as a result of his statement. Here I was, at the culmination of a month-long adventure,

enjoying the enviable privilege of seeing and photographing a sight few before me have gazed upon, behind-the-scenes at one of Australia's most progressive herp breeding establishments—and they yearn to pair up common green iguanas? Worst of all, the Australian Reptile Park's goal may well be impossible if a specimen hasn't survived nearly two decades somewhere within the country. That's when "organismic isolation" became law to slam the door on virtually all movement of wildlife in or out. It's also hampered herpetocultural progress by severely restricting the keeping and exchanging of native species between zoos and individuals there, a consequence herp people were grudgingly dealing with at most of my stops during the trip.

Australia has to be one of those magical places that every herper hopes to someday visit. My time came in Dec. '93–Jan. '94 at the invitation of the Second World Congress of Herpetology to speak on the trade in living herps and the impact of captive breeding. This was certainly a topic dear to my heart, so the opportunity to attempt to show the state of the art in herpetoculture to a global audience could not be taken lightly. What a great reason to visit "down under" as a business trip! The data I related had little direct bearing on the situation in Australia where trade in herps is still negligible compared to

U.S. and European levels of commerce. This is in stark contrast to the comfortable familiarity of nearly everything else about that capitalistic country. Whether in the cities or the "outback," the people's friendly nature and sense of humor made me feel right at home, like being in another sparsely populated state "out West." The camaraderie I felt with herpers I met during and after the meeting made me glad I chose to include some "shocking" slides in my talk.

One of my goals was to show the wildlife authorities that despite their Herculean effort to hoard endemic species, plenty had indeed found an avenue out. A special effort, aided by slide loans from friends, was made to illustrate successful private breeding programs abroad that included endemic Aussie species, many of which are thought by many of the Australian authorities to be "found nowhere else." Contrary to some local suspicions, "living as purely exotic curiosity pets" were not the intended fate of most. The forbidden fruit syndrome and consequently high value created for these animals has, of course, only added to the enthusiasm to propagate them. I hoped to tease them slightly that the rest of the world was profiting by their adherence to the "old school of thought"



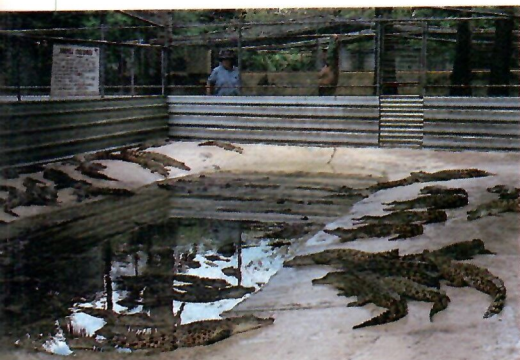
Several types of pythons were seen on roads and in the field. This juvenile olive python (*Liasis olivaceus*) was one of two I found at night in the Northern Territory. Photo by the author.



An exquisite baby fierce snake or inland taipan (*Oxyuranus microlepidota*) captive-bred at the Australian Reptile Park in Gosford, New South Wales. Photo by the author.



Knob-tailed geckos, such as *Nephurus asper*, are some of the other unusual rock-dwelling species in the Territory Wildlife Park's varied collection. Photo by the author.



A rearing pen for young "salties" (*Crocodylus porosus*) at the Darwin Crocodile Farm is proof that Australian authorities have no problem seeing the feasibility of commercially breeding this species of reptile. Photo by the author.

and subsequent stifling of Australians' freedom to do the same.

Second, I wanted to show that international audience the degree to which Americans and others have embraced the spirit of mass production regarding herpetoculture and the possibilities it holds to supply global wants and needs. The scale already achieved was news to many in the audience, judging from the gasps elicited by certain slides of particularly impressive breeding facilities, retail shops, shows, and mass assemblages of captive-bred animals available for sale. While scientists continue to debate the suitability of captive stock for reintroduction to depleted natural areas, it's hard to argue that the multitudes of these "artificially-created babies," and the potential to expand further with other species, isn't having a positive impact on replacing the need for wild harvesting of herps for the pet and research markets.

My only regret was that my talk didn't come sooner during the congress because, immediately following it on the second to last day of the agenda, people eagerly introduced themselves to discuss their own views on the subject, invite me to visit

later, etc. An earlier spot would have allowed more time to meet people from the private sector of whose status (or existence) I arrived with scant knowledge.

I did arrive with the name of "one of the biggest in-country herp dealers in Australia" in my pocket. His shop was conveniently located across town in Adelaide, which I wasted no time in visiting if for no other reason than to satisfy my curiosity. What would my southern hemisphere counterpart be like in a country where the laws precluded most captive-oriented herp activity?

The Pet Centa was a small retail shop in a row of stores a mere 5-minute cab ride from downtown. The owner, Dene

Mann, turned out to be a thoroughly congenial and informative gentleman who was happy to paint me an accurate picture of the herp-keeping situation in the state of South Australia and elsewhere. Although by comparison with U.S. equivalents Dene's business was quite small and low key, he was indeed a major player in the limited legal reptile trade as it struggles to build a following amidst a plethora of prohibitive rules, excessive permits, and the resulting high prices for widely occurring species. His herp section of the otherwise more or less typical all-around pet shop was neat and clean. The animals, ranging from brown water pythons, *Liasis fuscus*, to juvenile captive-bred White's treefrogs, *Litoria caerulea*, to a young captive-bred



The thorny devil (*Moloch horridus*) can be a vividly colored creature when freshly molted. Its suit of "thorns" is more for looks; they're not stiff enough to break the skin when held. Photo by the author.



These adult eastern blue-tongued skinks (*Tiliqua s. scincoides*) are hopefully a sexual pair. John Weigel would love to see offspring of these help pave the way for the wider acceptance of trade in captive-bred pet herps in Australia. Photo by the author.

Spencer's monitor, *Varanus spenceri*, each possessed the criteria for legal sale—a permit documenting its origin. This narrowed one's sources considerably, especially for wild-caught animals as few permits were issued for non-scientific collecting purposes. What was legally held by people already could generally be bred and sold after proper transaction papers were applied for and received. South Australia seemed to be the most lenient of the Australian states for this, and was thus an appropriate place to emphasize herps. My mind raced ahead to the not-so-distant future when, based on U.S. trends, Australia Parks and Wildlife staffers may have to work overtime and weekends just to senselessly handle the paperwork for tens of thousands of captive-bred native herp species within its own borders.

It's no coincidence that the location for the congress also made it the most feasible to hold NARAMA, the first Australian educational expo of reptiles and amphibians. It was a somewhat radical concept for Australia considering the laws, and although no animals were actually exchanged there, the whole undertaking was a positive educational experience for the public and all involved. It opened many visitors' eyes to the fascination of herp-keeping. It is hoped that the few wildlife authorities who reputedly attended the congress also found time to view the captive herps as a forecast of things to come.

A 3-week whirlwind tour followed the conference and let me see in person that the art of herpetoculture had in no way eluded Australia's collectors. I was shown and assisted in photographing a mesmerizing assortment of species, most new to me in the flesh. My hosts seemed as interested in my experiences as I was in theirs. They, without exception, envied our latitude to swap animals and to use money gleaned from sales of offspring to advance our hobbies. On one hand, it was refreshing to witness the almost wholly altruistic enthusiasm that fueled their endeavors, but it hurt to think how progress could be propelled ahead even faster if a little deserved capitalism was allowed to fund efforts. Interestingly, many of the "farms" I saw were actually involved in moneymaking ventures with herps in the form of public exhibits; the breeding colonies were, of necessity, often part of display groups.

Peter Mirtschin's Venom Supplies facility, nestled in the peaceful Barossa Valley wine-making country north of Adelaide, was my first stop. Not open to the public, his operation is having considerable success supplementing his source of raw ma-

terial with captive-bred stock. Several sizeable outdoor pits had just been built to complement as neat and organized an indoor venom lab and breeding building as any I'd viewed previously in the United States. Peter is a staunch advocate of herpetoculture as a viable business option for Australians, and he has been vocal in trying to convince the government to realize this. In books and articles, and as a speaker at the congress, he's been urging the authorities to ease up a bit on its total prohibitionist policies regarding amateurs privately dealing in captive-bred herps. His operation would be an inspiring role model should old policies be amended to allow Aussies to put their strong pioneering spirit behind a modern approach to solving the demand for non-endangered, captive-bred wildlife.

Joe Bredl's Wildlife Park was another surprise hidden on the outskirts of the quiet town of Renmark, a couple hours drive to the north. His displays consisted of mostly outside fenced pens. These were ideally suited to photographing the inhabitants. Among his successes were four hatches of perenties, *Varanus giganteus*, from specimens collected personally over the years. To date, these were the only ones bred in captivity of which he and I were aware. Joe had scores of people interested in his babies. So far he had found homes for them all for what seemed like give-away prices for such handsome creatures. At a time when the economy there is as sluggish as a three-legged chameleon, the monetary infusion that a single clutch could fetch at U.S. or European values would cover major renovations for the entire zoo.

Topping Joe Bredl's wish list was a black rat snake, *Elaphe o. obsoleta*, to pair up his aging female. He had resorted to hybridizing it with a corn snake, *Elaphe guttata*, in past years as the chances of ever obtaining a proper mate are nil. Joe was one of the relatively few private Australians to even be permitted to possess exotics since his involvement with herps predated the adoption of the "reclusive" laws of the mid-1970s. My first thought, as may occur to someone reading this, was to send him a male black rat snake upon returning to the states—a simple but highly illegal act for me and for him, and thus one that should never be undertaken.

At Alice Springs I made the decision to temporarily leave my tour group, necessitating an all-night bus ride later to catch up to them 500 miles (800 km) to the north. I felt I had no choice if I were to meet Greg

Fyfe at the Reptile House/Camel Farm south of town. Here I found an extraordinarily clean and classy exhibit that could have easily been missed had it not been for Dene Mann's suggestion to check out the source of his Spencer's monitor. An evaporatively-cooled indoor herp house (that sure was heavenly on a 113°F (45°C) day!) with a couple dozen individual desert-motif displays showed many inland herps off at their best. Classic brilliant red coarse sand provided the substrate for most exhibits and added to the memorability of seeing animals native to Australia's "Red Centre." It also made a logical and colorful slide-taking background. The tour really blossomed when Greg and keeper Bruce Munday extended it to the reserve facility where many juvenile and half-grown specimens were housed. My only chance to handle and shoot local endemics such as inland carpet pythons, *Morelia bredli*, womas, *Aspidites melanocephalus*, western blue-tongued skinks, *Tiliqua occipitalis*, and my first thorny devil or moloch, *Moloch horridus*, came here. I'd heard that molochs are difficult to maintain, even in Australia, if not kept outdoors with access to 1000–2000 tiny ants per day. What was their secret here? I couldn't help but crack a smile at the sheer simplicity of Bruce's putting their pair under a wire milk box on the building's shaded back porch. A small section of cat food, placed out only minutes before, enticed an



I couldn't resist the chance to examine this new giant, the oenpelli python (*Morelia oenpelliensis*) up close. Tourists have occasionally encountered them while viewing Aboriginal rock paintings in Arnhem Land. Photo by M. Rojce.



THE MODULAR APPROACH TO ENVIRONMENTAL CONTROL

The most versatile temperature control system designed for Herpetologists. The Modular approach provides the solution to your particular requirements.



PROPORTIONAL TEMPERATURE CONTROL

BASIC SYSTEM: Consists of Control Module, Remote Temperature Sensor and Power Module.

- **UNIQUE** combination of Proportional Controller and digital thermometer along with easily added accessories, make this the only control system you will ever need.
- **PROPORTIONAL** Temperature Controller incrementally adjusts power to heaters to maintain the desired temperature.
- **ACCURATE** LCD digital thermometers are individually calibrated to within .5° F.
- **SAFE** isolated, low voltage controller eliminates risk of electrical shock. Unique electronic design insures system will not overheat in event of damage to sensor or external connections.
- **POWER** Module controls heat sources up to 500 Watts.

ACCESSORIES: Easily added plug in Modules allow you to customize your system.

- a) Night time temperature drop.
- b) Programming Module provides:
 - 1) Min./Max. temperature read out.
 - 2) High/Low temperature set points to control lights or auxillary heaters.
 - 3) Audible alarm.
- c) ON/OFF Power Modules.

NEW ACCESSORIES

- **1500 Watt Power Module.** Designed for entire room heating.
- **Light Control Module.** Provides gradual light control for dawn and dusk simulation.
- **Thermal Module.** Low voltage heat pump permits safe heating or *cooling* of the controlled environment.

All products designed and manufactured in the U.S.A., providing excellent customer support and speedy delivery of orders.

Dealer and Distributor inquires welcome. For detailed information please write or call.

HELIX CONTROLS

A Division of Helix Magnetics, Inc.

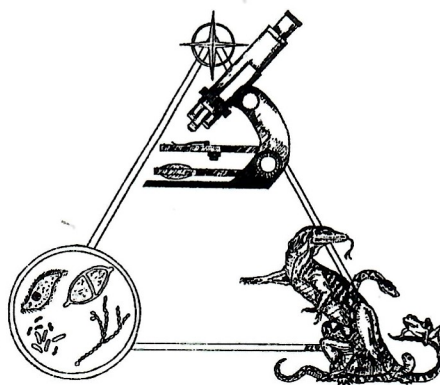
8535 Commerce Avenue • San Diego, CA 92121 • VOICE (619) 566-8335 • FAX (619) 566-9472

endless stream of victims to the waiting lizards which plucked them one by one in rapid succession.

As with the perenties, plenty of Australian enthusiasts are waiting in line for the chance at captive-bred rarities such as inland carpet pythons as Greg's are about the only source of legal ones. Hobbyists can't just go out and catch a pair and try to breed them. Everything's protected by law—from the smallest gecko to the ubiquitous cockatoos, the latter which the government still pays bounties to certain hunters to destroy. It's no wonder that many herpers I met often question the wisdom of their government's priorities and rules on wildlife.

I caught up with the other 10 members of our "goanna dreaming" tour on schedule in Katherine after a boring 14-hour bus ride in which my sleep was only occasionally jarred by a luckless wallaby bouncing off the mesh 'roo guard. The habitat had greened, reflecting the effects of the monsoon season. Monitors (goannas) dashing across roads were the first welcomers to the Northern Territory's abundant herplife. Until then, wild specimens of nearly everything had mastered being elusive, but here the frequent rains brought creatures forth in relative force. Road cruising at night finally became a some-

New! Long Needed Handbook! Describing How to Make Your Sick Reptiles Well!



Includes:

- Diagnostic flow chart for reptile disease identification.
- Most recent drug information available for proper dosages.
- Written by a team of infectious disease professionals.
- All information from reptile research, not mammal extrapolation.

Title: *Handbook of Antimicrobial Therapy for Reptiles and Amphibians.*

Ordering information: Mail \$13 checks, made out to **HIIDRA**, to cover handbook, shipping and handling expenses. Mail to **HIIDRA**, Biology Dept., Adrian College, Adrian, MI 49221.

HIIDRA

Herpetological and Ichthyological Infectious Disease Research Associates.

Your Herptile Breeding Project is Missing a Very Important Part.

Rep-Cal[®]

- Detailed formulation
- Quality human grade ingredients
- Accepted and utilized by veterinarians and major zoos
- The only phosphorous-free/Vitamin D3 Calcium Supplement

Available through veterinarians, reptile wholesalers and fine pet stores in the U.S., Canada and Europe



Rep-Cal Research Labs

P.O. Box 727 • Los Gatos, CA 95031

(408) 356-4289

© Rep-Cal Research Labs

what fruitful source of photo subjects, and even the days brought several interesting encounters with fearless Mertens' water monitors, *Varanus mertensi*, at the bodies of permanent water we explored. Many excellent camera opportunities within Kakadu National Park made up for the next morning's only unexpectedly cool reception by a local herper on the whole trip.

