

THE VIVARIUM

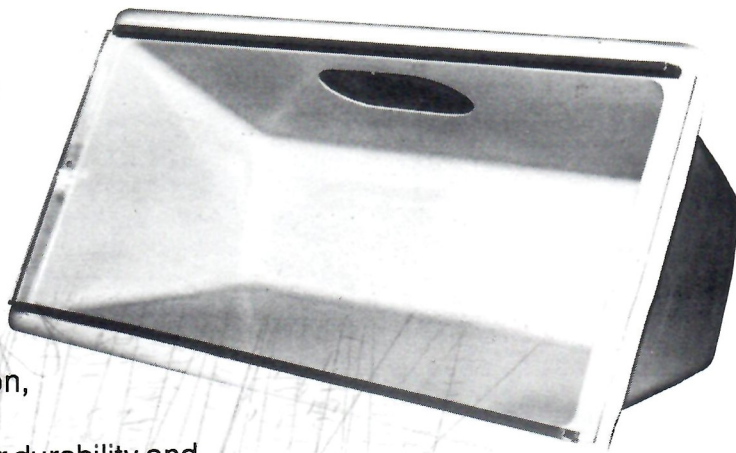
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Tropical Frogs

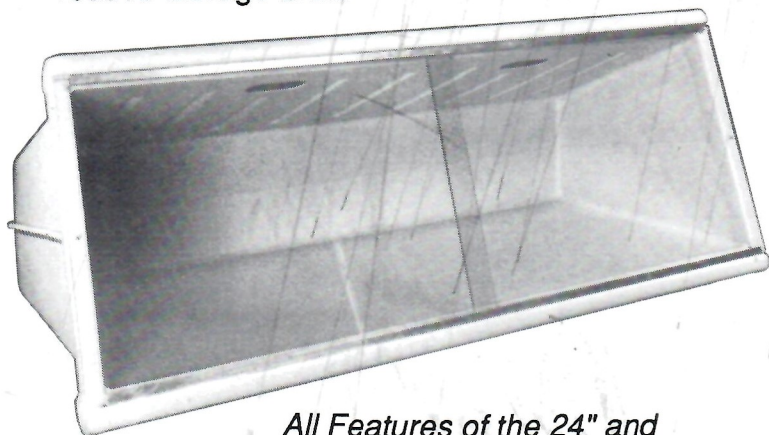
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Photo Editor

Philippe de Vosjoli

Graphic Design and

Production Assistant

Andrew J. Mansker

Advertising

Peggy Lee Dillon

Andrew J. Mansker

CONTRIBUTING WRITERS

Allison Alberts, Ph.D.

Dave Barker

Tracy Barker

Ellin Beltz

Dave Fogel

Ralph Gowen

Doug Mader, D.V.M.

Roy Pinney

Vince Scheidt

Kevin Wright, D.V.M.

COPY EDITORS

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Dorothy DeLisle

Randall L. Gray

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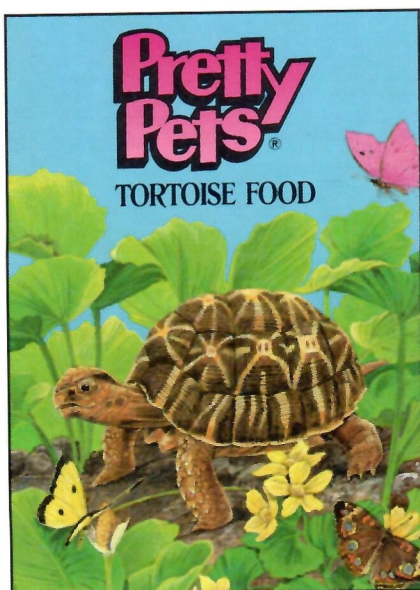
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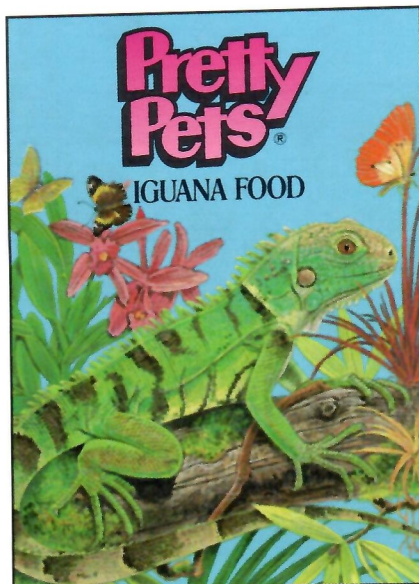


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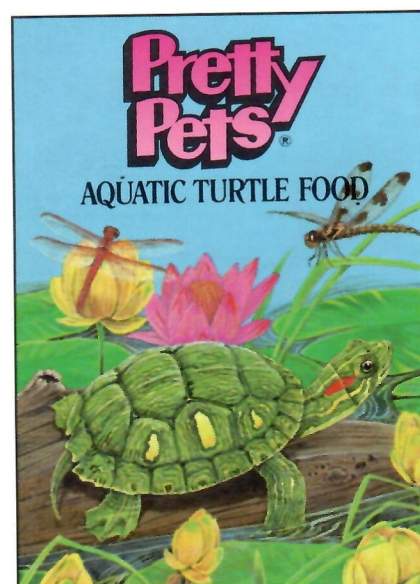
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by
Philippe de Vosjoli,

AFH President

Famous herp psychic's prediction for 1994:
Life becomes more complex.

Complex: Consisting of interconnected or interwoven parts. A whole composed of interconnected or interwoven parts.

Complexity: The study of emergent behavior exhibited by interacting systems operating

survival of the complex systems of human and animal communities, as well as the even more complex planetary community. Certainly, an awareness of complexity can broaden and literally expand human consciousness. (If a human following a certain experience is conscious of more elements or aspects, etc., of reality, then his or her consciousness can be said to be expanded compared with its previous condition.)

Some of you are probably wondering at this point: What is Philippe leading to?

The notion of complexity as it relates to the environment of captive animals has been a concern for some of us involved in herpetoculture. While the second wave of herpetoculture has focused on a reductionist, minimalist approach to keeping amphibians and reptiles (developing the most space- and labor-effective methods for the highest possible production with the lowest incidence of disease), the third wave, which I have previously predicted, will focus on naturalistic (some call it "semi-naturalistic," but this seems awkward) and more complex vivaria. These will include

lighting and heating systems, plant diversity, plant/soil relationships, and landscaping that result in microclimatic features, water filtration systems, biological waste processing, etc.

The year of the third wave revolution will be 1994.

Several of us vivarists, including herpetoculturists, store owners and manufacturers have been working on the prototypes for these naturalistic vivarium systems. The first commercial products and books relating to naturalistic vivaria will become available by the summer of 1994. Although the research in the area of creating complex vivaria for herptiles is still in its infancy, the preliminary methods will revolutionize the way we keep smaller amphibians and reptiles. The long term impact of naturalistic vivarium systems on herpetoculture will be comparable to that of the mini-reef system (the complex system approach) for keeping salt water organisms.