I had persuaded my colleagues to squeeze in a few extra hours at a reptile exhibit near the small town of Humpty Doo. Discovering that the author of several books I owned ran the exhibit, I prematurely assured the skeptics of the group that here we would find yet another Aussie herper eager to meet us and expand our herpetological horizons. Instead, my luck ran out as everyone, including me, was ready to move on after only 15 minutes at that past-its-prime, tired, old reptile park. I hadn't thought it possible to see blue-tongued skinks in such bad shape, either from lack of feeding or from internal parasites, that their backbones and pelvic girdles protruded so grotesquely. I swallowed my pride and admitted that this was one place I, and probably all this man's fellow countrymen, would prefer to see just continue on its path of fading away in the manner of Florida's old roadside snake pits.

The tour officially disbanded in Darwin, but my two newfound Slovenian friends, Matjaz and Irena Rojc, and I teamed up for further wanderings that included the Darwin Crocodile Farm. Sharply contrasting the hurdles erected in the paths of private citizens in acquiring and swapping "small" native herps, the big money pursuit of commercializing Australia's two crocodilian species, the huge estuarine crocodile, *Crocodylus porosus*, and the much smaller slender-snouted freshwater crocodile, *C. johnstoni*, seems to be prospering with the government's total endorsement. This farm epitomized efficient large-scale herp farming. Why doesn't such a glowing example inspire duplication at all levels within this class of the animal kingdom? Upon additional reflection, I sure can't berate them too much on this point when a more restricted, but parallel situation festers in my own backyard. Florida alligator farmers are allowed to sell progeny interstate while no permits are issued to breed and sell other protected species of herps like eastern indigos, *Drymarchon corais couperi*, and pine snakes, *Pituophis melanoleucus mugitus*. It's sad to have to suspect that it may simply be a case of the dark side of our sisterly capitalistic sys-

Continued on page 36

INCUBATORS

CAGES

HEATING

THERMOSTATS

DON'T MISS THIS!

Get the Nation's Largest Catalog of Reptile & Amphibian Supplies



Guaranteed Lowest Prices!

◆ FREE 48 Page Catalog ◆

Big Apple Herpetological
(Formerly Big Apple Snakes)

For Catalogs & Orders (800) 666-6672
For Product Information (212) 799-9065

Big Apple Herpetological-P.O. Box 632-New York, NY 10023

WE WELCOME RETAILERS!
ASK FOR OUR WHOLESALE PRICE LIST!

HUSBANDRY

FEEDING/DOSING

MEDICATIONS

VITAMINS

CAPTIVE BRED SNAKES

BOOKS

HERP SHIRTS

LIGHTING

THERMOMETERS

FOODS

ACCESSORIES

HERPETOCULTURE IN THE CLASSROOM

Announcing a four-day workshop designed for teachers (K-12) July 27-30, 1994, in Rock Springs, Wyoming, on the responsible care and maintenance of amphibians and reptiles in schools. Two or three graduate credit hours are available to participants through the University of Wyoming.

July 27-30!



Presenters

Dan McCarron

Biology teacher,
White Mt. Jr. High
Rock Springs, WY.
Education Coordinator,
American Federation of
Herpetoculturists

Sean McKeown

Curator of Reptiles,
Chaffee Zoological
Gardens, Fresno, CA.
Managing Editor-
THE VIVARIUM

For more information about this very unique workshop, please contact:

Dan McCarron
White Mountain Junior High
Science Dept.
P.O. Box 1089
Rock Springs, WY 82902
Phone: (307) 382-4160
Fax: (307) 382-7351

This workshop is being made available through a Dwight D. Eisenhower, Mathematics and Science Education Act, Title II Grant.

CAPTIVE BRED WILDLIFE FOUNDATION

P.O. Box 515
Portal, Arizona 85632
(602) 558-2458



**JEFF GEE
&
KIM GEE**

TORTOISES Galapagos, Radiated, Spurred, Leopard, Brown, Red-Footed
TURTLES Albino Red-Ear Sliders, Amazon Yellow Spot Sideneck
LIZARDS Caribbean Island Iguanas, Leopard Geckos
BIRDS Emus, Rheas
PYTHONS Albino Burmese, Carpet, Childrens, Indian, Ringed
BOAS Brazilian Rainbow, Dumerils, Rosy, Argentine Columbian
MILKSNAKES Honduran, Sinaloa, Pueblan, Mexican, Nelsons
KINGSNAKES Albinos, Gray-Banded, Mexicana, Blotched, California
RATSNKES Albinos, Trans-Pecos, Texas, Black, Corns, Asian
GOPHERSNAKES Albinos, Striped, Pacific, San Diego, Sonoran, Pines
SUPPLIES Books, Frozen Rodents, Heat Pads, Probes, Hide Boxes
T-SHIRTS Same as our Logo (gray, heavy, 100% cotton, M,L,XL) \$13
PRICE LIST Please Send Your Complete Name & Address and 2 Stamps.

Tropidophis semicinctus Gundlach and Peters, 1865



74. *Tropidophis semicinctus*

(Photo by Vlad T. Jirousiek)

Type-locality: Cuba.
Syntypes: ZMB 5076.

Description: Maximum total length about 460 mm; habitus slender; dorsal scale rows at midbody 21, 23, or 25; dorsal scales smooth or slightly keeled; ventrals 203-214 in males, 201-213 in females; supralabials 8-11; infralabials 9-12; subcaudals 34-39 in males, 34-40 in females; preoculars 1-1; postoculars 3-3.

The head is chestnut brown, and the dorsal ground color is yellow to orange. The body blotches are dark brown to black, 19-29 in number, in two discrete series with a tendency to fuse on the neck. The dorsal pattern gives the impression of alternating pale and dark bands. An orange to brownish vertebral stripe 5-6 scales wide is often present. The supralabials and throat are yellowish. The tail has 3-9

blotches. The venter is immaculate.

Distribution: Western and central Cuba; Pinar del Rio Prov., Rancho Mundo, Sonora; east to Sancti Spiritus Prov., northwest of Trinidad; Casilda, north to Matanzas Prov., and to near Sagua la Grande, Villa Clara Prov., in the northeast.

Natural History:

Habitat: Mesophilic; Darlington (1927) collected two under a rock with *Arrhyton*.

Reproductive notes: Petzold (1969) reported newborn *T. semicinctus* with total lengths of about 160 mm and body masses of 1.5 g.

Remarks: Defensive behavior includes rolling into a ball with the head tucked away, auto-hemorrhaging (Darlington, 1927), and expulsion of an offensive anal secretion (Barbour and Ramsden, 1919).

Announcing! The Natural History of West Indian Boas

by
Peter J. Tolson
and

Robert W. Henderson

Complete color coverage of the island Genera
Tropidophis, *Epicrates*, *Corallus* & *Boa*.

One of 1994's most important books.

Hardcover with dust jacket, 123 pages, small folio.

List price \$79.95

Special limited time offer: 20% discount & free shipping with mention of this ad.

\$64.00 per copy.

Published by R & A Publishing Ltd.
&

Distributed by Eric & Kathy Thiss

Serpent's Tale Books

464 Second Street

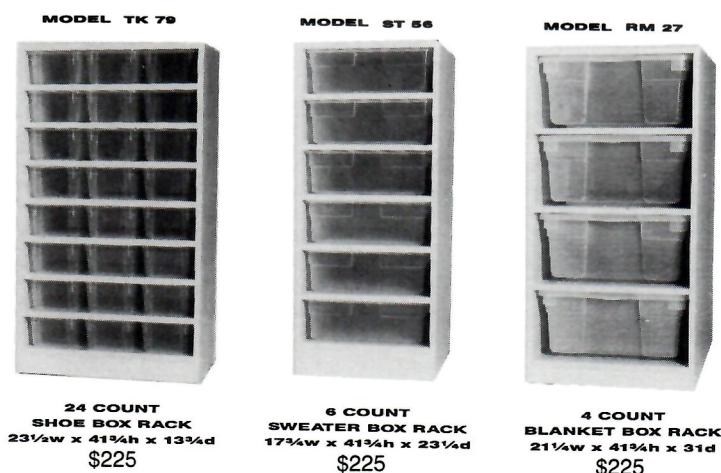
Excelsior, MN 55331

Tel. 612-470-5008 Fax 612-470-5013

Visa, Mastercard or personal checks accepted.

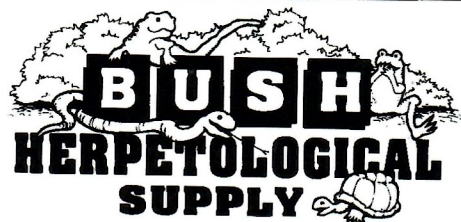


**WE OFFER PROFESSIONALLY
MANUFACTURED RACK SYSTEMS.
STOCK SIZES ARE AVAILABLE AND
CUSTOM ORDERS ARE WELCOME. THESE
UNITS ARE PRE-WIRED WITH UL RATED
HEATERS AND CAN BE SHIPPED READY
TO PLUG IN AND USE. RHEOSTATS AND
MICRO CLIMATE THERMOSTATS ARE
STOCKED AND SOLD SEPARATELY.**



**CABINETS ARE CONSTRUCTED USING 3/4" WHITE THERMOFUSED MELAMINE.
HEATERS ARE POSITIONED TO ESTABLISH THERMAL GRADIENT. EXACT TOLERANCES ARE PROVIDED FOR LIDLESS SYSTEMS.**

**SANDMAR ENTERPRISES
484 VERNON WAY EL CAJON, CA 92020
619-579-2350 FAX 619-579-2106.**



1-800-451-6178
Full line of herpetological supplies
Call for catalog

Down Under - Continued from page 34

tems surfacing. Maybe the correct amount of monetary lubricant has not yet seeped down to the right political wheels needed to launch a new wave of "domestication" aimed at smaller species not necessarily useful only for direct consumption as food or skins.

Next came the Territory Wildlife Park near Berry Springs as we backtracked slightly to the south. I had the good fortune to meet Grant Husband of the reptile department weeks before at the congress. This proved to be a true blessing as it opened the doors to yet another incredible collection of different tropical species, this time focused on the country's northern humid zone. It was here that I was introduced to the Oenpelli python, *Morelia oenpelliensis*, a long slender species that may attain 12 feet (4 m) in length. Amazingly, this snake was unknown to science until less than two decades ago, so naturally it was a genuine thrill to examine one as its coils encircled my body. I was also thrilled to see and shoot unfamiliar odd-looking endemic geckos, such as the knob-tailed gecko, *Nephurus asper*, and the giant cave gecko, *Pseudotoxodactylus lindneri*. Very exciting to me too were the hatchling and adult "frillies" (frilled lizards), *Chlamydosaurus kingii*, at the park. We had previously seen several of these alert lizards in the wild, but had not yet had the fortune to document them on film. Grant also identified tan and reddish-brown Burton's snake lizards, *Lialis burtonis*, we observed on the road nearby as sexual dimorphism within this quite variable species.

Grant's knowledge on the herpetofauna of this region was impressive in that he had only recently adopted this area as home since moving from the east coast to take this position "on the frontier." Herpetocultural work isn't common in Australia, and wildlife parks and zoos offer the most promise.

The last leg of my trip took me to the doorstep of the world-renowned Australian Reptile Park in Gosford, north of Sydney. This public attraction has endured since Eric Worrell, an Aussie who helped to popularize reptiles, opened it in 1958 as both a display and venom production attraction located between Sydney and Brisbane. Its popularity grew as an educational exhibit of both native and exotic species, and today captive breeding can claim to be an important adjunct to its functions. Meeting the Weigels, John and Robyn, who now run the park, was an honor. I received the grand tour and was

given generous freedom in arranging photographic subjects both inside and outside the numerous enclosures and buildings. John's lead keeper, Trent Russell, spent hours helping me shoot whatever caught my eye of their many captive-bred herp offspring on and off display. His patience was unsurpassed with the full gamut of species I chose to pose in a makeshift studio, including deadly tiger snakes, *Notechis scutatus*, an amelanistic death adder, *Acanthopis antarcticus*, a bewildering assortment of bizarre-looking geckos and skinks, and, of course, the litter of fierce snakes referred to at the beginning of this feature. Many of the births here represented firsts in captive propagation for Australia and the world.

Australian Reptile Park had the largest collection of non-Australian herps I saw on the trip. Although my favorites were not the non-native anacondas, cobras, or rattlesnakes on exhibit, I couldn't help but be impressed knowing these animals, or their progeny, were among the lonely few that might ever be viewed by most Aussie visitors or school children. Breeding lines for these species had to be maintained since resupplying new bloodlines from out of the country is no longer an option. Perhaps it's been this firsthand experience with the nearness of "in-country extinction" that's honed the dedication and procreative skills of John and Robyn's staff. Or maybe it's a reaction to an oppressive system that has failed to evolve with the times as habitat destruction, not over-collecting by humans, is indisputably the gravest challenge to all forms of wildlife. I sensed a small snippet of hope that someday in the not-too-distant future Australia Parks and Wildlife officials will accept man's assistance via herpetoculture to help alleviate and solve the problems man has created for some species.

My last full day down under was spent surveying the fire-ravaged terrain west of Sydney for evidence of surviving herplife. The fires had ceased 2 weeks prior to my arrival, and green grass and weeds were already in abundance on many hillsides. I failed to turn up any animals, or any charred remains for that matter, but I thought the prognosis for slow recovery in the areas I saw was better than the early news reports predicted for the area in general.

I flew home the next day with an immense satisfaction. I had just spent an incredibly enjoyable month among the spectacular herpetofauna, dazzling scenery, and hospitable herpers of one of the often-dreamed-of travel goals of my life.

Reptile Nutrition Series

Iguana Fruit & Flower Formula



... with
**FRESH FRUITS
and FLOWERS**
to duplicate
the Iguana's
NATURAL DIET.



with
**EXTRA CALCIUM
and
VITAMIN D3!**

**SCIENTIFICALLY
FORMULATED**

with **ALL NATURAL INGREDIENTS** to provide the optimum attraction and balanced nutrition for the Green Iguana.

available in **JUVENILE or ADULT Diets**

Also try **Iguana Vegi Formula**

A **FROZEN** Product of OCEAN NUTRITION CORP. San Diego, CA 91950

Read special emphasis on the friendly people part, as it, above all else, made the trip special. I felt good to think that my presentation at the Second World Congress might, in some small way, contribute to an evolution in the laws, the time for which virtually everyone agreed has come.



Carolina Mouse Farms

P.O. Box 382
Salem, SC 29676
803-944-6192



MICE AND RATS

Frozen

Competitive Prices
Discounts for large quantities

For a Free Price List write or call
Darrin & Libby Reed

The Importance of Rain Chambers in Herpetoculture

by
Kevin M. Wright, DVM

A rain chamber is a tool that can be very helpful in the management of a collection of amphibians and reptiles. With certain taxa such as Madagascar leaf-tailed geckos (*Uroplatus*), it is difficult to treat a dehydrated specimen unless a rain chamber is used. Spray misting the enclosure with water from a pressurized garden sprayer, soaking the herptile in a plastic container of water filled to an appropriate and safe depth, or using a small flow drip system (e.g., I-V [intravenous] bag dripset) may not be enough to rehydrate a dehydrated tropical, moist forest species of reptile or amphibian. Rather, a herptile of this sort needs continuous access to water by a method that the animal recognizes and can utilize, such as rain. Some species such as a

Wagler's viper (*Tropidolaemus wagleri*) are stimulated to defecate by rainfall. Constipation (abnormally delayed or infrequent passage of dry hardened feces) and obstipation (severe blockage due to constipation) may result if such a specimen's husbandry does not include exposure to artificial rainfall.

A further use for a rain chamber is to stimulate breeding in tropical, moist forest, and wet/dry season inhabiting herptiles. Many amphibians, e.g., many treefrogs (*Hyla*), Madagascar tomato frogs (*Dyscophus*), etc. and reptiles, such as tropical arboreal vipers, geckos, and even tropical tortoises have reproductive cycles that are triggered or enhanced by prolonged warm rainfall. Spray misting or drip systems may not provide sufficient stimulus to trigger courtship and copulation in some species.