The implications of the use of complex systems in herpetoculture are far reaching from an ethical, aesthetic and educational standpoint:

1) Even though a naturalistic vivarium is an open system (we introduce, water, food, etc.

and replace plants, soils and water as needed), because the survival of the system is to a significant degree dependent upon how we design and maintain it, the naturalistic vivarium becomes a metaphor for more complex systems in nature. Designing a vivarium gives an individual an inkling of what it means to attempt, in a god-like manner, to create a world that works. The well designed vivarium becomes a type of open-system biosphere; while working with it, one can learn important lessons about the world in which we live. One of the lessons we can learn, of course, is how systems can fail.

The Creation of the Vivarium

On the first day, the vivarist set the limits of his world.

On the second day, he introduced the soils and the water.

On the third day, he added the lights and the heat.

On the fourth day, he placed the rocks and the woods and features, to give his world character.

On the fifth, he carefully and strategically placed the plants.

On the sixth day, he introduced the animals. And on the seventh day, he adjusted and maintained the system.

2) A complex vivarium can become a sort of living laboratory or classroom. The temperature varies depending on the heat provided, but also on the topographical elements of the system. Relative humidity will vary between exposed areas and areas covered with shelter. Ventilation can be manipulated. Soil and water characteristics may change and possibly achieve some kind of equilibrium. Plants will grow, changing the topography and soil structure, etc.

3) If one starts caring about the animals in the system and about the system itself, one will usually start caring about the fate of the same animals and similar systems on the planet. This is probably one of the greatest educational benefits of keeping animals in times when the majority of the human population is so detached from the natural world supporting our planet. Humans tend to care about other forms of consciousness once they become conscious of them.

As should be obvious, the primary goal of the third wave of herpetoculture is significantly different than that of the second wave. Instead of space- and labor-effective systems, the goal is to develop complex systems and strive towards achieving at least temporary states of equilibrium. These systems will usually require more space, though not necessarily more labor, than the commercial breeding systems and technology associated with second wave herpetoculture. Production effectiveness is not a required goal of third wave herpetoculture, but ends up being an incidental outcome. Indeed, animals in complex



Naturalistic vivarium (3' x 3') designed by the author. It includes a miniature waterfall, biological filtration and a variety of plants including *Alocasia*, Sundew (*Drosera adelae*), jewel orchid (*Haemaria discolor*), a dwarf ginger, gesneriads (*Streptocarpus*, *Nananthus* and *Sinningia*), a pitcher plant (*Nepenthes*), chinese evergreen and variegated arrowhead. Small treefrogs and poison-dart frogs inhabit this set-up.

at the threshold of stability and chaos. Definition by Bill Roethzheim in *On the Cutting Edge of Technology*. 1993. Sams Publishing.

Complex systems

There are several factors that make up an animal's habitat: topographical (landscape), climatological, chemical (soil and water characteristics), associational (plants, prey and predators; insects, molds and bacteria that break down fecal matter, etc.; intraspecific (interactions between members of the same species); interspecific (interactions between members of different species). If one looks at an animal's ecology or niche, the above factors form a complex system in which the participation of the various living organisms in and with the non-living components of the environment result in a dynamic whole whose sum is greater than its component parts. A good example of this is the environmental complex in which the activity of insects, mollusks, amphibians, reptiles, birds, mammals, bacteria, mycorrhizal fungi and plants recycle energy and nutrients to form what we call a rainforest.

Understanding how complex systems (such as rainforests) work is probably critical to the

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Continued on page 10

Herp News from Around the World

by
Ellin Beltz

"MAMBAPHOBIA" STRIKES PALO ALTO

AFH members Valerie Haecky, Mike Kilby, Matt Aikawa, and Al Colby just about filled my mailbox with their contributions about the infamous mamba lost in Palo Alto; or was it lost indeed? It seems as though a man called city animal control officers about 5 PM on October 13, 1993 and reported his 7 foot (200 cm) black mamba (*Dendroaspis polylepis*) missing. He said he feared arrest for not having the proper license to keep the snake and said he'd warn his neighbors with posters. He also said that he had a collector's permit in Arizona where he used to live, according to the Palo Alto Police Department. Immediately, the reaction (or overreaction) began...The mayor went on T.V. to ask people to stay at home and call the police if the snake was seen. Officers went door to door in the area where the snake was reported missing. School officials and neighborhood watch groups organized. The poison control center called every major zoo in the state and tried to have antivenin moved from the Los Angeles Zoo to Stanford University Medical Center. Pet owners carried their cats inside; parents slammed windows shut. Police detectives conferred in a makeshift "war room." Over 1,000 residents jammed police switchboards, most asking if the mamba had been captured. Neighbors described a special gait, "The Palo Alto Quickstep." Newspapers published information boxes about the black mamba and called university and zoo herpetologists including Madge Minton, David Chiszar, Sean McKeown and Harvey Fischer for comment. The *San Francisco Examiner* printed the magic incantation to ward off venomous snakes from the Atharva Veda of ancient Hinduism ("O, serpent, die, do not live; back upon thee shall thy poison turn"). Edward O. Wilson of Harvard was quoted: "The good people of Palo Alto are more likely to be hit by a car than bitten by a black mamba." Police appointed two shooting range masters as snake sharpshooters. "Snakes" were reported everywhere. One of these turned out to be a squirrel rustling tree branches and leaves; another was determined to be a sprinkler head in a local park. A local cafe added black mamba filet with peanut sauce to the top of their daily specials list. By the third day, a group of children dressed in turbans and veils gathered at a park and danced while their ringleader played the flute in an effort to tease the unseen and unfound mamba into a wicker laundry basket. The snake did not attend. The next day, one

firefighter was seen wearing a t-shirt which read, "I survived the quake, I'll survive the snake." Local snake owners came out against the owner of the missing mamba calling him everything from "irresponsible" to "a bozo." Residents placed a rubber snake and a toy duck in a hardware cloth cage decorated with a sign "Caution! Black Mamba Snake Trap!" By the fifth day, the papers were beginning to suggest the whole thing could have been a hoax. One interviewed Peter van der Linden who studies urban legends. He said the snake story has serious credibility problems: "It's right before Halloween, people are expecting to be scared. It looks to me more like a hoax, but the jury's still out." No reliable reports of the mamba were received by police although several callers had themselves convinced they'd seen it. Arizona Game and Fish Department provided the Palo Alto police with the names of 28 people with venomous snake permits who had moved to California, but none of the leads panned out. Police alleged that the costs of seeking the snake were not considerable. One officer said that it seemed as though everything else in town stopped for mambaphobia. [October 13, 14, 15, 16, 17, 18, and 21 *San Jose Mercury News*; October 14, and 15 *San Francisco Examiner*; October 14, *San Francisco Chronicle*; October 13 *San Mateo Times*; October 14 and 15 *Hayward, CA Daily Review*] On the other hand, the poor thing may only have gone dormant for the winter...

VICTIM OF EL NINO?

A resident of Homer, Alaska found a dead green sea turtle washed up on a local beach and reported it to the Pratt Museum. Betsy Webb, the collections curator believes that the 103 pound "teen-aged" turtle may have ridden a warm current to Alaska, but then was killed by the icy waters of Kachemak Bay and added, "There have been a lot of interesting things showing up, like schools of sharks." Another theory is that the turtle could have been caught in a fishing net, because she said, "There are some abrasions on the front flippers." Webb will perform a necropsy after which the animal's remains will be placed on display. [Anchorage, AK *Daily News*, October 27, 1993 from Sam Goldman]

CAN THE TURTLE SAVE A VALLEY?

Residents of Leona Valley, a relatively undeveloped area in Los Angeles County, CA are determined to keep development away, so they've enlisted the help of the once plentiful western pond turtle (*Clemmys marmorata*). At present, there are only six known habitats for this species remaining in L.A. County. Dan Holland of the Western Aquatic Turtle Research Corp. said, "To be candid, we're just trying to create emotional interest here. We'd like to get a bunch of environmentalists shook

up over this and put pressure on the city." There are only 700 homes in the 18 square mile valley now, but a 7,200 home development was approved by the Palmdale City Council despite heavy protest and court battles instituted by the Leona Valley Town Council. [October 31, 1993: *San Francisco Examiner*, from Matt Aikawa; and *Fresno Bee* from Wendy McKeown]

IRANIAN FROG JAM

A three-mile section of highway in the Hamadan province of western Iran was blocked by millions of frogs according to Steve Newman's syndicated column "Earthweek" [*The Tacoma, WA News Tribune*, November 8, 1993 from Marty Marcus]. The report indicated the amphibians may have been "flushed out of their usual breeding grounds by several days of heavy rains. However, some unconventional Iranian researchers have speculated that major changes in the earth's strata and faults may have increased underground temperatures, making some subterranean habitats too warm for the frogs."

DON'T TRY THIS AT HOME DEPARTMENT

An Egyptian villager visiting the town of Desouq, a delta town 135 miles (217 km) northeast of Cairo, died after trying to imitate a traditional snake handler. He put a venomous snake's head in his mouth and was bitten twice, once on the lip and once on the tongue. [*San Diego, CA Union* from William Wells]

NO FIRE FOR THIS SALAMANDER

A student committee in charge of planning Stanford University's annual "Big Game" bonfire the night before the UC-Berkeley (Cal) vs. Stanford football game, cancelled the pre-game activity because the nearly-endangered California tiger salamander (*Ambystoma californiense*) was discovered residing in the dry bed of Lake Lagunita which is the usual site of the event. Way to go, Stanford students! [*San Francisco Examiner*, October 10, 1993 from Matt Aikawa] An ecologist of my acquaintance informs me that this site is a vernal pool which is the actual habitat of this salamander.

SPLAT-FREE ZONE

Sensitive, kind, caring city officials in the enlightened town of Berkeley, CA have closed a one mile stretch of South Park Drive to protect roughskin newts (*Taricha granulosa*) during their annual migration to and from their breeding ponds. The road will remain closed to cars and bikes until the conclusion of the newt's breeding season in March. [*San Francisco Chronicle*, October 27, 1993 from Matt Aikawa] Next, some enterprising entrepreneur should come out with Alfred E. Newman

shirts..."What me worry?" (Make a million, but send me one, okay?)

BET IT NEVER HEARD OF THE 2ND AMENDMENT...

A Delray Beach, Florida man shot and killed a seven foot alligator inside his house with a .357 Magnum handgun. His wife had first seen the animal while it was strolling on the lawn outside their lakefront home. As she began to call the Florida Game and Fresh Water Fish Commission, the alligator crawled through their screen door and across the living room floor. The man said, "[My wife] heard the screen crinkling or crunching. He opened his mouth wide, I mean wide, and that's when she went hysterical." [Tacoma, WA News Tribune, November 20, 1993 from Marty Marcus]

NEW WAY TO GET SALMONELLA

A Utah resident was diagnosed with *Salmonella irumu* after she had lost 10 to 15 pounds and experienced nausea, vomiting, abdominal cramps and diarrhea. County nurses interviewed the woman and found that she had trained her pet green iguana (*Iguana iguana*) to defecate in the bathtub every day. A fecal sample from the iguana revealed the same strain of bacteria in its feces as had been identified from its owner. State epidemiologist Craig Nichols said, "The key point really is, in handling and keeping any of these large lizards, people need to know they can be a health risk. And they need to be extremely careful about their own personal hygiene and also in cleaning cages and terrariums. You really have to disinfect and sanitize after you have an animal in a tub or anything else that is also used for humans or for food preparation. The same thing would apply if it were a kitchen sink." [Idaho Falls, ID Post Register, August 12, 1993 from DelRay S. Davenport]

FEDS PROPOSE INCREASE IN TORTOISE HABITAT

The Interior Department plans to protect 6.2 million acres of mostly federal land in California, Nevada, and Utah to provide habitat for the threatened desert tortoise (*Gopherus agassizii*). If the proposal is finalized, mining, grazing, off-road vehicle use, and other activities harmful to the tortoises could be banned. Utah officials have been negotiating for less than the proposed 137,000 acres of land to be set aside in Washington County and have proposed that less than half that amount be saved. State and local officials contend that the Endangered Species Act has thwarted economic growth around St. George. [The Provo, UT Daily Herald, August 29 and September 1, 1993 from David A. Webb]

VIRGINIA RESPONSE AND REACTION TO VENOMOUS BITES

AFH member Daniel Riley of Woodbridge, Virginia sent a plump envelope full of stories which follow up on the widely reported pair of venomous snake bites suffered by Virginia snake keepers earlier in 1993.

* At least 28 venomous snakes were reported taken into custody in Stafford after one of them bit a Prince William County man. County Supervisors passed an amendment to their ordinance on exotic reptiles which pro-

hibits the keeping of non-indigenous venomous snakes. [Potomac News, October 13]

* DeLynn Holden commented in the Washington Post, October 2, 1993: As a reptile owner, I am disappointed at the way your paper has reported the recent cobra bites... A cobra bite is a rare occurrence; one per year is the East Coast's average. Compare that with the average for native venomous snakes (1,200 bites per year), and this shows me I have a thousand times better chance of being bitten in a public park than by my neighbor's pet... In some cases, loosely worded ordinances outlaw 'exotic' animals, a term which encompasses a variety of fish and birds, as well as monkeys, ferrets and other mammals. Another catch-all term is 'harmful' animals. If we're talking potentially dangerous, shouldn't such laws also give our county governments the right to impound people's Dobermans, pit bulls, or poodles...? Let's not forget about bee keepers and bees. Many more people are seriously stung by bees than bitten by venomous snakes...

* Snakebite victim Drew Yeager was convicted of a misdemeanor for possessing the African spitting cobra which bit him and paid a \$100 fine. He had kept 41 venomous snakes in his home which officials originally planned to kill by freezing, but which were spirited out of his house by another snake keeper. [Potomac News, September 29]

* Norm Tennant, a Potomac News columnist wrote a column titled "Needed: protection from lawmakers, not snakes" in the September 27 issue which included: "Local government can sometimes get out ahead of its syntax as well.. I have personal knowledge that there are several people in Stafford County who are harboring dictionaries. I'm not sure this includes the people in the courthouse. If so, I wonder how they can allow into their law-making a sinuous, slippery word like 'exotic.' I would rather allow a venomous reptile 'loose in the public law' than such a subjective term as exotic. About the only animals that couldn't be called 'exotic' are dogs, cats, cows, horses, and some humans. Put the word 'exotic' on the prohibited list, and one of several things will happen. You'll need a latter-day Noah to roust out all the ant farms, iguanas, hamsters, tropical birds, pet fish, rabbits, goats,, turtles, and other perfectly harmless reptiles in the county... Or you'll have one more unenforceable statute... Venomous reptiles have the potential to cause a lot of trouble, expense and danger, but probably not as much as the slipshod statute writer. Snakes are usually penned up and don't live all that long. A loose and long-winded law, however, can live about forever."