Certain species may be best managed by incorporating a rain system into the enclosure itself (see article on breeding Wagler's viper in *The Vivarium* 3(3):19-22). Shy and nervous species are probably best worked with an in-cage design. Also, to minimize the handling of venomous species, it is suggested that an in-cage misting system be used. Be certain that luke-warm, not cold, water is used for tropical and sub-tropical species.

When designing such a system for amphibians, it is recommended that a prefiltration system containing activated carbon be used to remove ammonia and chlorine from the tap water. Essential elements to consider when including a rain system in any enclosure are the use of materials designed for exposure to constant moisture, adequate drainage of water from the cage, temperature control of the incoming water, and airflow sufficient to lower the humidity after the rain is stopped. A small computer fan placed along one air vent provides excellent airflow in most cages. An often overlooked aspect of enclosure design is failure to prevent flooding in the event of obstruction of the primary drain. One option is to have an overflow drain in the enclosure to shunt excess water, and another option is to have a fail-safe valve system to shut-off the rain.



This *Uroplatus fimbriatus* is reaping the benefits of a rain chamber. The chamber is a wood framework with wire mesh mounted onto a PVC plastic utility sink. A hose ring or circular sprinkler is attached to a hose for a "raining" effect. This method has proved effective for arboreal vipers such as *Atheris*, *Bothriechis* and *Trimeresurus*, as well as chameleons and *corucia*. Photo by Rick Reed.



A simple drip-cup method for watering lizard vivaria at the Fort Worth Zoo. A hole is drilled in the bottom of the tank to allow drainage. This shows the method in use with *Uroplatus sikorae*. Photo by Rick Reed.



Tadpoles of Chacoan horned frogs (*Ceratophrys cranwelli*), the result of a successful spawning in a rain chamber. Photo by Bob Mailloux.

A portable rain chamber may be more practical for many herpetoculturists. One of the simplest and cheapest rain chambers is a 32 gallon (121 L) lock top rubber or plastic garbage can (e.g., Rubbermaid®) with a shower nozzle placed through an appropriately sized hole in the top and several 1/4 inch (6 mm) drain holes drilled in the bottom and sides of the bucket. The chamber should be tested to insure that the rate of water flow into the bucket does not overtake the rate of drainage. This system should be used some place with adequate drainage. This is particularly useful in assisting shedding arboreal snakes and other herps that are uncomfortable unless clinging to a branch, as an entire limb may be placed into the bucket. The disadvantage of this chamber is that it is dark inside the rain chamber, and depending on the species, this could be of some concern if the

rain bucket is being used for propagative efforts. Nevertheless, some taxa breed quite well after having been rained on this device. Once again, if an amphibian species is to be rained on using this system, do be sure a filter that removes chlorine and chloramines from the tap water is used.

Another rain chamber design makes use of a utility tub. A wood-framed screen-mesh enclosure is built to fit inside the utility tub. Multiple frames can be made so that different specimens can be rotated through the rain process without having to be removed from their respective rain chamber enclosure. This system also allows plenty of fresh air and light into the enclosure during the raining, and thus may be more suitable for many diurnal species rather than the bucket system. A shower head on a flexible hose can be used to provide the rain. [The standard vinyl garden hose can leach toxins. These hoses are not designed to convey drinking water. There is only one drinking water-safe garden



Fine mist nozzles are extremely useful in developing rain chambers for many species of amphibians and reptiles. This type can be used on the end of a hose for a portable misting device, or it can be incorporated into the hard plumbing of a cage for a permanent system. *Photo by Ron Conti.*



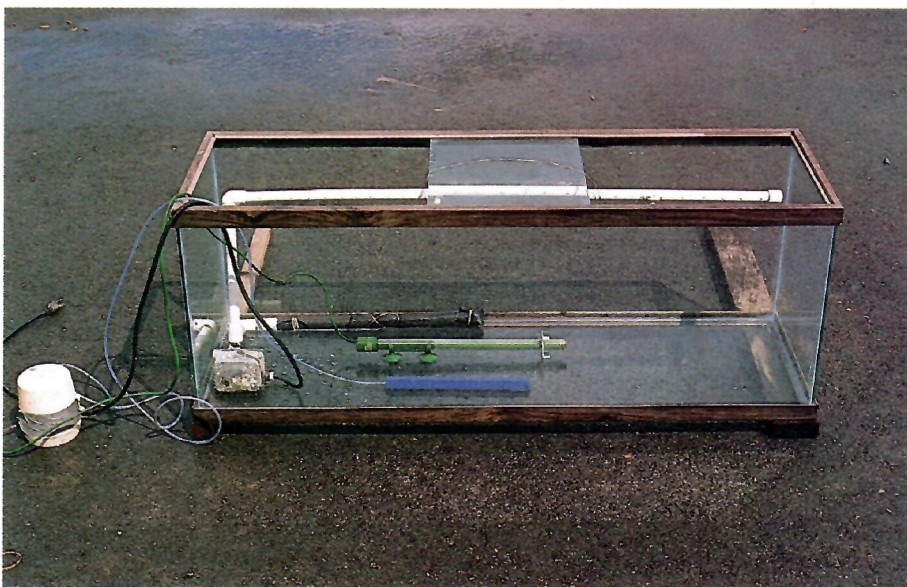
Top view of a vivarium designed for amphibians. The top Plexiglas has 1/4" ventilation holes that can serve a dual function as a rain system. Water can be slowly dripped through a small set of ten holes, or the entire top can be flooded so that the vivarium is completely moistened. The bottom has a drain so that standing water does not build up in the substrate. *Photo by Ron Conti.*



Albino Chacoan horned frogs (*Ceratophrys cranwelli*) in a rain chamber. *Photo by Bob Mailloux.*



A simple rain chamber using drilled PVC and a water pump. *Photo by Bob Mailloux.*



Front view of the rain chamber. A submersible heater and air pump are used to control temperature. *Photo by Bob Mailloux.*

Reptile Nutrition Series

Iguana

Vegi Formula

... with
FRESH GREEN
LEAFY VEGETABLES
to duplicate
the Iguana's
NATURAL DIET.



SCIENTIFICALLY
FORMULATED

with ALL NATURAL INGREDIENTS to provide the optimum
attraction and balanced nutrition for the Green Iguana.

available in JUVENILE or ADULT Diets

Also
try

Iguana Fruit & Flower Formula

A FROZEN

Product of OCEAN NUTRITION CORP. San Diego, CA 91950



Wayne Hill - Continued from page 17

academics to publish even more. In this way, at least "live animal" academics and zoo herpetologists are getting their information to breeders, and breeders are supporting their work.

But the market economy has caused a problem. Some of the "mass appeal" publishing companies use ambitious people with little knowledge, instead of bona fide knowledgeable herpetoculturists, to write fast books on herps that are of poor quality. On a more positive note, that same economy has some excellent private breeders writing books now, among them Philippe de Vosjoli, Dave Barker, John Rossi, and Bob Applegate.

THE VIVARIUM: Breeders come under criticism for producing lots of albinos and other mutants. Is this a fair position, or in your opinion is it more like breeding fancy show guppies in the aquarium hobby?

HILL: I cannot tell you what the members of the LFHS think about breeding albinos and mutants, but I can tell you what I think about that. If albinos or mutants are bred for the pet trade, I see no problem with producing them. The basis of the criticisms is that concentrated effort could be focused on breeding normal animals with the potential of using them to restock areas that have been decimated. It is generally accepted in the herp community that this is not a valid criticism. Most breeders do not have locality data for their breeding stock, and would therefore pollute gene pools if they released their offspring. An acceptable exception would be to restock an island with only a tiny remnant population, such as the restocking efforts for herps like Jamaican iguanas.

THE VIVARIUM: Wayne, everything you've taken on in recent years seems to become magical, if not legendary. Would you care to shatter this illusion?

HILL: Has everything I recently tried worked? No.

I tried an antivenin bank for Florida herpers that keep venomous snakes with CFHS president Curt Harbsmeier. We encountered so much governmental red tape that we had to put it on hold. We also budgeted money from CFHS with which to establish a confiscated reptile holding facility for the USFWS. This agency often uses zoos to house confiscations, and most zoos do not want large numbers of wild-caught reptiles dumped on them, but they are sometimes reluctant to refuse them to prevent the possibility of the animals being poorly kept or even euthanized. In those cases where the person wins their court case with the government, we wanted to be able to return reptiles to their owners in healthy condition. Too often, by the time things are finally sorted out, the confiscated reptiles are returned in freezer

Rain Chambers- Continued from page 39

hose on the market, Waterworks Drinking Water-Safe Hose® by Colorite Waterworks, 101 Railroad Ave., Ridgefield, NJ 07657. ph. (201) 941-2900. -Ed.] A shower head with multiple nozzles can be used to provide either a fine spray or a veritable deluge. The only disadvantage of this system is that it is typically larger, more cumbersome and less portable for the herpetoculturist than the bucket system. The advantage to the herptile is that it offers more options.

Other, more elaborate rain systems can be designed depending on the needs of the

particular herptile being worked with. Make sure the design is water-durable, provides adequate drainage, and has appropriate "habitat" or "cage furniture" for the intended specimen's or specimens' well being. A rain chamber can be an invaluable tool for the care and propagation of many species by the more sophisticated herpetoculturist.



bags. The USFWS, however, did not respond to our proposal.

THE VIVARIUM: *Would you care to share your predictions for the "hot" species to look for over the next few years in herpetoculture?*

HILL: Investing in the reptile and amphibian market may be like investing in the stock market. The trick is to stay one step ahead of what will be in great demand in the near future. Through my contact with the top 200 breeders and dealers in the country, I have formed the opinion that the most popular animals for breeding stock that will hold their price are black-headed (*Aspidites melanocephalus*), diamond (*Morelia s. spilota*), and Timor pythons (*Python timoriensis*), Amazon emerald tree boas (*Corallus canina*), and black milk snakes (*Lampropeltis triangulum gaigeae*). Coming down in price this year, due to oversupply, are womas (*Aspidites ramsayi*), Argentine (*Boa constrictor occidentalis*) and Dumeril's boas (*Acrantophis dumerili*), and most tricolor kingsnakes (*Lampropeltis* sp.).

Lizards seem to be the hot growth stock, and bearded dragons (*Pogona* sp.) and blue-tongued skinks (*Tiliqua* sp.) will stay strong over the next 2 to 3 years. But the strong "new kid on the block" that will be a big success over the next 5 years or more is frilled dragons (*Chlamydosaurus kingii*). Even a breeder I call "The Prince of Pythons" has invested in frilled lizard breeding stock. Geckos that will maintain their prices are New Caledonia geckos (*Rhacodactylus* sp.). Veiled (Yemen) chameleons (*Chamaeleo calytratus*) and spurred tortoises (*Geochelone sulcata*) will be dropping in price. Within the next 10 years, I expect to see Komodo dragons (*Varanus komodoensis*) and Fiji Island banded iguanas (*Brachylophus fasciatus*) being produced by private breeders.

Everything herpetoculturists breed successfully, and commercially, reduces the take on wild animal populations, but if people can't make money doing it, not very much will get done.



Smith Co.

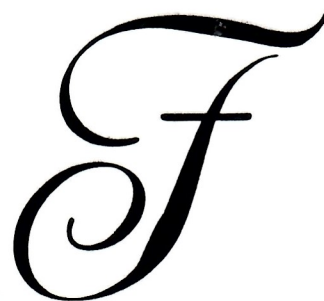
P.O.B 173 • Largo, FL 34649

— **Captive Born** —
Boas - Pythons
Kingsnakes - Ratsnakes
Lizards - Turtles
Supplies

Buy, Sell or Trade
for Current List Call:

(813) 596-9901

Farm Raised For Today And Tomorrow



Since 1957, Flukers has provided quality products at great prices, and we will continue to keep high standards while going the extra mile for customer satisfaction.

Choose from our complete selection of
**Crickets, Mealworms, Iguanas, Veiled
Chameleons, Geckos, and our renowned
Fluker Labs Iguana Diet.**



Fluker Farms Est. 1957

Baton Rouge, LA.
☎(800)735-8537 Ask For Ext. 50

Career - Continued from page 23

possess Ph.D. degrees. Many reptile curators undertake important field research, are members of taxon advisory groups, and are active participants in the working groups of the International Union for the Conservation of Nature (IUCN).

An assistant reptile curator or reptile house supervisor at a large zoo directly manages the day-to-day operation of the reptile collection and the supervision of the staff as opposed to the curator who has more administrative, applied research, writing, and public-speaking duties. A senior keeper has limited supervisory duties and, along with the reptile keeper(s), is responsible for the day-to-day care and management of the reptiles and amphibians in the collection as well as the feeder rodent and insect colonies. Keepers are expected to interface positively with other zoo staff and the zoo visitors. Keepers often give behind the scene tours to school groups and interpret information about the herptiles to the zoo public. Most keepers positions require previous zoo keeping experience, some college or university course work in a biology-related field, or in anthropology or behavioral psychology. The majority of today's keepers have bachelor's degrees. Many even have advanced degrees. A num-

ber of keepers work on special projects or are studbook coordinators.

Some curators of education or assistant curators of education at zoological parks and at regional natural history museums and regional nature centers also have strong herp backgrounds.

The requirements are similar to zoo reptile staff positions. However, strong teaching, and interpretive skills are also an important prerequisite of this type of position. Additionally, education personnel must very much enjoy interfacing with children and people of varied backgrounds and interests. Education departments in zoos, museum, and nature centers frequently have live reptiles. These are often worked by staff and, at least partially, by volunteers. The reptiles may go out on zoo mobile programs to schools or may be handled by children in a supervised setting.

So You Want To Be A Reptile Vet!

What about becoming a private exotic vet with an emphasis in herptiles or working as a zoo vet in a zoo with a large and diverse reptile and amphibian collection? Typical prerequisites to vet school are a bachelor's degree with a mandatory core group of classes in the major sciences (biology, physics, chemistry), as well as some animal science. Occasionally, as little as 3 years of

Erratum

In the Volume 5, Number 6 issue of *The Vivarium* magazine, the article entitled Phyllomedusine Frogs of Latin America in the Wild and in Captivity, pp. 26-29, 36, needs the following list of corrections. The following errors were mistakenly added to the article through the editorial process:

1) In the section of the article entitled "Genera and Distribution," page 26, please note that the genus of *Hylomantis* is not new but is resurrected.

2) In "Genera and Distribution," page 26, change the following sentence from "The genus of *Agalychnis* now consists of 8 species, ranges from southern Mexico to the Pacific low-

lands of northern South America," to "The genus of *Agalychnis*, consisting of eight species . . ." The taxonomic modifications discussed previously in the section did not affect *Agalychnis* as implied.

3) In "Genera and Distribution," page 26, change the following sentence from "There is a distinct possibility that there will be newly described species added to *Phyllomedusa* and the new genera to be derived from it." to "There is a distinct possibility that there will be newly described species added to *Phyllomedusa* and the new and resurrected genera derived from it." There will be new species of phyllomedusine frogs described but the editorial mistake implies there will be new genera as well which may or may not be the case.

4) In the section entitled "Reproductive Strategies", page 27, change the following sentence from "Using their exceptional tails, they manipulate the angle of the body which allows them to feed in mid-water, not moving around much and filter feeding, rather than at the surface film." to "Using this exceptional tail, they manipulate the angle of the body, allowing them to feed in midwater, on detritus from below, and on surface film." The tadpoles do feed at the bottom as well as on surface film.

5) The photograph on the top of page 28 is incorrectly labeled as *A. moreletii*. The frog is *Phyllomedusa sauvagii* and the photograph is by Michael Ready.

Career - Continued from page 41

university work is acceptable for admission to vet school. A number of vet students have already taken some graduate work as well. A grade point average of a B (3.0) or better is typically necessary. However, exceptions are made for some minority candidates or students with especially well-rounded and/or unique backgrounds. Vet school itself takes 4 years and by graduation will have cost between \$40,000 and \$100,000 depending on the particular university. Some grants and financial aid may be available. Welcome to the wonderful world of student loans.