* Pennie A. Davy commented in the Potomac News [September 24]: "I am so fed up... Drew is a respected, long-time resident of Haymarket who has been handling non-venomous snakes since he was about three years old. He loves snakes; they are his hobby as well as his pets. True, venomous snakes can be dangerous, but so are many other hobbies - drag racing, bungee jumping, power-boat racing, hunting - just to name a few. If we all had the same, safe hobbies and lifestyles, this would be a very boring world indeed."

* The head of the animal control department in Prince William County was interviewed about his role in capturing one household full of venomous snakes and his visit to those owned by Drew Yeager which were later removed by other snake keepers. He said that the cobra was at least a "known quantity. If you get out here at night in your cruiser and stop a car with tinted glass and out-of-state plates, you're walking up behind it and you don't know what you're getting into." He described his first experience with a houseful of snakes: "There were 25 cobras in [the bedroom], a total of 36 poisonous snakes in a 12-by-12 room. There were Egyptian cobras. He had spitting cobras... they don't even have to bite you. I didn't have any snake cages to keep them in, and the doctor... had warned us about the scarcity of antivenin serum. He said, 'Don't move them unless you're ready to die.'" [Washington Post, September 15]

* William F. Meininger expressed his opinion in the September 12 Potomac News: "In discussing the incidents with friends, no one... felt sorry for the man who was bitten. Several others thought that the snakes should be given inoculations against any human disease they may have contracted and that the owners should be destroyed."

Thanks to everyone who contributed clippings for this column and to Michael J. and Nancy R. Shrom, David A. Webb, David Wright, Alan R. Mills, P.L. Beltz, and Daniel Riley for stories previously used. You can contribute, too! Send newspaper or magazine clippings with the publication slug with date and your name firmly attached (tape preferred to staples, glue, or paperclips, please!) to me at the address on the masthead of this publication.



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A California Yankee Visits the British Herpetological Society

by
Robert George Sprackland

It may seem peculiar to anyone familiar with herpetology in the United States that there would be an active and dedicated tradition of herpetoculture alive and well in the United Kingdom (UK or Great Britain). Although the "Brits" have always had a tremendous love of animals, which they passed on to the American "colonies," there are today many impediments to the pursuit of the responsible keeping of exotic creatures of any sort. These impediments include the highly prohibitive laws and a bureaucratic maze regarding the import and keeping of wildlife requiring an elaborate paperwork trail on many herps as well as the extensive veterinary documents usually required for import. Also, there is the lack of a diverse group of native herp species, routinely cool weather (I think of the place as "jolly cold England," based on a July visit), and the relatively recent gutting of government-sponsored natural history institutions and of support of zoos in favor of social welfare programs. Nevertheless, herpetocultural interest holds on tenaciously. After all, this realm was home to some of the world's greatest explorers who brought with them some of the great naturalists – Joseph Banks, Thomas Huxley, Joseph Hooker, Charles Darwin – to mention just a few. Despite the well meaning but highly flawed governmental restrictions and limitations as well as an overabundance of equally flawed, but well meaning animal rights activists throughout the country, the naturalist tradition lives on across "the great pond."

During October and November 1993, I had the privilege of attending two major functions of the largest of the United Kingdom herpetology groups, the British Herpetological Society (BHS). This herp society also pub-

lishes a general-interest bulletin, featuring notes on herpetoculture and travel. In some ways, it is reminiscent of *The Vivarium*, but without the widespread use of color. The BHS also publishes the more scientifically oriented *Journal* (similar to the *Bulletin of the Chicago Herpetological Society*, without ads or puzzles). Both are issued quarterly and would be of interest to many readers of *The Vivarium*.

The first event I attended was a meeting held at Birbeck College, part of the large, sprawling University of London system, and it featured an interesting range of speakers. Leading the program was Leigh Gillett, an officer of the BHS, supporting the value of amateur herpetoculturists in conducting long-term studies of amphibians and reptiles. He was followed by David Bullock (National Trust, UK), reporting on the very promising recovery of Round Island off Mauritius in the Indian Ocean (see *The Vivarium* 4(3): 14-18). This unique island is home to several of the world's rarest lizards and to one critically endangered boa. (A second boa is believed to have become extinct within the past fifteen years. It was a poignant moment when Bullock showed a color slide of a wild specimen of this boa, perhaps the last individual specimen ever viewed by humankind.) As a result of the active support of the Mauritius Dept. of Wildlife and the work of scientists in the Mauritius Wildlife Appeal, there has been a concentrated effort to reintroduce specially reared seedlings of native plants. Non-native plants have been removed during "weeding parties" every six months. Non-native introduced injurious super tramp species of mammals (goats and rabbits), which were responsible for the decline of the reptiles by destroying the protective vegetation, were previously eliminated. I received a welcome response to my question about how Round Island geckos (*Phelsuma guntheri*) or Gunther's day geckos, as they are frequently called in UK, were doing. Bullock replied that their populations were steadily increasing.

Bullock's discussion was followed by herpetoculturist Roger Meek's talk about work done with Roger Avery (Bristol University) on the thermal ecology (the way a reptile uses different areas of its habitat to control body temperature) of lacertid lizards and turtles in the former country of Yugoslavia. It was a welcome and very comfortable meeting, uniting amateur and well-known university/museum herpetologists in a venue where both exchanged useful

information (facilitated afterwards by the obligatory socializing at a nearby Bloomsbury pub). In each case, the speaker presented material to a diverse audience, neither patronizing nor intimidating any of those present. This positive blend of private herpetoculturists and university herpetologists is also reflected in both the bulletin and the journal published by the British Herpetological Society.

"... this realm was home to some of the world's greatest explorers who brought with them some of the great naturalists – Joseph Banks, Thomas Huxley, Joseph Hooker, Charles Darwin – to mention just a few."

Just a few weeks later, the BHS held their annual swap meet/captive breeding expo/book sale, in the rustic village of Uxbridge, northwest of London. The nearest tube station (underground subway train) is about a mile (1.6 km) from the meeting area, so it provided an interesting stroll through the scenic town. At first, I feared I might get lost since the map provided was not well drawn, but suddenly I saw the cars—lots of cars—and the ever-popular, herp-related bumper stickers. The exhibition was smaller than the shows in San Diego, California and the Herp Expo in Orlando, Florida, but there was no mistaking the universal signs: Herpers meeting here! There was a nominal charge of two pounds (about three dollars) for entry. (This is a major revenue source for the BHS.) I entered a small community center, its large main room absolutely packed with reptile and amphibian enthusiasts from all over Great Britain. I soon learned that most of the indoor heating was provided by our bodies; when the event was closing a few hours later, the temperature dropped at a rate proportionate to the rate at which people left.