Contrary to popular belief, most general vet students do not get detailed training in managing and treating reptiles and amphibians. To obtain this type of training, a vet student needs to take elective rotation in exotics during the third and/or fourth year of vet school. This is only offered in about half the university programs, so it is important to specifically inquire **before** you apply. You want a vet program that offers a specialty in zoo animal medicine and/or exotic animal (nondomestic) medicine. Upon completion of 4 years of vet school, a graduate would typically want to be accepted into a practice that specializes in exotic animals for at least 2 years or a 1- to 2-year internship in a zoological park before further advancing his or her career. To be considered for a regular full-time zoo vet position, a candidate would need a minimum of 2 years experience in zoo vet medicine. Most successful candidates have at least 5 years of such vet work under their belt.

Animal Health Technician (Vet-Tech)

Just as exotic vet medicine is a relatively new specialty, another new career field is the Animal Health Technician (AHT), also sometimes referred to as a veterinary technician. A vet tech position is the animal care equivalent of what being a registered nurse (RN) is to treating people.

To become an AHT, you must attend a vocational school for 10-12 months, usually at a cost of \$5,000-\$10,000 or take a 2-year course at a community college. The community college route costs less than \$1000—a bargain by today's educational pricing. Upon completion of the program, the candidate is required to pass a series of exams to graduate. However, you are not a bona fide AHT until you pass the state exam and are state certified. Only a minority of graduates have the academic background to pass the relatively tough state licensing test, so consider this before enrolling. The state testing is multiple choice and covers applicable vet tech skills and knowledge relative to large, small and exotic animal practice. There are also sections on nursing, radiology, pharmacology, and surgical assisting.

There are very few vet techs with a working knowledge of reptiles and amphibians, their care, and their management. For this reason, licensed vet tech positions to those with a strong reptile background are readily available with exotic vets in bigger cities and/or university towns.

Community College: A 2-Year Alternative

If you are looking for skills without the desire to get a traditional academic career, then traditional 4-year schools aren't the

only route available. Many of the country's community colleges benefit from the presence of local experts in natural history who often teach courses in field biology or zoology, often with portions of the courses about reptiles and amphibians. If you want to know what your veterinarian sees under a microscope, or how an ecologist studies animals and/or how to keep accurate records, then community college classes can be very useful. You are also more likely to get a seasoned professor who is hired for his or her teaching skills in your lab, rather than a graduate student with a year or less of teaching experience behind him or her, or a research-oriented professor in a big university. Should you opt for going on for a bachelor's degree, you can save time and money, often with no sacrifice in teaching quality, by taking the first 2 years' classes at a community college. Only the most pretentious universities will not accept classes in transfer for a bachelor's degree from an accredited community college, while most schools with top-notch herpetology programs do accept them readily. Two-year (AA) degrees frequently meet the minimum requirements for an entry level keeper position in a zoological park or as an animal room technician at a college or university or a veterinary assistant position at a veterinary hospital.

There are a range of potential choices. Select the one or ones that are best suited to your own interests and skills.

The authors wish to thank George R. Zug, Lewis Wright and Jay Madrono for their helpful comments and suggestions.



Coming Events

July 16, 1994: H.O.T.S. 3rd Annual Herp Expo and Sale will be held in Rochester, Michigan. For info, contact: Dino Ferri (810) 375-5915; fax (810) 375-5193.

July 27-30, 1994: Herpetoculture in the Classroom Workshop for teachers will be held in Rock Springs, Wyoming. For info, contact: Dan McCarron, White Mountain Junior High, Science Dept., P.O. Box 1989, Rock Springs, WY 82902; ph. (307) 382-4160, fax (307) 382-7351.

July 28-August 1, 1994: Joint Meeting of the Herpetologists' League and the Society for the Study of Amphibians and Reptiles will be held in Athens, Georgia. For info, contact: Dr. Joshua Laerm, Museum of Natural History, University of Georgia, Athens, GA 30602-1882; ph. (706) 542-1663.

August 6-7, 1994: Pomona Reptile Expo will be held in Pomona, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

August 13-14, 1994: National Reptile Breeders Expo will be held in Orlando, FL. For info, contact: Wayne Hill, ph. (813) 294-2235. For hotel reservations ph. (800) 327-2110 or (407) 351-1000. For discount airfare, Delta Airline ph. (800) 241-6760 — reference file #XX0004.

August 14, 1994: Second Annual Herpetological Fair will be held in Providence, Rhode Island. For info, contact: Roger William Park Zoo, 1000 Elmwood Avenue, Providence, RI 02907; ph. (401) 785-3510.

August 20, 1994: Third Annual Turtle, Tortoise, and Reptile Show will be held in San Luis Obispo, California. For info, contact: Bob Thomas, TOO SLO, P.O. Box 14222, San Luis Obispo, CA 93406; ph. (805) 481-5222.

August 20, 1994: New York Herpetological Expo will be held in Liverpool (Syracuse), New York. For info, contact: Robert Cunningham, 409 Waldorf Parkway, Syracuse, NY 13224-2241; ph. (315) 446-9292; or Dick Deuel (716) 624-1460.

August 20-21, 1994: San Francisco Reptile Expo will be held in San Francisco, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

August 28, 1994: Second Annual St. Louis Reptile Breeders Expo and Sale will be held in St. Louis, Missouri. For info, contact: James Brumley, 4341 Telegraph, St. Louis, MO 63129; ph. (314) 892-6605 or 845-2308.

September 1-2, 1994: Third Annual International Reptile Breeder's Convention will be held in San Diego, CA. For info, contact: IRBA, P. O. Box 85152-279, San Diego, CA 92186; ph. (619) 497-3550; fax (619) 263-6898.

September 3, 1994: Fifth Annual Eastern Herpetological Expo will be held in Pottsville, Pennsylvania. For info, contact: G. Leonard Knapp, 215 Lawn Avenue, Sellersville, PA 18960; ph. (215) 257-6088.

September 10-11, 1994: Orange County Reptile Expo will be held in Costa Mesa, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

September 17-18, 1994: San Jose Reptile

Expo will be held in San Jose, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

September 17-18, 1994: The Mid-Atlantic Reptile Show will be held in Baltimore, Maryland. For info, contact: Tim Hoen, The Maryland Herpetological Society, 2643 N. Charles Street, Baltimore, MD 21218; ph. (410) 235-6116 or (410) 557-6879.

September 18, 1994: Reptile and Amphibian Showcase will be held in Cleveland, Ohio. For info, contact: Matt, Northern Ohio Association of Herpetologists, (419) 433-3639.

October 15, 1994: Staten Island Herp Meet will be held in Staten Island, NY. For info, contact: Al Swanson, P.O. Box 090064, Staten Island, NY 10309; ph. (718) 317-8382.

October 15-16, 1994: San Mateo Reptile Expo will be held in San Mateo, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

October 22-27, 1994: Joint Conference of the American Association of Zoo Veterinarians and the Association of Reptilian and Amphibian Veterinarians will be held in Pittsburgh, Pennsylvania. For info, contact: Julie Fazlollah at (404) 993-2822.

October 29-30, 1994: North Bay Reptile Expo will be held in San Mateo, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

November 19-20, 1994: Arizona's Largest Reptile Expo will be held in Phoenix, Arizona. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

November 26-27, 1994: Pennsylvania Exotics and Family Pet Showcase will be held in Woodbury, New Jersey. For info, contact: Vicki Clark, Expo USA, 503 E. Penn Blvd, Woodbury, NJ 08096; ph. (609) 848-3312, fax (609) 384-6704.

December 3-4, 1994: San Francisco Reptile Expo will be held in San Francisco, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

December 10-11, 1994: Pomona Reptile Expo will be held in Pomona, California. For info, contact: Cedar Hill Reptile Enterprises, 43 Mecham Road, Petaluma, CA 94952; ph. (707) 792-2014.

February 18-20, 1995: Northern California Herpetological Society's Seventh Conference on the Captive Propagation and Husbandry of Reptiles and Amphibians will be held in Davis, California. For info, contact: NCHS, P.O. Box 1363, Davis, CA 95616-1363.

AMAZON



FALL 1994 **WINTER 1995**
29 Oct./05 Nov. 11/18 Feb.

**Herpetologists, Entomologists,
& Nature Photographers
Study Expedition**

UPPER AMAZON REGION OF PERU -
LEAVING FROM PORT OF IQUITOS ABOARD
OUR RIVERBOAT WITH AMERICAN CAPTAIN
AND EXPERIENCED CREW.

Led by Don Boyer, Supervisor of the Herpetology Department at world famous Dallas Zoo, and assisted by native naturalist expert, with daily briefings, lectures, and day and night collection forays. Explore the flooded Amazon Rain Forest, and photograph the great biodiversity of these seldom seen areas. Group size limited. Call for brochure.

8 DAYS ALL INCLUSIVE FROM MIAMI \$1598⁰⁰

For details and reservations contact:

MARGARITA TOURS

division of Amazon River Expeditions SCRL Ltd
P.O. Box 2513 · Ft. Lauderdale, FL 33303-2513
Tel: 305-764-8274 · Fax: 305-463-0050

"We Are Professional Amazon Jungle Outfitters"

MICE ON ICE

FRESHLY FROZEN

MICE & RATS

- DELIVERED TO YOUR DOOR
 - NEXT DAY AIR, UPS
 - Pinkies • Fuzzies • Adults
 - VISA, MASTER CARD, Am/Exp., Discover, Money Order, Checks
 - Low Prices • Free Price List
 - Annual Contracts Available
 - SATISFACTION GUARANTEED
- Call Now . . . 24 Hour info line

(904) 338-8270



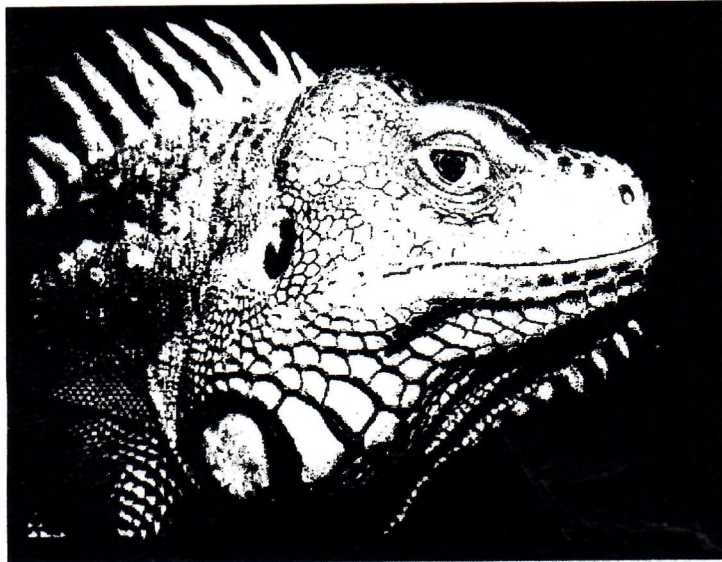
**SAN DIEGO REPTILE
♦ BREEDERS ♦**

"WE PRODUCE
CAPTIVE BRED GEMS"
(BUY BREEDER DIRECT)

SPECIALIZING IN BOAS • PYTHONS • COLUBRID SNAKES

To subscribe to our mailer send \$3 U.S. annual subscription fee and a S.A.S.E. to: S.D.R.B., P.O. Box 556, Campo, CA 91906 U.S.A. or call
(619) 478-5794
FAX (619) 478-5794

NUTRI GROW Iguana Diet TM



- tested and successful
- a nutritious diet
- feed dry or moist
- available in four sizes
- order through your local pet store or through :

AMERICAN REPTILE INC.

118 S. MAIN, DRY RIDGE, KY. 41035
TEL. 606-824-9950 FAX. 606-824-5434

finally... a product that makes feeding your iguana as easy as feeding your dog!

Monitors - Continued from page 27

sion can occur in some species if individuals are maintained together for long periods of time. Gravid female *V. beccarii* can be especially aggressive toward cage mates (Garrett and Peterson, 1991). In some instances copulations have occurred throughout the year when pairs are left together for long periods of time. A pair of *V. olivaceus* maintained under these conditions at the Dallas Zoo for 9 years consistently produced infertile eggs. These animals were separated in August of 1991. On 13 February 1992 the female was introduced into the male's enclosure; copulation was observed over the next 3 days. Egg deposition occurred 92 days later. Eight eggs were deposited over the course of a week. Four eggs were fertile but only one hatched 98 days later. This pair has produced two additional fertile clutches since the first was produced, but no young have hatched. It is possible that a long-term nutritional problem is contributing to the lack of hatching success in this species.

All gravid females are provided with nest chambers. For *V. olivaceus* and *V. gouldii*, 25-gal plastic trash cans filled with soil are provided. For the other species smaller shift cages constructed of Plexiglas with an outer shell of plywood measuring 11 X 11 X 25 in. (28 X 28 X 64 cm) filled with sph-

agnum moss are provided. After eggs are weighed and measured, they are placed either in 1-gal jars or 10-gal aquaria with vermiculite and water in a 1:1 ratio, by weight. Occasionally containers are opened to allow fresh air in. Eggs are incubated at 82°F (28°C). Incubation varies from 95–101 days for *V. gilleni* to 229–235 days for *V. gouldii*.

Neonatal care

Hatchlings are generally maintained in 10-gal aquaria and each provided with a hiding box, water dish, a 20-watt fluorescent ultraviolet light (Sylvania 350 BL), and a 50-watt incandescent spotlight (Sylvania 50/R20 Reflector). Hatchling *V. beccarii* are provided with a constant water drip system to prevent dehydration. Three-week-old domestic crickets, mealworms, waxworms, and preweanling mice are readily accepted by most neonates a few days posthatching. On occasion, food items must be crushed to expose internal fluids to elicit a feeding response.

Conclusion

Theoretically, if healthy, sexually viable, mature pairs of any species of *Varanus* can be obtained, reproduction can be achieved. In fact, most successful hatchings, 50% or better, have occurred over the past decade (Horn and Visser, 1989; Slavens, 1992).

Naive (no previous exposure to prey or predator chemicals) captive-hatched monitors have offered staff at the Dallas Zoo opportunities for a variety of behavioral experiments. Currently, chemosensory prey tracking and chemical detection of predators is being investigated in several groups of captive-hatched *V. gouldii*. In addition, staff members have contributed numerous publications over the past 28 years concerning various aspects of behavior (Murphy, 1969, 1971, 1972; Murphy and Mitchell, 1974; Carpenter et al. 1976; Murphy and Lamoreaux, 1978; Boyer and Lamoreaux, 1983; Barker, 1984; Mitchell, 1990; Garrett and Peterson, 1991; Garrett and Card, 1993). Hopefully, recent advances in the captive management of these taxa will offer insight into the natural histories of these animals.

I wish to thank J. B. Murphy, L. A. Mitchell, C. M. Garrett, D. M. Boyer, and D. T. Roberts for helpful advice in the preparation of this article.

Literature Cited

- Auffenberg, W. 1981. The Behavioral Ecology of the Komodo Monitor. Gainesville: University of Florida press. 406 pp.
- Auffenberg, W. 1984. Notes on the feeding behavior of *Varanus bengalensis* (Sauria: Varanidae). J. Bombay Natural History Soc. 80:286–302.

Continued on next page

Why is lighting for reptiles so important?

In the wild, reptiles utilize the sun's UVB rays to synthesize Vitamin D3 in their bodies. Reptiles must have Vitamin D3 present to process the calcium in their diets. Without Vitamin D3 the calcium in the diet cannot be absorbed into the blood stream, and simply passes through the system unused. A reptile's need for UVB, Vitamin D3, and calcium absorption does not change because it lives in captivity. In fact, most captive reptiles are purchased as juveniles, when the need for calcium absorption (for strong bones and growth) is at it's highest.

The UVB spectrum naturally present in sunshine can only be duplicated with **fluorescent** lighting, and must be of an **intensity** which mimics that of the sun. While most all fluorescent bulbs produce a minute amount of UVB, the intensity may not duplicate the sun's, resulting in inferior Vitamin D3 synthesis and limited calcium absorption.