The British Herpetological Society had a booth at this Uxbridge herpetoculture gathering where they sold memberships and back issues of their publications. In many ways, the BHS is similar to a cross between the AFH and a large regional herp society like the Chicago Herp Society or the Northern California Herpetological Society. The BHS represents a broad cross section of enthusiasts, promoting large meetings and producing symposium volumes focusing on herpetoculture. The National Association of Animal Keepers, a British organization that promotes humane care of exotic animals in private collections and in zoos, had a small, but very nice display of exotics (non-native) herps that included a



This room is packed with enthusiastic British herpetoculturists at the annual swap meet at Uxbridge.

prehensile-tailed skink (*Corucia zebrata*), sheltopusik or European giant legless lizard (*Ophisaurus apodus*), and an Asian water dragon (*Physignathus cocincinus*). Unlike America, herptiles of this sort are relatively uncommon in private collections in England. The other major society present was the Association for the Study of Reptiles and Amphibians (ASRA). They were represented at a booth, selling their newsletters and husbandry proceedings. Their newsletter is similar to regional publications put out in the U.S., reminding me particularly of "Notes from NOAH," and focusing on topics of interest mainly to folks in Britain. The husbandry proceedings appeal to a more diverse audience, with several good papers, many on breeding, per issue. In format, they are similar to proceedings volumes put out by the Northern California Herpetological Society or the Greater Cincinnati Herpetological Society.

Surprisingly, there is far more interest in natural color phases of colubrids and boids in Great Britain than among some of the herpetoculturists in the United States. Virtually no albinos were being offered, and when I mentioned the subject, few showed an interest in albinos. My general impression from both my conversation with members and through observing the various booth offerings is that much of the British herpetological community is seriously involved in herpetoculture. The dealers were selling legitimately captive bred milk snakes (*Lampropeltis triangulum*), corn snakes (*Elaphe guttata*), gopher snakes and pinesnakes (*Pituophis melanoleucus*). Also present were a contingent of non-dealing amphibian people who regularly bred newts, salamanders, and frogs. In fact, salamanders, including newts, seem to have a very large following here, including exotics, despite the difficulty in obtaining the most desired American species. What are those species, you ask? Red-spotted newts (*Notophthalmus* sp.), spotted (*Ambystoma maculatum*) and tiger salamanders (*Ambystoma tigrinum*), and surprisingly, slender salamanders (*Batrachoseps*), the latter being fed on vestigial-winged fruit flies and tiny garden insects. Perhaps, some of the obvious popularity of amphibians in UK is the familiarity on the part of the people with native amphibians that they have enjoyed since childhood, and also, that the typical cool, moist climate is well suited to their maintenance needs.

The problems in acquisition of non-native amphibians and reptiles seem to have as much to do with high mortality in shipping as with the lengthy government forms required to obtain them.

This was, of course, my first BHS meeting. However, from an American point of view, although the variety of exotic herps was meager, the specimens represented were both interesting and entirely legitimately captive bred. I was particularly impressed with a young yellow anaconda (*Eunectes notaeus*), already expressing its somewhat pugnacious tendencies, and a large container of juvenile jeweled lacertas (*Lacerta lepida*) (called eyed lizards in Europe). The latter, although rather

drab as babies, are spectacular as adults. Mature specimens may reach two feet (61 cm) in total length and are a bright green with blue ocelli along the sides. The superficial resemblance to a small monitor lizard (*Varanus*) or tegu (*Tupinambis*) is remarkable.

As the assistant managing editor of *The Vivarium* and as a representative of the American Federation of Herpetoculturists (AFH), it was very encouraging to be told by so many people how much they enjoyed our magazine, and how they looked forward to each issue. Some said it was their best exposure to species that even most British zoos cannot obtain. Others praised the "how to" breeding and husbandry articles. By the same token, I prevailed upon several persons to provide future articles, so our readers may be likewise informed about some of the impressive herp breeding being done in Great Britain. Meanwhile, if you are planning a trip to the United Kingdom, consider consulting the British Herpetological Society journal or bulletin to see if your visit coincides with one of their meetings. The bulletin is found in many natural history museum libraries and at universities with active herpetology departments; or write the BHS (see below) to request their schedule. The meetings are generally free, well run, and a good place to meet your British counterparts.

For more information:

The British Herpetological Society, c/o Zoological Society of London, Regent's Park, London NW1 4RY, England; costs about \$30 to join. This includes subscriptions to the bulletin and journal (4 issues of each per year).

Reptilian, Mantella Publishing, 22 Firs Close, Hazlemere, High Wycombe, Bucks HP15 7TF, England; is published monthly, with volume 2 starting in December 1993. Overseas readers have to write for subscrip-



Busy book and animal dealer's booth at Uxbridge. Animal sales seemed to greatly exceed those of books.

tion rates. Sample issue \$6. Each issue contains a complete list of all regional herp societies in Great Britain.

The Association for the Study of Reptilia and Amphibia can be reached at POB 73, Banbury, Oxon OX15 6RE, England.

Thanks to: Terry and Marion Thatcher for their kindness and assistance during the swap meet, and to Tom Burgess, editor of *The Reptilian*, for information about his publication.



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AFH Perspective - Continued from page 5

vivaria usually breed regularly because third wave systems strive to simulate essential features of an animal's habitat, including climatic factors.

An idea that some vivarists have been experimenting with is to create what I've called self-sustaining vivarium systems. The adult animals breed, the eggs hatch within the system with no special intervention on the part of the vivarist, and the young animals are raised within the system, allowing the population to grow until it achieves carrying capacity. Once this happens, the population eventually levels off or starts declining. The vivarist will usually transfer animals to another system at this point.

That's my prediction for 1994. Third Wave Herpetoculture: A revolution in the making. The future looks very promising and exciting!

Recommended reading

Bostock, S. 1993. *Zoos and Animal Rights: The Ethics of Keeping Animals*. Rutledge, London. 227 pp.

de Saint Exupery, Antoine. 1943. *The Little Prince*. Harcourt Brace Johanovich. This important little book, disguised as a children's story, addresses many existential questions involving the meaning of human life, as well as issues of responsibility towards those beings that we care for. As an example, here is a quote which should be relevant to anyone involved in keeping animals: "To you I am nothing more than a fox, like a hundred thousand other foxes. But if you tame me, then we shall need each other. To me, you will be unique in all the world. To you, I shall be unique in all the world...."

Waldrop, M. 1992. *Complexity: The emerging science at the edge of order and chaos*. Simon and Schuster. 380 pp.

Definitions

Vivarium, pl. vivaria: A place, usually an indoor glass-fronted or glass-sided enclosure for keeping animals and/or plants under conditions which simulate some of the essential elements of an animal or plant habitat. Currently used primarily in conjunction with the keeping of amphibians and reptiles but also certain insects and arachnids such as theraphosid spiders (tarantulas).

Naturalistic vivarium: A vivarium designed to imitate or give the impression of the appearance of nature.

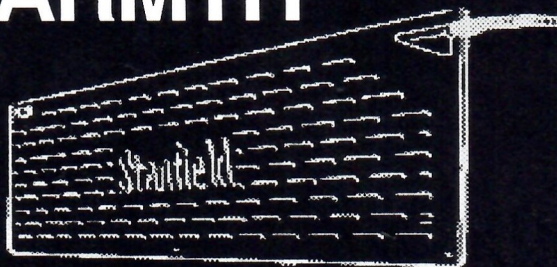
Vivarist: An individual involved in the art and science of keeping animals and plants in vivaria.

Herpetocultural Lingo

Herp addiction/herp addict: A neurosis of certain herpetoculturists who are addicted to the novelty aspect of amphibians and reptiles. They are always looking for something new. They get off on adrenaline or other neurosecretive rush generated when confronted with an animal they haven't seen before. At the time of purchase, they're all excited. They are going to dedicate themselves to this new species, create the best set-ups, etc. However, they quickly become bored. The animals are kept in minimalist set-ups because the herp addict impulse buys

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with the desire to design fancy set-ups in a future that never happens. They typically have large, diverse, changing collections. A favorite line is, "Want to see the new _ _ _ _ I just got?"

Herp habituation: Habituation can be defined as the failure to react to stimuli that previously elicited a reaction. Varying degrees of herp habituation are common among herpetoculturists.

"Andean milksnakes? Yeah I've seen those."
"You just have Solomon Island skinks and Nile monitors? I've seen hundreds, all types."
"He just has New Caledonia geckos, *Rhacodactylus auriculatus*, nothing special."
"Brazilian rainbow boas and emerald tree boas, no big deal." "Horned frogs? I've bred thousands." "Done this, done that."



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Thirty-seven years ago, Archie Fairly Carr, Jr., wrote a book called *The Windward Road*. It contains a collection of his essays about his travels in search of green sea turtles in the Cayman Islands, Costa Rica, Panama, Trinidad, and the Florida Keys. Archie Carr devoted his life to the study of sea turtles and was one of the first to call for their protection.

A native of Mobile, Alabama, Carr came to the University of Florida during the Great Depression of the 1930s to study English and become a teacher.

As a boy in Alabama, he had collected snakes, frogs and turtles, a hobby he continued after moving to Florida. He earned a bachelor's degree from the University of Florida in 1932, a master's degree two years later and, in 1937, he earned the University's first doctorate in biology. Depending on his mood, he would call himself a zoologist, a herpetologist, a naturalist and/or "a turtle man."

Dr. Carr became increasingly internationally known for his pioneering studies on the biology and conservation of sea turtles. With his wife Marjorie, who began her career as a professional biologist, they also became influential conservationists in Florida. They raised funds and persuaded legislators, editors, and business people to support conservation projects before it became popular to do so. (Marjorie has just completed a new book on the natural history of Florida to be published by Yale University Press in 1994. It will contain a collection of some of Archie's writing not previously published).

"The nesting beaches of these mild creatures would be taken over by man. People are breeding too fast for the turtles and taking over the beaches which could finish the turtle," Carr predicted. Despite growing human population pressure, biologists are trying to prevent that prediction from coming true in various parts of the world. Baby turtles emerging from their nests in the sand are a wonder to behold. Only two inches (5 cm) long, the tiny survivors, about the size of a silver dollar, will grow to be several hundred pounds if they survive to adulthood. The females born at this beach will somehow find their way back to the very same beach when it is their time to nest.

Using improvised tagging techniques and research funds from the Navy, Archie Carr was able to document the remarkable navigational abilities of the loggerhead turtles (*Caretta caretta*). They journey 1,200 miles (1930 km) each way from the beaches of Ascension Island, a speck of land only five miles wide between Brazil and Africa, where large numbers lay their eggs on various small beaches to hatch. The young turtles then swim to the east coast of Central and South America where they mature, and then back to Ascension in

the southern Atlantic Ocean to lay their eggs 30 or 50 years after their birth.

In Florida, Melbourne Beach has the largest number of nesting loggerhead turtles (*Caretta caretta*) in the Western Hemisphere. It is here that biologists are studying the effects of artificial lighting from coastal developments on nesting turtles and on hatchling sea turtles.

When there is no interference from humans, the emerging turtles go directly to the ocean

certain colors or wavelengths of light can actually repel the turtles' attraction. A program called "headstarting" was initially tried in Ft. Lauderdale where some 82,000 eggs were taken with a reported 70% successful breeding rate, much more than would occur in the wild. There are many unanswered questions about this technique for which we will not know the answers for a number of years. Heavy reliance on "headstarting" is a concept that some conservationists have reservations

about because it may not be beneficial in the long run for turtles. These individuals believe that sea turtles will only survive if the turtles can continue to nest along the beaches as they

have for millions of years undisturbed by man.

To accomplish this, a national wildlife refuge has been established by Congress and named The Archie Carr National Wildlife Refuge. Land acquisition is now in progress involving 500 acres of beaches on Florida's east coast that would protect one of the world's most critical marine turtle nesting beaches. This would be the first sea turtle refuge in the contiguous United States, and it would provide the only real protection in the country for two species of turtles potentially threatened with extinction.

The University of Florida was so appreciative of Carr's conservation efforts that, in 1959, it appointed him as a graduate research professor of biology. This relieved him of teaching obligations, allowing him to devote more time to sea turtles.

Professor Thomas Barbour of Harvard's Museum of Comparative Zoology, a distinguished herpetologist of the time, invited Carr to Cambridge on a fellowship in the summer of 1937. It was the first of seven summers he would spend as a Thomas Barbour fellow.

The most unusual of Archie Carr's many distinctions is that his literary gifts equalled his scientific gifts. Combining his original academic interest in English with his passion for natural history, he wrote eleven books, several of which won top awards. In 1952, his *Handbook of Turtles* won the Daniel Giraud Elliott Medal from the National Academy of Sciences. *High Jungle and Low* (1953) won the 1955 John Burroughs Medal for exemplary nature writing.

In Carr's *The Windward Road* (1956), one chapter, "The Black Beach," received an O'Henry Award and was included in "Best Short Stories of 1956." It inspired the formation in 1959 of the Caribbean Conservation Corporation (CCC), a group dedicated to the study and conservation of sea turtles. The CCC coordinated the job of setting

Archie F. Carr

by Roy Pinney



Archie F. Carr in the field. Photo provided by Caribbean Conservation Corporation.

shore and swim away as quickly as possible to avoid potential predators. Since the early 1970s, researchers have noticed a disturbing trend. On beaches with increased development, where the dunes have been destroyed and replaced by high-rise buildings with bright lights, more and more of the hatchlings never find their way to the sea. Instead, they are drawn away from the water in the opposite direction towards the parking lots and condominiums. Trying to solve the problem of hatchling disorientation, Florida has enacted extensive anti-beach lighting regulations in many coastal areas to protect nesting turtles, due in part to the work of Carr and the researchers he trained.

At Delray Beach, where caring city officials ordered that lights along the beach be turned off, the turtles crawled up on the highway that runs along the beach by the hundreds and were killed in traffic. Researchers were stunned. It seems that even without the lights on the beach, the turtles were attracted inland by the illuminated sky from the city and from shopping centers.