Incandescent bulbs (those that screw into a socket) may produce UVA rays, which have psychological benefits in reptiles, but cannot produce the vital UVB spectrum, and do not aid in calcium absorption in any way.

Introducing Zoo Med's latest technological breakthrough in reptile lighting:



Repti Iguana Light UVB 310

The Repti Iguana Light UVB 310 was designed specifically for the quick growth rates and higher calcium needs of Iguanas. Repti Iguana Light UVB 310 produces the complete Ultraviolet spectrum present in sunlight, in the tropics, at 12:00 Noon.

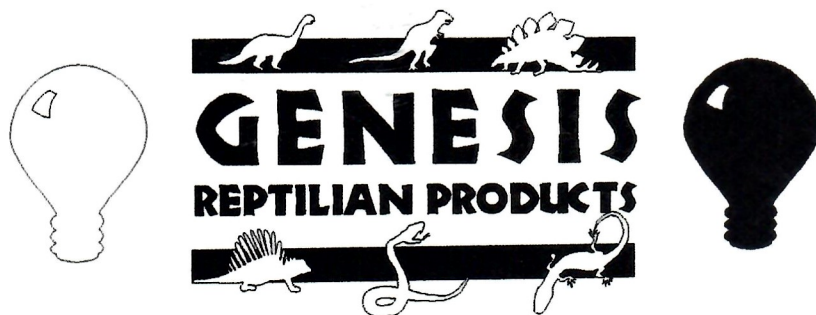
- UVB 310 nanometers provides the exact band of rays within the UVB spectrum that prove most productive for maximum Vitamin D3 benefits and calcium absorption.
- 2.5% total UVB output duplicates the **tropical** sun's intensity.
- Kelvin Rating of 5500, consistent with the sun's Kelvin Rating at 12:00 Noon.
- CRI rating of 93, the preferred Color Rendition Index for viewing reptiles.
- Also provides the UVA spectrum, important to a reptile's psychological well being.

ReptiSun UVB 310

The ReptiSun UVB 310 was designed to be used with all types of lizards, snakes, turtles, tortoises and amphibians. ReptiSun UVB 310 produces the complete ultraviolet spectrum present in sunlight, in the desert, at 12:00 Noon.

- UVB 310 nanometers provides the exact band of rays within the UVB spectrum that prove most productive for maximum Vitamin D3 benefits and calcium absorption.
- 2.2% total UVB output duplicates the **desert** sun's intensity.
- Kelvin Rating of 5500, consistent with the Kelvin Rating at 12:00 Noon.
- CRI of 93, the preferred Color Rendition Index for viewing reptiles.
- Also provides the UVA spectrum, important to a reptile's psychological well being.





**IN THE BEGINNING THERE WAS LIGHT
AND IT WAS GOOD...**

**NOW THERE ARE GENESIS BULBS,
AND THEY'RE BETTER.**

The GENESIS bulbs are perfect for all of your reptile's needs. We offer Lunar and Solar bulbs that not only provide heat, but also give your reptile an ideal basking area. They are available in several sizes and wattages. GENESIS BULBS are uniquely coated from within to virtually eliminate chipping and scratching, while maintaining a natural day or night environment.

**AVAILABLE IN SELECT PET STORES AND BY MAIL ORDER
FOR MORE INFORMATION CALL (909) 599-3809
OR WRITE TO: GENESIS REPTILIAN PRODUCTS,
1034 W. ARROW HWY., SUITE D-175, SAN DIMAS, CA 91773
DEALER/DISTRIBUTOR INQUIRIES WELCOME**

THE MID-ATLANTIC REPTILE SHOW '94

Sponsored By The Maryland Herpetological Society

September 17th & 18th 1994

Saturday 10 A.M. To 4:30 P.M.

Lectures 7:30 P.M. To 11 P.M.

Sunday 11 A.M. To 6 P.M.

Captive Born Reptiles Only

94's Proceeds Will Purchase

Rainforest

**PROCEEDS FROM OUR 1993 SHOW SAVED MORE
THAN 131 ACRES OF RAINFOREST!**

Keynote Speaker: Dr. Daniel-H. Janzen

Rainforest Ecologist, on his work in Guanacaste, Costa Rica

Ron Markel, author of "King Snakes and Milksnakes"

Dr. Keith Gold, DVM

Trooper Walsh & Roger Rosscoe, National Zoo - Komodo Dragons

Anthony Wisnieski, Curator of Reptiles, Baltimore Zoo

Tom Crutchfield, Crutchfield Reptile Enterprises

Location: The Maryland State Fairgrounds and The Timonium Holiday Inn

Hotel Reservations 1 (800) 289-4499 or 410-252-7373 (ask for convention rate)

Delta Airlines Discount 1 (800) 241-6760 (ask for # V0107)

Admission Donation: Two Day Adult Pass \$10.00/One Day \$6.00/Children under 12 and Seniors \$5.00

Additional Donations Welcome. Checks may be forwarded to:

The Maryland Herpetological Society, 2643 N. Charles St. Baltimore, MD 21218

Phone: (410) 235-6116 Wed 9-5 only or

Show Coordinator Tim Hoen - Phone (410) 557-6879 anytime

Vendor sales only. No venomous reptiles. Not responsible for damage, theft, or injuries.



Monitors - Continued from page 44

Auffenberg, W. 1988. Gray's Monitor Lizard. Gainesville: University of Florida press. 419 pp.

Barker, D. G. 1984. Maintenance and reproduction of the green tree monitor at the Dallas Zoo. Proceedings 8th Annual Reptile Symposium on Captive Propagation and Husbandry. 91-92. Hahn, R. (ser. Ed). Thurmont, MD. Zoological Consortium, Inc.

Bartlett, R. D. 1982. Initial observations on the captive reproduction of *Varanus storri*, Mertens. Herpetofauna, Sydney 13(2):6-7.

Bayless, M. K. and Renolds, T. 1993. Breeding of the Savannah monitor lizard in captivity (*Varanus exanthematicus* Bosc, 1792). Herpetology 22(1):12-14.

Bohme, W. 1988. Zür Genitalmorphologie der Sauria; funktionelle und stammesgeschichtliche Aspekte. Bonn. Zool. Monogr. 27:1-176.

Bohme, W. 1991. New findings on the hemipenial morphology of monitor lizards and their systematic implications. Mertensiella 2:42-49.

Boyer, D. M. and Lamoreaux, W. E. 1983. Captive reproduction and husbandry in *Varanus gilleni*. Proceedings: 7th Annual Reptile Symposium on Captive Propagation and Husbandry. 59-63. Tolson, P. J. (ser. Ed). Thurmont, MD. Zoological Consortium, Inc.

Bredl, J. 1987. First captive breeding of the perentie monitor. Thylacinus 12(1).

Bredl, J. and Schwaner, T. D. 1983. First record of captive propagation of the lace monitor, *Varanus varius* (Sauria: Varanidae). Herpetofauna, Sydney 15:20-21.

Card, W. 1993. Significant monitor hatchings at the Dallas Zoo. AAZPA Communique, April, 16.

Card, W. and Mehaffey, D. In press. A radiographic sexing technique for *Heloderma suspectum*. Herpetol. Rev.

Carpenter, C. C., Gillingham, J. C., Murphy, J. B., and Mitchell, L. A. 1976. A further analysis of the combat ritual of the pygmy mulga monitor (*Varanus gilleni*). Herpetologica 32(1):35-40.

Chippindale, P. 1991. Captive breeding of the Timor monitor (*Varanus timorensis similis*). Herpetol. Rev. 22(2):52-53.

David, R. 1970. Breeding the mugger crocodile (*Crocodylus palustris*) and water monitor (*Varanus salvator*) at Ahmedabad Zoo. Int. Zoo Yearbook. 10:116-117.

Davis, R. B. and Phillips, L. G., Jr. 1991. A method of sexing the Dumeril's monitor. Herpetol. Rev. 22(1):18-19.

Edienmuller, B. and Horn, H.-G. 1985. Some examples of breeding and the present state of knowledge about breeding in *Varanus* (Odatia) *storri* Mertens 1966. Salamandra 21(1):55-61. Translated by M. J. Bennett.

Frye, F. L. 1991. Biomedical and Surgical Aspects of Captive Reptile Husbandry (2nd ed.). Krieger, Melbourne (2 vol.), 637 pp.

Garrett, C. M. and Peterson, M. C. 1991. *Varanus prasinus beccarii*. Behavior. Herpetol. Rev. 22(3):99.

Garrett, C. M. and Card, W. 1993. Chemical discrimination of prey by naive neonate Gould's monitors (*Varanus gouldii*). J. Chem. Ecol. 19(no. 11):2599-2604.

Greene, H. W. 1986. Diet and arboreality in the emerald monitor (*Varanus prasinus*), with comments on the study of adaptation. Fieldiana: Zoology. no. 31:1-12.

Horn, H.-G. 1991. Breeding of the lace monitor (*Varanus varius*) for the first time outside of Australia. Mertensiella 2:168-175.

Horn, H.-G. and Gerard, J. V. 1989. Review of reproduction of monitor lizards in captivity. Int. Zoo Yearbook 28:140-150.

Huff, T. 1991. The husbandry and headaches of maintaining large lizards in captivity: An anecdotal

MICROCLIMATE ELECTRONIX

AT LAST A FULL RANGE OF AUTO-DIMMING THERMOSTATS DESIGNED FOR HERPETOLOGICAL USE

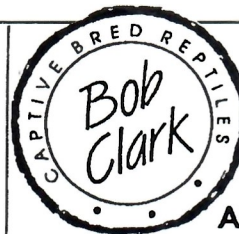


- No stress from flashing lights.
- Accurate temperature scale.
- Heat source gives constant dependable warmth.
- Field tested for over 4 years.
- Remote sensor allows for outside mounting of thermostat.
- Indicator on front panel dims and brightens with heat output.
- Optional capability of maintaining lower night temperature automatically.

The Microclimate continuous feedback circuitry constantly makes minute adjustments in the power output and effectively eliminates the differential caused by the on/off cycle of conventional thermostats. While other thermostats turn the heat on as the temperature falls and off again as the temperature rises the Microclimate thermostat is always on but only at the level needed to maintain the set temperature.

BOB CLARK
12316 VAL VERDE DR.
OKLAHOMA CITY, OK 73142

Fax# (405) 749-0798
Tel# (405) 749-0797



**ALL
AVAILABLE
PYTHON
COLOR
AND PATTERN
MORPHS**

**Consistently first producing
new varieties for the market**

- Albino Burmese Pythons 1986
- Labyrinth Burmese Pythons 1990
- Albino Ball Pythons 1991
- True Striped Ball Pythons
- Hypomelanistic Burmese Pythons
- Leucistic Burmese Pythons

*Other python species also
available*

**SPECIALIZING IN THE CAPTIVE
PROPAGATION OF PYTHONs**

12316 Val Verde Drive
Oklahoma City, OK 73142
U.S.A. (405) 749-0797
FAX (405) 749-0798



approach. Proceedings of the 15th International Herpetological Symposium on Captive Propagation and Husbandry. 173-180. Uricheck, M. J. (ser Ed), Western Connecticut State University.

King, D. and Green, B. 1979. Notes on diet and reproduction of the sand goanna (*Varanus gouldii rosenbergi*). Copeia 1979:64-70.

Losos, J. B. and Greene, H. W. 1988. Ecological and evolutionary implications of diet in monitor lizards. Biol. J. Linnean Soc. 35:379-407.

Mertens, R. 1958. Bemerkungen über die Warane Australiens. Senckenberg. Biol. 39:229-269.

Mitchell, L. A. 1990. Reproduction of the Gould's monitor (*Varanus gouldii*) at the Dallas Zoo. Bull. Chic. Herp. Soc. 25(1):8-9.

Murphy, J. B. 1969. Notes on iguanids and varanids in a mixed exhibit at the Dallas Zoo. Int. Zoo Yearbook. 9:39-41.

Murphy, J. B. 1971. Notes on the care of the ridge-tailed monitor (*Varanus acanthurus brachyurus*) at the Dallas Zoo. Int. Zoo Yearbook 11:230-231.

Murphy, J. B. 1972. Notes on Indo-Australian varanids in captivity. Int. Zoo Yearbook 12:199-202.

Murphy, J. B. and Lamoreaux, W. E. 1978. Threatening behavior in Mertens' water monitor (*Varanus mertensi*). Herpetologica 34(2):202-205.

Murphy, J. B. and Mitchell, L. A. 1974. Ritualized combat behavior of the pygmy mulga monitor lizard (*Varanus gilleni*). Herpetologica 30:90-97.

Peters, U. 1971. First hatching of *Varanus spenceri* in captivity. Bull. Zoo Mgmt. 3:17-18.

Pianka, E. R. 1972. Zoogeography and speciation of Australian desert lizards; an ecological perspective. Copeia 1972:127-145.

Shea, G. M. and Reddacliff, G. L. 1986. Ossifications in the hemipenes of varanids. J. Herpetol. 20(4):566-568.

Slavens, F. L. and Slavens, K. 1992. Reptiles and Amphibians in Captivity, Breeding—Longevity.

Slaveware. Seattle, Washington. 497 pp.

Stewart, J. S. 1989. Techniques for sex identification in large reptiles. In: Gowen, R. L. (Ed) Captive propagation and husbandry of captive reptiles and amphibians. Northern California Herpetological Society. Special publication 5:99-103.

Visser, G. J. 1981. Breeding the white-throated monitor (*Varanus exanthematicus albigularis*) at the Rotterdam Zoo. Int. Zoo Yearbook 21:87-91.

Visser, G. J. 1985. Notizen zur Brutbiologie des Gelbwarans *Varanus (Empagusia) flavescens* (Hardwicke and Gray, 1827) im Zoo Rotterdam. Salamandra 21:161-168.

Walsh, T., Rosscoe, R., and Birchard, G. F., 1993. Dragon tales, the history, husbandry, and breeding of Komodo monitors at the National Zoological Park. The Vivarium. 4(6):23-26.



All Books 20% or More Off List Price
Send S.A.S.E. For Free Catalog
Shipping and Handling \$2.00 for 1st Book,
\$1.00 ea. for each Additional Book
Wholesale Catalog Available to Legitimate Dealers



25 Enchanted Hills Road • Suite 1 • Owings Mills, MD 21117

Phone & Fax: 410/ 356-0424

SAMPLES

- 1) Cogger-"Reptiles & Amphibians"-20% off
- 2) Markel-"King Snakes & Milk Snakes"-25% off
- 3) Yates-"Nature of Borneo"-20% off
- 4) Coburn-"Atlas of Snakes"-23% off

DAVID BLAIR'S CRITTER CORNER

Call: (800) HERP-NUT

(800) 437-7688

For Orders or to Request a Catalog



**Quality Lighting, Heating, Housing, and Nutritional Supplies
for Reptiles & Amphibians at Discount Prices by mail !**

**For Product Info. CALL:
CRITTER CORNER, INC.**

316 W. Mission #117 Escondido, CA 92025
(619) 746-5422



Open 7 DAYS a WEEK
Mon - Thur 10 a.m. - 6 p.m.
Friday 10 a.m. - 7 p.m.
Saturday 10 a.m. - 5 p.m.
Sunday 11 a.m. - 5 p.m.

MAIL ORDER PET SHOP

CALIFORNIA & NEW YORK

TELEPHONE	DIRECTORY
Product Info. & Order Line	800 - 366 - 7387
Customer Service FAX	800 - 326 - 6677
California Local	800 - 877 - 3834
New York Local	916 - 928 - 0215
	516 - 595 - 1717

Herpetoculturists!

*Tired Of Having To Buy Your Supplies
From A Number Of Outlets Instead Of Just One?*
Well, We Are Just The Place That You Have Been Looking For.

A Few Samples Of Our Product Line

Reptile Sexing Probes (Set Of 6).....	(H4003) ... \$ CALL
Flexwatt Reptile Heat Strip.....	(H5101) ... \$ CALL
(11 inches wide / 20 watt / Priced per Foot)	
Flexwatt Reptile Heat Strip.....	(H5102) ... \$ CALL
(3 inches wide / 6 watt / Priced per Foot)	
Microclimate Thermostats #DLL.....	(H5202) ... \$ CALL
Green Iguana Manual.....	(IG0404) ... \$ CALL
Aspen Bedding (1700 Inch).....	(H6837) ... \$ CALL
Super Preen (125 gm.).....	(H3062) ... \$ CALL
Reptivite (16 oz.).....	(H3113) ... \$ CALL
Nekton Rep (20 gm.).....	(H7412) ... \$ CALL
Phillips BL - Blacklight (24 Inch)	(H3121) ... \$ CALL
Zeigler Cricket Diet.....	(H3181) ... \$ CALL
Zeigler Iguana Diet.....	(H3180) ... \$ CALL

FREE Shipping

FREE FAX Lines

FREE Catalogues

FREE Order Lines

FREE Customer Service

FREE Product Information

NO Minimum Orders

We Accept:

MasterCard - Visa - Discover &
American Express

Next Day and Second Day Air
are available.

WESTERN REGION
1338 North Market Blvd
Sacramento, CA 95834

1 - 800 - 366 - 7387
24 Hours A Day - 365 Days A Year

EASTERN REGION
250W Executive Drive
Edgewood, NY 11717

Classifieds

HOW TO PLACE A CLASSIFIED AD IN THE VIVARIUM: Type or clearly hand write your ad on a 3 x 5 index card in 30 words or less for a total of \$15.00. Any ad over 30 words costs \$0.50 per additional word. Payments must be made in advance and must include the correct amount in order to be placed in the next issue. Classifieds that run for one year (6 times) paid in advance, qualify for a 5% discount. For additional info, call (619) 747-4948 or fax (619) 747-5224. **Deadline for the September-October issue is July 21st and for the November-December issue is Sept. 21.**

THE VIVARIUM is not responsible for any false claims or misleading statements found in the classified ads.

ANIMALS

For Sale: Whyte Ark Reptile Enterprises offers the first c.b. Surinam horn frogs *Ceratotryps cornuta* available anywhere in years. We breed, buy and sell an exciting variety of herps. Wholesale or retail customers may phone or fax us at (415) 387-0927.

For Sale: Redding Reptile Breeders: A wide selection of captive-bred snakes. Write for our free 1993 price list. RRB, Box 1142, Project City, CA 96079, (916) 275-8782.

For Sale: Adult and subadult specimens of African spur thigh tortoises, *Geochelone sulcata*. (909) 780-0715.

For Sale: Quality bred and imported reptiles and tarantulas. For free price list send SASE to: **Special Care**, #5 W. Prospect Ave., Pgh., PA. 15205, (412) 928-9433.

Free Pricelist of huge selection of quality captive-bred and cherry picked imports. Over 200 types of reptiles and amphibians on our monthly list to suit any taste and budget. For the discriminating collectors from beginners to advanced breeders, to pet shops, who want to stock nothing but the highest quality and variety at wholesale prices. Give us a call today at (813) 939-7377. Gulf Coast Reptiles, 3228 Fowler St., Ft. Myers, FL 33901.

For Sale: Quality captive produced serpents and geckos. Albino and normal colors of western diamondbacks, Burmese, corns, Sonoran gopher snakes, striped, banded Cal kings, and Brazilian rainbow boas. Also available are great bloodlines of boa constrictors. Taiwanese beauty snakes, Honduran milks, Nelson milks, Sinaloa milks, Pueblan milks, Arizona mt. kings, desert kings and black pines. Quantity discounts available. For info or price list contact: Brad Tylman or Bo Sofge, 6700 N.W. Hwy. 99 W., Corvallis, OR 97330, (503) 745-7626.

For Sale: Tarantulas: mascarino spiderlings, juv., adults, price list, many species, goliath bird eaters, king baboons, tiger rump doppelganger, red Martinique tree spider, more. 1187 Montecito Drive, Los Angeles, CA 90031, (213) 227-6566.

For Sale: Gray banded kings-held back '93 hatchlings feeding on frozen mice \$135 - \$175, '93 5.0 Arizona mt. kings, 5 yr. old male grayband. Expecting baby Mex. Mex., graybands, thayeri, Sinaloa, nigritus, corns (albino, norm. snow) Cal. kings (desert, banded, albino) albino prairie kings, eastern milk and leopard geckos. 5 piece stainless probe sets \$15. Quantity discounts. Call (516) 728-9267.

For Sale: Australian bearded dragons (*Pogona vitticeps*) one month old \$75.00 each, 2 months \$100.00 each. Leopard gecko hatchlings \$25.00. Veiled chameleons: hatchlings \$75, 1 month \$100.

The Reptile Service

For seven years we have sold only to JOBBERS!

We import from ten countries including Egypt, El Salvador, Philippines and Suriname.

We are USDA licensed and now currently breed jerboas, hedgehogs, dormice, dwarf apricot jerboas, fruit bats and many more.

We ship overnight via UPS, Airborne Xpress or to your nearest commercial airport via Delta, American and many others.

We guarantee live arrival and work hard not to send you animals you can not sell.

JOBBERS, give us a chance to show you why "The Reptile Service" is the fastest growing reptile dealer in the U.S.A. and we promise you will not be sorry.

**Rian Gittman
The Reptile Service**

**730 S. Deerfield Ave. #5 • Deerfield Bch, FL 33441
Phone: 305/428-8005 • Fax: 305/698-0012**

Blue-tongued skinks: northern \$200, Irian jayan banded juveniles \$200, common \$175. Australian water dragons (*Physignathus lesueurii*), 10-12" juveniles \$500/pr., Superworms \$20/lb. postpaid. Send SASE for pricelist and care sheets. Weis Reptiles, Rt. 4, Box 468, Tallahassee, FL 32304. (904) 574-1037.

For Sale: R & M Herpetoculture: Specializing in high quality captive-bred; colubrids, pythons, boas, iguanas and tree frogs. For a complete price list of available animals. Call or write: Rich Owings/Mark Walsh. 1435 Marsan Ct., Campbell, CA, 95008 (408) 374-9407.

For Sale: INVEST IN THE FUTURE, buy captive-bred Australian bearded dragons, *Pogona vitticeps*, sired by red phase males, established, \$90. Normals, \$75. Leopard geckos, head-started, \$25. Corn snakes various kingsnakes and milksnakes, possible others, inquire. Call or send address for price list. Dave Duncan, private breeder, 2607 N. Arthur, Fresno, CA 93705 (209) 227-1566.

For Sale: Looking for unusual snakes? Rare, collector specimens for serious herpetoculturists. Exclusively captive-bred. SASE to: Vince Scheidt, PO Box 22885, Dept. V, San Diego, CA 92192-2885.

For Sale: Captive-bred Phyllomedusine frogs. If interested contact Outback Herpetological Company at (408) 741-4911.

For Sale: Vibrant *L. alterna*, Hondurans, *thayeri*, Pueblans, *pyromelana*, *splendida*, rosy boas, more. Free price list. Mark Hakkila, 1750 Boston Drive, Las Cruces NM 88001. (505) 522-1322.

For Sale: 50-50+ black and white California kingsnakes. Selectively bred since 1988 for width, color and pattern. \$75.00-200.00. Photos available of breeders and hatchlings. Wes Greene (918) 322-9830.

For Sale: Captive bred boids and colubrids. For price list send S.A.S.E. to Donna & Jerry Fogle, 14120 Driskell Loop Rd., Wilmer, AL 36587 or call (205) 649-9469.

For Sale: Healthy imported Madagascan chameleons, day and leaf-tailed geckos. Also c.b. green basilisk. Send S.A.S.E. for brochure, to Scott Hughey, 85 Buffumsville Rd., Somersworth N.H. 03878 (603) 692-6528.

For Sale: Announcing: TIGER RETICS. We are proud to announce the second successful breeding of this uniquely patterned python. For more information call (612) 774-1044 and provide your mailing address.

For Sale: Sri Lanka pythons. These are one of the most beautiful of the large pythons, rarely offered for sale. Our bloodline is the best anywhere. \$300.00 each. Jim Gregg (206) 776-3755.

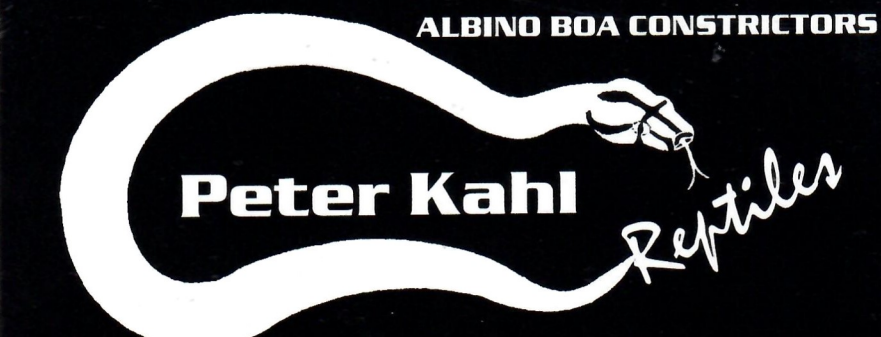
For Sale: Veiled chameleons, \$85.00. "Pick" leopard geckos \$20.00. Bearded dragons \$75.00. All captive-bred. Center For Reptile & Amphibian Propagation, 217 Upper Cibolo Creek Road, Boerne, TX 78006. (210) 537-5250.

For Sale: Captive-bred baby Bengal monitors. Born 7-6-93. Also have eggs incubating due to hatch this summer. First ever in U.S. New York sales only or with a U.S.D.I. permit. Call for info. Danny Gorman (516) 735-8283.

For Sale: ALBINO BOA CONSTRICTORS, my second year of production from the original strain and hets. from my new strain. Also, diamond x carpets, Brazilian rainbows, and het. for albino ball pythons. Brian Sharp, P.O. Box 123, Catharpin, VA 22018. (703) 754-4624 (phone/fax).

For Sale: Rare and select colubrids and rosy boas. Albino Queretaro kings, 50/50 kings, hypomelanistic rosies, orange desert rosies and more. Many exceptional phases of Pueblan milksnakes - orange, apricot, ultra wide white, bi-color, etc. Great prices on *L.*

ALBINO BOA CONSTRICTORS



Peter Kahl

Reptiles

Specializing in Captive Born Boas & Pythons

FOR PRICE LIST, CONTACT: PETER KAHL REPTILES • P.O. BOX 150
LONG GREEN, MARYLAND 21092 OR CALL (410) 592-9675 • FAX (410) 592-6911

alterna, *arcifera*, *greeri*. Every animal feeding. Don Wilson, Seven Generations Reptiles, P.O. Box 339, Joshua Tree, CA 92252. (619) 366-0071.

For Sale: 1.1 King Cobras, devenomized and scented onto rats. Male (16 ft.) female (13 ft.), \$2800.00. 1.1 spectacle cobras 4 ft. and 5 ft., \$450.00. Must have permits. Call Grant (305) 385-8300.

For Sale: 1.0 Bolivian *amarali* 91, short, stocky, \$750.00; 1.0 kerry king, South Brazilian *amarali*, was a keeper 6' \$1,000.00; 2.1 Madagascar ground boas, 91/92, 4 to 6' \$8,500; 1.0 Malayan blood pythons, male appolosa phase, \$1,000; 0.1 diamond python c.b. early 93, strong feeder \$3,000.00; Rosy boas: 1.1 saslowi, San Mateas Canyon, c.b. 93, \$550.00 pr.; 1.1 myriolepis, San Gabriel, c.b. 93, \$700.00 pr.; Arizona choc.'s *L. t. gracia*, mottled dark choc. with cream, beige, and pearl interspaces, prettier than Kofa's c.b. 93, \$700.00 pr. Bill Tropp (714) 494-0721, 63 Calle Industrias #544, San Clemente, CA 92672.

For Sale: Captive born rhinoceros iguanas, *Cyclura cornuta*, Cuban rock iguanas, *Cyclura nubila*, 10 bloodlines, highest quality, F1 & F2, largest U.S. Breeder, 5 bloodlines green iguanas. Call Robert, (305) 872-9811

For Sale: Captive born GREEN TREE PYTHONS, well started on small mice, several blood lines available, quantity discounts, \$750.00 each. For more information on these and other boas and pythons. Call Mark (215) 342-2432 (PA).

For Sale: QUALITY CAPTIVE PRODUCED SNAKES. 100+ forms (species, subspecies, color & pattern morphs) of boids & colubrids. Fair prices, excellent quality. For 1994 price list send SASE: Lloyd & Sunnie Lemke, 25947 RD 140, Visalia, CA 93292. For more information (209) 734-6352.

For Sale: SHINGLEBACKS. Chance of a lifetime. Longtime colony of five individuals. \$1,800 each. All in excellent health and condition. Believed to be one male and four females. (602) 885-1195.

For Sale: Choice selection from over 35 of the most unusual reptiles being bred in captivity today. For the discriminating collector and investor. For free 1994 price list send SASE to: Bill Gaines, c/o GAINES REPTILES, INC. 6 Pine Tree Lane, Trafalgar, IN 46181, or call (317) 261-8417 (day), (317) 878-4042 (evening).

For Sale: Adult snakes, 1.0 Sinaloa milk, 0.1 lavender Cal king (banded), 0.1 eastern milk, 0.2 c.b. '90, Texas rat snakes (het for Leucistic) 0.1 c.b. '90 & 1.2 WC '93 ball pythons, & 0.3 c.b. '94 eastern milks all for \$450.00. Also, Nile monitor approx. 20" \$50.00. C.b. '94 Burmese pythons, albino patternless \$700.00, patternless known het for albino, \$350.00 & Normals \$55.00 ea. in ten lots. Common boa constrictors \$45.00 ea. in ten lots. Call LAND SNAKES phone/fax (313) 728-5619 Westland, MI. Visa & Mastercard

Advertiser's Index

Advanced Vivarium Systems	2
Amazon River Expeditions	43
American Reptile, Inc.	44
Barker, David G.	21
Barnes, Byron	9
Bean Farm, the	21
Big Apple Herpetological	34
Broda-Merker Enterprises	17
Bush Herpetological Supply	36
Captive Bred Wildlife	35
Carolina Mouse Farms	37
Cedar Hill Reptiles	50
Central Florida Herpetological Society, Inc.	16
Central Florida Reptile Farm	13
Clark, Bob	47
Cold Blooded Design	9
Critter Corner	47
Custom Cages	15
Exotic Care	51
Fitzgerald, Pete	15
Fluker Farms	41
Genesis Reptilian Products	46
Glades Herp	13
Goergen, Dick	21
Gourmet Rodent	9
Hammock Foundation, the	12
Helix Controls	33
HIIDRA	33
Kahl, Peter	49
Lorio Reptile Supplies	13
Mail Order Pet Shop	48
Maryland Herp Society	46
Maryland Reptile Farm	47
McElhaney Video Productions	13
Mice On Ice	43
Midwest Custom Products, Inc.	51
N.G. Publishing	12
Nekton USA, Inc.	17
Neodesha Plastics	7
Ocean Nutrition	37, 40
Rainbow Mealworms	54
Rep-Cal Research Labs	34
Reptile Breeders, Inc.	17
Reptile Haven	51
Reptile Resource, Inc.	21
Reptile Service, The	48
Reptile Specialties	12
San Diego Reptile Breeders	43
San Mar Enterprises	36
Serpent's Tale	35
Smith Co.	41
St. Louis Lizard Co.	6
Tetra Terra fauna	56
West Coast Zoological	50
Zoo Med Laboratories	45, 55

1994

Upcoming Reptile Expos

Presented By Cedar Hill Reptile Enterprises

May 14-15	Costa Mesa, Ca.	Orange County Fairgrounds Building # 16
June 11-12	Phoenix, Arizona	Arizona State Fairgrounds 19th Avenue & McDowell
August 6-7	Pomona, Ca.	Los Angeles County Fair Pomona FAIRPLEX
August 20-21	San Francisco, Ca.	Cow Palace
Sept. 10-11	Costa Mesa, Ca.	Orange County Fairgrounds Building # 16
Sept. 17-18	San Jose, Ca.	Santa Clara County Fairgrounds Fiesta Hall
Oct. 15-16	San Mateo, Ca.	San Mateo Expo Center Next to Bay Meadows Raceway
Oct. 29-30	Santa Rosa, Ca.	Sonoma County Fairgrounds
Nov. 19-20	Phoenix, Arizona	Arizona State Fairgrounds 19th Avenue & McDowell
Dec. 3-4	San Francisco, Ca.	Cow Palace
Dec. 10-11	Pomona, Ca.	Los Angeles County Fair Pomona FAIRPLEX

For Vendor Info: Cedar Hill Reptile Enterprises
43 Mecham Rd.
Petaluma, Ca. 94952

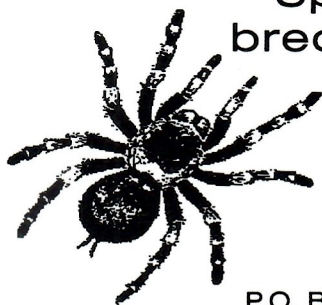
Phone us at (707) 792-2014 or Fax (707) 664-0334

Anyone Can Be A Vendor !