That experience encouraged the researchers to look for other solutions. They think that

Continued on page 14

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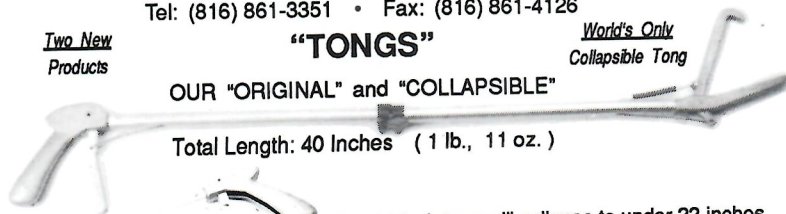
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up a research station at the black sand beaches of Tortuguero, Costa Rica, which support the largest number of nesting green sea turtles in this hemisphere. Since 1955, volunteers have assisted CCC in a long-term study of these endangered reptiles by patrolling the beaches at night in four hour shifts, watching for turtles to come ashore. When the nesting females begin to lay their eggs, volunteers count the eggs, make records of the information on the tags, and assist researchers in the application of new tags when needed.

The Pacific coast of Costa Rica is also known for its massive "arribadas," the near-simultaneous arrival of tens of thousands of nesting olive ridley turtles (*Lepidochelys olivacea*). Approximately 95% of known nesting Kemp's ridley (*Lepidochelys kempii*) arribadas occur in Rancho Nuevo, Mexico. Arribadas have been described as the most spectacular event in the world of reptiles. The story is detailed in *So Excellent a Fish*, a *Natural History of Sea Turtles*, published in 1967. *Ulendo, Travels of a Naturalist In and Out of Africa* (1964) describes Carr's three journeys to Nyasaland. It has just been reissued by the University Press of Florida (1993). Carr also wrote numerous scientific papers and popular magazine articles.

Carr's books were dedicated to his wife Margie, a daughter Mimi, and four sons Chuck, Steve, Tom, and David, the latter who is now executive director for the Caribbean Conservation Corporation (CCC).

Archie F. Carr died of cancer May 21, 1987 at his home on Wewa Pond near Micanopy, Florida. He was 77 years old.

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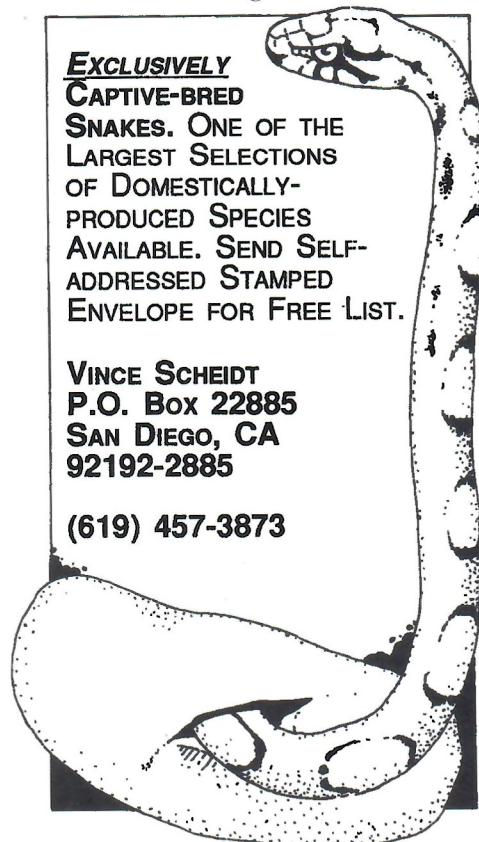
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THE VIVARIUM

Notes on the Natural History and Captive Husbandry of the Sonoran Mountain Kingsnake (*Lampropeltis pyromelana*)

by
Thurgess Cranston

The night had been hideous. As the sun mercilessly attacked my face that morning, I took inventory of my immediate surroundings. The room was totally annihilated with dirty underwear, smelly clothes, etc. strewn around in a random manner. Sleep during the prior night had been difficult at best, due to the veritable symphony of my stuffed sinuses and the resulting din of off-key snoring from several graduate students spending the summer doing field research. I was in the infamous "bachelor quarters" at the American Museum of Natural History's research station in the Chiricahua Mountains of southeastern Arizona.

My herping partner, Ron, and I had spent six nights in the field before deciding to 'splurge' and spend the night in facilities having some facsimile of civilization. When I say in the field, that's basically what we had done - camping without benefit of a tent in the various mountain ranges of southeastern Arizona. For several of those nights, we would only have a few hours sleep before a sudden downpour would wake us. The year was 1982, and we were looking for one of the most attractive American reptiles, the Arizona mountain kingsnake (*Lampropeltis pyromelana*).

That morning in my bed in those heretofore mentioned "bachelor's quarters," I reflected back on what had been an interesting trip. We had seen several of the montane rattlesnakes - the blacktail (*Crotalus molossus*), the banded rock (*Crotalus lepidus*), and the twin-spotted (*Crotalus pricei*). We had spotted several of the whipsnakes of the region - the Sonoran (*Masticophis bilineatus*) and the coachwhip (*Masticophis flagellum*). Also sighted at lower elevations but left undisturbed, were several of the more common desert snakes of the region including the Sonoran gopher snake (*Pituophis melanoleucus affinis*), glossy snake (*Arizona elegans*), and night snake (*Hypsiglena torquata*). Unfortunately, we had not as yet seen what we had primarily come to see, the magnificent Arizona mountain kingsnake.

Suddenly, from outside, I heard a young child exclaim, "Look, Mom! A coral snake!" I rushed to put some pants on and ran outside to see a gentleman in his late twenties holding a huge Arizona mountain kingsnake for the little girl. I asked him when and where he had

caught the serpent, and he replied, "Just a few minutes ago, up the canyon."

I ran back to the room, got my hiking boots, collected my herping partner Ron, and drove up the canyon. Within minutes, we were hiking up the stream, carefully checking various cracks in granite rock outcroppings and around old, fallen trees in the desperate hope of finding one of these animals. The prior night had seen torrential rainshowers, probably 1.5 inches (3.8 cm) or more, and the ground was still quite wet. After searching for twenty minutes, we came upon a very deep crack and **POW!** - we were both hit with the beautiful reds, blacks, and whites of a young adult specimen soaking up some morning sun. The next concern was the safe removal of the animal. This was accomplished by gently lifting the rock directly above the snake, and hand catch-

"This species is popular with many snake enthusiasts because of its brilliant coloration and relatively easy requirements for maintenance and captive propagation."

ing it. The rock was then placed back exactly the same way it was found, both to preserve this micro-habitat and for future checking. This magnificent snake is still in my collection after eleven years, not only thriving, but also producing scores of offspring since the initial 1984 breeding season.

The Arizona mountain kingsnake is a relatively small to medium-sized (28 - 43 inches) (71 - 110 cm) colubrid. This species is popular with many snake enthusiasts because of its brilliant coloration and relatively easy requirements for maintenance and captive propagation. For many years, four subspecies were recognized (Shaw and Campbell, 1974). These were *Lampropeltis pyromelana* (triad counts of 43 or more), *Lampropeltis pyromelana* "woodini" (triad counts of 43 or less), *Lampropeltis pyromelana infralabialis* (nine lower labial scales in comparison to ten lower labials found in the other subspecies), and *Lampropeltis pyromelana knoblochi* (broken triads along the sides of body). More recently, *L. p. pyromelana* and *L. p.*

"woodini" have been combined under the subspecies *L. p. pyromelana*.