Look for more Great Reptile Expos in other locations around the U.S.

WEST COAST ZOOLOGICAL

Specializing in Captive
bred Tarantulas & Reptiles



(619) 672-3143
FAX (619) 672-6235

Call or Fax
for FREE Price List

P.O. Box 720849 San Diego, CA 92172-0849

accepted.

For Sale: Spotted pythons, hand picked, \$300/pr.: Outstanding offspring from select breeding stock of boids and colubrids expected this 1994 season! For a free price list: Todd Smith, 4450 California Ave K-372, Bakersfield, CA 93309, (805) 397-7591.

For Sale: Dumeril's boas, neonates from outstanding peach colored adults, \$350.00 - \$400.00. Brazilian rainbow boas, unrelated offspring from "Lamar" strain orange, or blood red adults, \$175.00 - \$225.00. Diamond x jungle carpet pythons, hatchlings from fluorescent yellow/velvety black parents, \$250.00. Nature's Marsels, Winslow W. Murdoch, M.D. or Sean Jacobs, 1580 Overlook Dr., Malvern, PA. 19355 (610) 647-8437.

For Sale: Diamond pythons, jungle carpets, dumeril's boas, all c.b./h. from unrelated parents. Guaranteed healthy and feeding. Photos available. Eric Skov, HC60 Box 175, Wells, NV 89835 (702) 752-3909.

For Sale: Anerythristic Honduran milksnakes, \$1,000.00 heteros, \$500.00. Large selection of locality bred *L. alterna*. Also *knoblochi*, *stuarti*. Expected this fall. Dan Johnson, P. O. Box 42505, Houston, TX 77242-2505, (713) 589-1874.

For Sale: ALBINO MILK SNAKES: If that's your goal, here's the economical way to start or to augment your breeding stock: c.b. *Lampropeltis ruthveni* with 50% chance each of being het albino. Terry, (813) 824-0705.

PUBLICATIONS

Wanted: Boa, python and colubrid snake husbandry and captive breeding articles for *THE VIVARIUM* magazine. Also desired are frog and salamander articles. Gratis copies of that issue and compensation available in exchange for articles. Writer's Guidelines are available from *THE VIVARIUM* Editor.

For Sale: FAUNA CLASSIFIED. Monthly classified publication for reptiles, amphibians, food items, supplies, literature, more. Excellent information source, worldwide circulation. Subscription \$14.00. Free sample. G.V.S., 2379 Maggio Circle #C, Lodi, CA 95240, (209) 369-7737 MC/Visa.

For Sale: 1994-1995 HERPETOLOGICAL DIRECTORY. Excellent information source for private and commercial breeders, wholesalers, foreign exporters, societies worldwide, publications, agencies, suppliers of food items and supplies. \$15.00. G.V.S., 2379 Maggio Circle #C, Lodi, CA 95240, (209) 369-7737 MC/Visa.

For Sale: REPTILIAN MAGAZINE. Check out the European perspective in this monthly, full-color magazine from England. 12-issue (one year) subscription \$59.00. 6-issue trial subscription \$30.00. Sample copy \$8.00 post paid. Copies available for resale to stores. Serpent's Tale Books, 464 Second Street, Excelsior, MN 55331, phone (612) 470-5008, fax (612) 470-5013.

For Sale: Herp Books & Magazines. Huge selection at excellent prices with great service. Call or write for a current stocklist. Pet shops may request a wholesale catalog. Serpent's Tale Books, 464 Second Street, Excelsior, MN 55331, phone (612) 470-5008, fax (612) 470-5013.

SUPPLIES

Wanted: VitaLite® full-spectrum natural light. Distributors wanted. Supply breeders, stores and pet enthusiasts. New VitaLite® spotlight, screws into any fixture. Also available, basking lights and red nite lights. Free replacement warranty. Call Kenny, toll free (800) 688-5826

For Sale: Flexwatt heat tape 3"-\$2.25ft., 11"-\$3.75ft. Clip sets \$1.50. Wholesale and bulk prices available. Write or call for a complete catalog of dry goods. Heating, lighting, health, hooks, probes &

books. **The Bean Farm**, 32514 NE 77th, Carnation, WA 98014-6701, (206) 861-7964 voice, (206) 333-4205 fax.

For Sale: DURA-LAST CUSTOM CAGE & CABINETRY: Top quality, hand-crafted laminated wood products, reasonably priced. Free price list. Call (914) 961-2189 or send SASE to 82 Wallace St., Suite 5, Tuckahoe, NY 10707.

For Sale: The EXTRACTOR® Vacuum Pump. Powerful suction removes venoms & poisons directly from the bite cavity without cutting. For snakebites, spiders, stinging insects & more. \$16.00 per kit or two for only \$28.00. Price includes shipping & handling within continental USA. Certified check or money order, 1-2 week delivery, personal checks, 2-4 weeks. Outside continental USA add \$2.50 each and longer delivery. Golden State Distributing, PO Box 42831 Bakersfield, CA 93384. Dealer inquiries invited.

For Sale: TRUE TERRARIUMS, custom made for YOUR herp, also with species specific interiors. All glass, with great ventilation, sliding front doors. Other herp specialty products too, such as cork, small pumps, vitamins, plants and more. Call or fax (512) 218-8835 or write to: Habitat Creations, PO Box 1652, Round Rock, TX 78680.

For Sale: CORK BARK Superior habitat and substrate material for reptiles and amphibians. Direct importer, EXCELLENT PRICES. Wholesale only. For orders and prices (410) 296-1746, fax (410) 296-3204. Write: CCP, 8307 Alston Rd., Towson, MD 21204.

GIFTS & CLOTHING

For Sale: "Dinosaur Gallery," selling paintings, sculptures, jewelry, fossils, etc, is looking for reptile and dinosaur artists or related items. Mail info to: 2205 E. Valley Parkway, Escondido, CA 92027, tel# (619) 741-3260.

RODENTS, ETC.

The Mouse Factory: Quality feeder mice and rats for sale. All orders are properly processed to insure quality control. Price: Pinkies \$25/100, Fuzzies \$30.00/100, and weanlings \$35/100. Ray Queen, P.O. Box 85, Alpine, TX 79831, (915) 837-7100.

The Gourmet Rodent: Rats and mice-pinkies, fuzzies and adults. For info, contact: Bill Brant, 6115 S.W. 137th Ave., Archer, FL 32618. Phone (904) 495-9024. We now accept Visa and Mastercard.

For Sale: FROZEN rats, mice, and chicks from \$25.00 per hundred. Jumbo rats \$1.50 each shipped FOB DTW. Perfect Pets Inc. 23180 Sherwood Road, Belleville, MI 48111. Phone (313) 461-1362.

LIVE & FROZEN RODENTS: High quality food for your herps at a nice price too! Mice from pinks to adults. Individually frozen, with choice of vacuum packaging, or resealable bags. Wholesale/retail. For more information, call (408) 663-0566, or send SASE to North County Exotics, P.O. Box 4856, Salinas, CA 93912-4856.

WANTED

Wanted: Boa, python and colubrid snake husbandry and captive breeding articles for **THE VIVARIUM** magazine. Also desired are frog and salamander articles. Gratis copies of that issue and compensation available in exchange for articles. Writer's Guidelines are available from **THE VIVARIUM** Editor.

Wanted: AUTHORS for **THE VIVARIUM**: For guidelines, write to **THE VIVARIUM** Editor, AFH, P.O. Box 300067, Escondido, CA 92030-0067.

Attention: Foreign Experienced Wildlife Writers. High quality reptile or amphibian articles written in proper English and with a Macintosh or IBM compatible software disk wanted. Write to: **THE VIVARIUM** Editor, AFH, P.O. Box 300067, Escondido, CA 92030-0067 for current Writer's Guidelines and compensation info. Yearly member-

Midwest Custom Products, Inc.

8608 E. 32nd St., Kansas City, MO 64129

Tel: (816) 861-3351 • Fax: (816) 861-4126

*Two New
Products*

"TONGS"

*World's Only
Collapsible Tong*

OUR "ORIGINAL" and "COLLAPSIBLE"

Total Length: 40 Inches (1 lb., 11 oz.)

Cost: \$70.00

Our 40 inch tong will collapse to under 22 inches in less than 10 seconds. Made to fit in most suitcases. Made with a "fine looking" anodized shaft!

Cost: \$38.00

Total Length: 39 Inches (8 oz.)

Our 39 inch hook will collapse down to 17½ inches long. Made with anodized aluminum shaft and stainless steel hook.

"MOST POPULAR"

- *Our original 40 in. tong (25 in. also available), 1.7 oz. \$50.00
- *Std. 39 in. field hook (1/4 in. stainless steel hook), 8 oz. \$28.00
- *Heavy duty hook (39 in. lgth., 5/16 in. stainless steel hook), 9 oz. \$33.00
- *Small hook (3/16 in. stainless steel hook, 16-24 in. lgth.), 4 oz. \$17.00
- *Probes: Set of 6 probes (sizes ranging from .020—.187), carrying case, lubricant (included). \$48.00

DISTRIBUTORS WANTED

ships are available in exchange for an article.

Wanted: Iguana owners, HELP!! I'm gathering information to improve the source material on green iguanas (only). Will you send for my questionnaire? Thanks. Jim Hatfield, P.O. Box 102, Lake Oswego, OR 97034-0014.

MISCELLANEOUS

NY Metro Reptile Expo. Ramada Plaza Hotel, New Rochelle, NY, Sunday, April 24, 10 am to 4 pm. A huge selection of captive-bred herps, supplies, books, and food. Special guest speakers and films. Directions and vendor information contact Bruce Lowder evenings at (914) 723-1424.

Mid-Atlantic Reptile Show. September 17-18 at the Maryland St. Fairgrounds and Timonium Holiday Inn. Call 1-800-289-4499 for hotel reservations & Tim Hoen (410) 557-6879 for information.



ANIMAL ENTERTAINERS presents

EXOTIC CARE

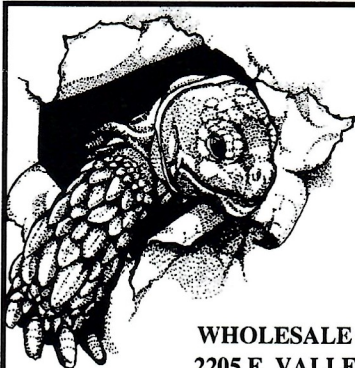
The
Reptile & Bird
Informational / Educational
Service

- ▲ Husbandry ▲ Nutrition
- ▲ Environment ▲ Disease

Randall Garrett Herzon, A.H.T.

For More Information
1 (800) 414-BIRD

*Not For Medical Diagnosis



REPTILE HAVEN

1,000's IN STOCK

Captive-bred & Imported:

- Boas & Pythons
- Turtles & Tortoises
- Lizards
- Frogs

WHOLESALE • RETAIL • BUY • SELL • TRADE

2205 E. VALLEY PKWY, ESCONDIDO, CA 92027

Wholesale price list available (sorry we do not send retail price lists)

TEL# (619) 741-0127

FAX# (619) 489-6778

Husbandry of Juvenile GREEN ANACONDAS (*Eunectes murinus*) in Captivity

by
Peter D. Strimple

Introduction

The green anaconda (*Eunectes murinus*) was first described by Linnaeus in 1758. This species is native to South America, inhabiting aquatic to semi-aquatic environs such as rivers, swamps, and the llanos. While large adults may exceed 25 ft. (7.7 m), the maximum adult length is uncertain. There is little doubt that they are the most massive of snakes (Strimple, 1993).

Although green anacondas are maintained by zoos and private herpetoculturists around the world, they are only reproduced in captivity infrequently. References pertaining to reproduction include Holmstrom (1980), Holmstrom and Behler (1981), Strimple (1986), and Ross and Marzec (1990). Literature on the captive husbandry of anacondas includes Matz (1981), Strimple (1986), Trutnau (1986), and Mattison (1988).

I have successfully reproduced green anacondas three times since 1985, and am currently working on second-generation breeding. In November 1993, the female (E.m. #2) that produced the three litters measured 12 ft. 11 in. (4 m) in total length. Herein, I provide morphometric data on newborn anacondas, their husbandry, and growth. Each breeding was the result of a breeding loan between owners. Therefore, I was entitled to keep half of each litter. In the case of litters #1 and #2, I kept the offspring for almost 3 months, affording me time to observe the young. The offspring from litter #3 were taken by the coholder of the breeding loan 11 days after birth, so I could observe them for only a short period.

Parturition

Birth #1:

Parturition occurred on December 24, 1985, resulting in 16 live young and 2 infertile ova (slugs). At birth, many of the neonates had an unusual tan to tannish-green ground color, much lighter than that of the olive-colored parents or other juvenile anacondas I have seen. This unusual coloration changed ontogenetically

within 2 to 3 months of age, becoming greenish.

Birth #2:

On January 18, 1988, the same female gave birth to a second litter that contained 21 live young and 14 slugs. These neonates were very similar in size and appearance to those born in 1985, with the exception that in most of them the ground color was more olive-green than tan or tannish-green.

Morphometric data on three litters of captive-bred green anacondas.

Litter No.	Litter Size	TOTAL LENGTH inches(cm)		WEIGHT grams	
		Range	Mean	Range	Mean
1	16	29.6-31.9 (75.3-81.0)	30.7 (78.1)	205.0-254.9	222.7
2	21	28.3-31.1 (72.0-78.9)	29.7 (75.4)	170.3-246.9	189.1
3	30	28.5-32.0 (72.5-81.5)	29.7 (75.5)	172.6-259.6	223.9

Birth #3:

On December 26, 1990, the same female produced a third litter which comprised 30 live young, 4 stillborns, and 3 slugs. All of the snakes from this litter had greenish ground colors.

Three of the four stillborn neonates had obvious birth defects; one had a short mandible, one had a disproportionately small head and some kinks in its spine, and one (notably smaller than the others) had a severely kinked spine. The fourth stillborn was unusual in that it had no apparent deformities.

Morphometric Data

Within 24 hours of parturition, the weight and total length of each neonate was measured and recorded. Weights were measured on an Ohaus® triple beam balance and recorded to the nearest 0.1 g. Length measurements were taken either by using the squeeze-box technique described by Quinn and Jones (1974), or by manually straightening the snake along a meter stick. In either case, the final value was an average of three measurements. Neonates from the three litters ranged from 28.3 to 32.0 in. (72.0 to 81.5 cm) in total length, and from 6.0 to 9.16 oz (170.3 to 259.6 g) in weight (see table).

Husbandry

Following each birth, the neonates were rinsed in water, dried, and then individually housed in small plastic containers that mea-

sured either 13 x 8 x 3.5 in. (33 x 20 x 9 cm) or 16 x 10.5 x 6 in. (41 x 27 x 16 cm). Newspaper was the substrate of choice although paper towels were occasionally used. A plastic retreat box and a water dish were placed in each container. In the case of the first two litters, the temperature in their enclosure was maintained at approximately 84–88°F (29–31°C) by the use of 120-watt heat tapes, positioned under each

row of containers. Snakes from the third litter were kept in a room maintained at 86°F (30°C). Cards, for recording feeding and shedding data, were attached to each container. Record keeping was facilitated by assigning each snake an inventory number comprised of a number indicating the year of birth, and a letter (i.e., #85-A, #88-B, #90-C).

While maintaining three litters of anacondas, only a single type of health problem occurred, blister disease. This disease affected snakes from the first and second litters only. During the first few weeks of maintaining these snakes, I quickly found that the neonates were very susceptible to this rapid-developing infection. Blister disease is typically associated with snakes exposed to damp and unsanitary cage conditions. However, the cages of the young anacondas were kept clean and were not overly humid although there were occasions when water spillage created high cage humidity. The water was changed every other day, and more often, if needed. There were times, however, when I was not able to change fouled water immediately, and I believe this contributed to the onset of the disease. Consequently, I removed the water bowls and offered water every other day, leaving the bowl in the cage for only a couple of hours. This greatly reduced the chance of exposure to fouled water and also reduced cage humidity resulting from

evaporation and/or spillage. This change, coupled with ecdysis, eliminated the blister disease without the use of antibiotics or other medical treatments.

Feeding/Shedding

Overall, inducing the neonatal anacondas to feed voluntarily did not prove especially difficult. As is often the case with newborn snakes, I expected that feeding would not occur until after their first shed. Therefore, with one exception, all the snakes from litter #1 were offered food after their first shed, which occurred from 35 to 87 days after their birth. Consequently, all the snakes had started feeding on fuzzy mice or pinkie rats within 80 days (many fed within 50 days). With litters #2 and #3, the young snakes were offered food weekly, before their first shed. In most cases these offerings were refused although a few of the snakes did accept food prior to ecdysis. In one instance, a young snake (#90-Y) fed twice before his first shed, which occurred 101 days after birth. Among all three litters there were only a few snakes that would not feed within the first couple of months after birth. The longest fasting period was 113 days by one of the snakes (#88-L) from the 1988 litter. A fasting period of that length may seem dangerously long, but Michaels (1970) reported that one captive specimen refused to eat for 167 days. The young anacondas maintained good body weight throughout these periods.

Typically, the first meals were offered in late afternoon although they were typically not eaten until dark. If a fuzzy (2-week-old) mouse was refused, it was removed and re-

Total length and weight measurements of four anacondas at birth and after one year.

Spec. No.	Ttl. length [inches (cm)]		Weight (g)	
	Birth	1 year	Birth	1 year
85-F	30.2 (76.8)	53.1 (135.0)	205.0	1837.0
85-H	30.0 (76.3)	58.1 (147.5)	224.1	2098.7
85-I	31.9 (81.0)	62.8 (159.5)	254.9	2245.1
85-K	30.3 (77.0)	50.4 (127.9)	227.5	1679.4

placed with a rat pinkie or fuzzy, and vice-versa. Neonates from the first two litters accepted live food only, having a marked preference for live rat pinkies and fuzzies over mice. Many of the snakes from the third litter first accepted, and seemed to prefer previously frozen, then thawed, mice (with split heads) over live pinkies and fuzzies. In addition, most of the young snakes fed more frequently at night, at least initially. I found that the use of alternative food sources such as tadpoles, small frogs, or fish was not necessary.

Once the young anacondas began feeding, they were offered food every 7 to 10 days. After a few feedings, those juveniles that were feeding on live pinkies or fuzzies were switched over to fresh-killed or



Head of the adult female green anaconda (*Eunectes murinus*) that produced litters in 1985, 1988, and 1990.



Female green anaconda (*Eunectes murinus*) with offspring from litter #2, born in 1988.



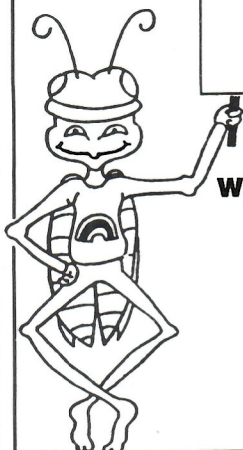
Male green anaconda (*Eunectes murinus*) with one of the neonates from the first litter, born in 1985. Note the tannish-green color of the juvenile.

RAINBOW MEALWORMS

126 E. Spruce Street
P. O. Box 4907
COMPTON, CALIFORNIA 90224

Call Now !!!!
1 (800) 777-9676

Feed your pets the "BEST"!
Feed them
Rainbow Crickets



**WE GUARANTEE
LIVE DELIVERY,
WITH AIRMAIL**

Please notify us of any
loss within 24 hours.

Dealer Inquiries Welcome
OVERCOUNT WITH EVERY ORDER

MEALWORMS • MEALWORMS • MEALWORMS

frozen-thawed mice and rats, which were readily accepted.

Occasionally one of the young anacondas would have trouble shedding properly (undoubtedly due, in part, to drier cage conditions). When this occurred, the snake was soaked in warm water for an hour or two until the skin could be removed.

Disposition

Neonates were extremely aggressive right from birth, striking at each other as they crawled around the cage or at my hand as I reached in to pick them up. Even after they were housed individually, many of the young snakes retained their pugnacious disposition for a month or more. Gradually, however, they became more docile, allowing themselves to be handled regularly without biting. This is especially true of the four specimens kept for the 1-year growth study, which, after about 4 to 5 months, became quite docile. Even after the juvenile anacondas were sent to other collectors, I was often told about how docile a particular specimen was. The tractable nature of some of these captives is in direct contrast to the well-deserved reputation of wild-caught specimens which are, to say the least, aggressive!

Growth

Information on the growth of anacondas can be found in Barton and Allen (1961),

Belluomini and Veinert (1967), Cox (1970), Luttenberger (1973), Deschanel (1978), and others.

From the 1985 litter of anacondas, I selected four neonates (#85-F, #85-H, #85-I, and #85-K) for a 1-year study on the feeding and growth of young anacondas in captivity. Each snake was maintained separately in a plastic sweater box. After approximately 4 to 5 months they were transferred to 10-gallon (38-liter) aquaria, and after 8 to 9 months to 15-gallon (57-liter) tanks. Newspaper was the standard substrate, and a large, flat-bottom plastic dish was used to provide water.

During the 1-year period of the growth study, the total length and weight of each snake was recorded monthly. During this time, they were fed appropriately sized mice or rats every 10 to 14 days. Dates for feeding and shedding, as well as the type and number of food items accepted, were recorded. At the end of the study the snakes had increased an average of 25.5 in. (64.7 cm) in total length, and they had gained an average of 61.3 oz (1737 g) (see table for specific measurements).

Currently, I still have specimen #85-K (renumbered E.m. #3) in my collection, and in December 1993, at 8 years of age, she measured 13 ft. 4 in. (4.1 m) in total length and weighed 111 lb (50 kg).

Conclusion

From working with three litters of green anacondas, I have found the following husbandry tips to be helpful: 1) keep them warm; 2) keep drinking/soaking water clean—offer water every day or every other day for a short period of time, if necessary; 3) feed them live rat and mouse pinkies/fuzzies, or frozen/thawed mouse split heads; 4) offer food overnight; and 5) allow them to refuse food for at least 1 or 2 months before considering assist-feeding (providing they maintain good body weight).

Acknowledgments

I would like to thank my wife, Jane, for reviewing the manuscript. I am also thankful to Bill Holmstrom (NYZS/WCS) and Mark Bayless for information on available literature. In addition, Paul Gritis kindly translated one of the references.

Literature Cited

- Barton, A. J. and W. B. Allen Jr. 1961. Observations on the feeding, shedding and growth rates of captive snakes (Boidae). *Zoologica* 46(7):83-87.
- Belluomini, H. E. and T. Veinert. 1967. Notes on breeding anacondas, *Eunectes murinus* at Sao Paulo Zoo. *International Zoo Yearbook* 7:181-82.
- Cox, B. 1970. Some aspects of maintaining the anaconda (*Eunectes murinus*) in the private collection. *Bulletin of the Chicago Herpetological Society* 5(2):34-39.
- Deschanel, J.P. 1978. Reproduction of anacondas, *Eunectes murinus*, at Lyons Zoo. *International Zoo Yearbook* 18:98-99.
- Holmstrom, W. F. 1980. Observations on the reproduction of the common anaconda, *Eunectes murinus*, at the New York Zoological Park. *Herpetological Review* 11(2):32-33.
- Holmstrom, W. F. and J. L. Behler. 1981. Post-parturient behavior of the common anaconda, *Eunectes murinus*. *Zoologische Garten* 51(5/6):353-56.
- Luttenberger, F. 1973. Die Geburt von Anakondas *Eunectes murinus* (Linnaeus, 1758) in Gefangenschaft. *Aquaterre (Biberist/Schweiz)* 10(2):15-21.
- Mattison, C. 1988. *Keeping and Breeding Snakes*. Blanford Press, London.
- Matz, G. 1981. Les boïdes ou serpents constricteurs. 7. *Eunectes* Wagler. *Aquarama* 15(61):37-39.
- Michaels, S. 1970. Anacondas. *Bulletin of the Chicago Herpetological Society* 5(2):31-33.
- Quinn, H. and J. P. Jones. 1974. Squeeze box technique for measuring snakes. *Herpetological Review* 5(2):35.
- Ross R. A. and G. Marzec. 1990. *The Reproductive Husbandry of Pythons and Boas*. Institute for Herpetological Research, Stanford, CA.
- Strimple, P.D. 1986. Captive propagation of the green anaconda, *Eunectes murinus murinus* (Linnaeus). *The Forked Tongue News*. Gtr. Cinct. *Herp. Soc.* 11(6):5-9.
- Strimple, P.D. 1993. Overview of the natural history of the green anaconda (*Eunectes murinus*). *Herpetological Natural History* 1(1):25-35.
- Trutnau, L. 1986. *Nonvenomous Snakes*. Barron's Educ. Series, New York.



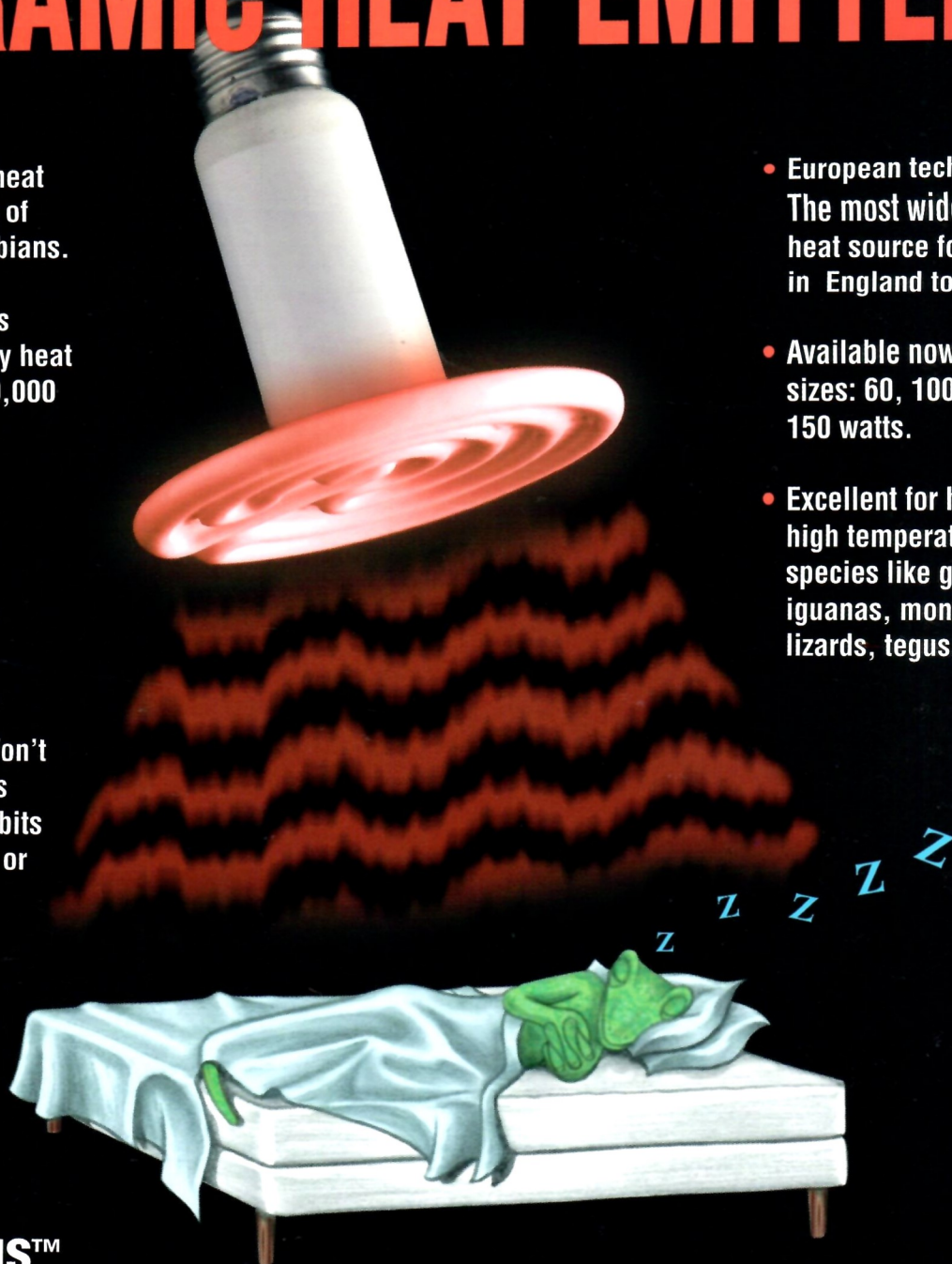
DON'T BE AFRAID OF THE DARK

Introducing the Repticare®

CERAMIC HEAT EMITTER

- Non light emitting heat source for all types of reptiles and amphibians.
- Lasts up to 10 times longer than ordinary heat lamps. 5,000 to 10,000 hours average.
- Moisture resistant; excellent in high humidity tropical climate terrariums. Will not burn out if it gets wet!
- No light emitted. Won't disrupt your reptiles natural sleeping habits (i.e., photoperiod), or yours!

- European technology. The most widely used heat source for reptiles in England today.
- Available now in 3 sizes: 60, 100, and 150 watts.
- Excellent for heating high temperature species like green iguanas, monitor lizards, tegus, etc.



Get Serious™



3090 McMillan Rd.
San Luis Obispo, CA 93401



Amnioterra

Tetra-Terrafauna, Doing More For Successful Reptile Keeping...

NEW!

Dry Formula Pre-Mixed Foods

Tetra-Terrafauna is first with a great new way to feed either aquatic or dry land reptiles. Just mix with boiling water and a completely nutritious, fresh meal is shortly ready. Add fresh foods as you mix for added nutrition and variety. Easy, convenient, economical and appreciated!



NEW!

Retail Displays To Compartmentalize Reptile Products

When reptile keepers need a product they now have a place to go! Tetra-Terrafauna's Health Care Center is prepacked with an assortment of Tetra Terrafauna's foods, including both new dry-formula, pre-mixes, and vitamin supplements. Tetra Terrafauna's First Aid Station comes prepacked with 4 each of Tetra-Terrafauna reptile ailment treatments, including new Vita Shell, turtle shell and skin conditioner.

Both displays are compact, permanent wire fixtures with informational riser signs. They are free to retailers when purchasing the prepacked merchandise assortments.



NEW!

Education for Successful Herptile Keeping

Successful Herptile keeping depends on quality education. And now this education is available in both video and digest format. The video to The Successful Terrarium is 30 minutes of information on establishing and maintaining all different types of Terrariums. Featuring Dr. Chris Andrews it includes a color encyclopedia of the most popular and unusual herptiles.

The digest for The Successful Terrarium, written by expert author Richard Bartlett, is an 80 page in-depth review of herptile keeping, including color photographs of over 70 different creatures.

Write for
a complete catalog.

Tetra

TERRAFAUNA

201 Tabor Road, Morris Plains, N.J. 07950