I have personally collected a "woodini" morph in exactly the same rock pile as a *pyromelana* morph in the Chiricahua Mountains of S. E. Arizona. I have, therefore, no feeling of uncertainty regarding the validity of this newer grouping. The amount of red varies tremendously in individual Arizona mountain kingsnakes. Some individuals are almost black and white when viewed dorsally, while others have hardly any black pigment and may initially, upon discovery, appear to be an almost red and white snake!

As a species, *Lampropeltis pyromelana* ranges from central Utah and eastern Nevada through Arizona and southwestern New Mexico into northern Mexico (Wright and Wright, 1957; Stebbins, 1985). The distribution is spotty and is limited, for the most part, to mountainous regions. Plant associations include edge (ecotone) areas of chaparral and pinyon-juniper woodland as well as pine-fir belts. The elevation at which they have routinely been found varies from 2,800 to 9,200 feet (850 - 2800 m). *L. pyromelana* have been found foraging from late afternoon to evening from early May through September. Recorded times have been from 2:30 PM until 9:00 PM. During foragings, preferred body temperatures as measured by cloacal temperature readings have been approximately 73°F (23°C). The majority of the day is spent by these animals in deep rock fissures prevalent throughout most of their range. Most *Lampropeltis pyromelana* are captured by or under surface rocks next to these fissures. These snakes utilize these smaller surface rocks to obtain warmth for digestion and growth while at the same time maintaining an effective covering for protection against predators.

Prey in the wild is confined to lizards and small mammals. Several specimens collected by the author have voided lizard scales; two have voided fur (most probably from mice of the genus *Peromyscus*). The most common lizard found in stomach contents is the mountain spiny lizard (*Sceloporus jarrovi*) (Stebbins, 1954). Other lizards that naturally range in Sonoran mountain kingsnake's habitat that have been taken by captive snakes include tree lizards (*Urosaurus ornatus*) and striped plateau lizards (*Sceloporus virgatus*).

Fecal samples from freshly caught specimens have yielded internal parasites on more than several occasions. One wild-caught male from the Chiricahua Mountains was found to



Utah mountain kingsnake (*Lampropeltis pyromelana infralabialis*). Photo by Dave Breidenbach.

have a heavy load of the protozoan, *Coccidia*. Applegate (1989) noted the occurrence of the protozoan, *Trichomonas* in several of his wild-caught specimens. In the specific case I am aware of, Flagyl® in the dose of 50 mg/kg (Applegate, 1989) was successfully utilized to eliminate these parasites. Once the internal parasites were eliminated, these specimens fed regularly on appropriately-sized mice. Applegate (1989) also noted that Flagyl® should not be given at higher concentrations with Arizona mountain king snakes.

Care in Captivity

Lampropeltis pyromelana is a relatively easy snake to maintain in captivity. Cages utilized by the author with the greatest success

have been the Herpatat® modular cage (Cranston, 1986; Merker and Mackin, 1989). These work especially well for my animals when they are under three feet (1 m) in length. Similar drawer-type cages have been used by other herpetoculturists with comparable success (Applegate, 1986; 1989). When my snakes approach six ounces (175 g), I typically move them to larger, ventilated sweater boxes with a simple hide box and water bowl. The key factor for successful maintenance is a secluded hiding area and an extended thermal gradient from which captives can thermoregulate.

Once the animals have adjusted to captive conditions, if kept at the correct temperatures

during different times of the year, most will readily feed and breed. However, the adjustment period for wild-caught adults may take up to two years. Mice are the best food item for captives. Usually, adults will feed on three to four fuzzy (2 to 3 week old) mice per week. After several years in captivity, wild-caught adults will feed at almost any time of day. Initially, after capture, many individuals tend to feed only at night. With several of my wild-caught adults, I have noticed an interesting phenomenon. Immediately after capture, several Sonoran mountain kingsnakes would readily feed for several months until the brumation (winter cool-down) period. Upon "emergence" from the winter cooling, these animals were very reluctant to feed. This reluctance continued for their second year in captivity. (In fact, one wild-caught female fed only three times during her second year in captivity.) After the second brumation period in captivity, these reluctant feeders would emerge with tremendous appetites and would rapidly grow in body mass. This behavior was not encountered with captive-produced offspring. In fact, I have had captive-produced offspring feed until mid-November (and they would have continued to feed had I not turned down the heat!). Applegate (1989) noted that his *L. pyromelana* would often go off feed in late summer or early fall. With the great majority of my wild-caught adults, I have also noticed this to be true. As with virtually all temperate climate colubrid snakes, water should be present at all times to prevent dehydration. Access to clean, fresh water is especially important in late summer and early fall when many snakes go off feed.

The thermal requirements for the captive management of *Lampropeltis pyromelana* should take into account the cool temperatures of their natural microhabitat in the wild. In my collection, Arizona mountain kingsnakes are purposely housed at the ground level tier of cages, in order for them to take advantage of the cooler air at the bottom of any room due to air temperature stratification. I vary the spring, summer, and fall temperatures from 59°F (15°C) at night to 82°F (28°C) during the day. During the winter brumation period, temperatures range from 45°F (7°C) to 54°F (12°C). Winter cooldown in my collection extends from late November through mid-February (a total of 12 weeks). After the spring emergence, most snakes feed readily within two weeks. Females are fed heavily to increase energy stores for the breeding period. Under my thermal regime, the breeding period begins in late March and extends through mid-May. *Lampropeltis pyromelana* is one of the earliest species of kingsnakes to breed in my collection. (This may be in response to the shortened growing season of the higher elevation from which these animals are found in the wild.) Courtship and breeding is typical of that of other American colubrid snakes. The male courts the female for periods usually lasting between 10 or 15 minutes. Copulation takes place shortly thereafter and, for my specimens, lasts approximately 10 or 15 minutes. Multiple copulations with different



Arizona mountain kingsnake (*Lampropeltis p. pyromelana*). Photo by Jim Bridges.

males best ensures a successful breeding. As with all my snakes, I check the female's cloaca to make sure that there is sperm that is motile (capable of movement) and not misshapened. Early in the breeding season, many of my males have large numbers of dead, fully developed sperm. I believe that these are the "leftover" sperm from the prior breeding season. Within 10 to 15 days, these males invariably produce large numbers of motile sperm. The female goes into her typical colubrid pre-egg laying shed five to seven weeks after the initial copulation. Eggs are laid from 12 (the usual) to 17 (the exception) days after this shed. This translates

would produce spectacular offspring. A second reason for the lower breeding success may have been a problem with my incubator. Flaws in the thermostat, only discovered later, created 9 - 14°F (5 - 8°C) fluctuations over the course of the 65 - 70 day incubation period during the 1992 - 1993 breeding seasons. For the upcoming breeding year, I have modified



Chihuahua Mountain Kingsnake (*Lampropeltis p. knoblochi*). Photo by John Walling.

TABLE 1

The following are breeding data collected from seven *Lampropeltis pyromelana*. The last day of winter cooling (=brumation) for each year was February 14th (+ or - 2 days). Breeding information was lost for the 1989-1991 years. Incubation temperature was 26°C unless otherwise stated. Numbers in parentheses under "% Hatch" represent number hatched over number fertile. Numbers in parentheses under "% Fertility" represent number fertile over number in clutch.

YEAR	N	BREEDING DATES	OVIPOSITION DATES	% FERTILITY	INCUBATION TIME	% HATCH
'84	1	4/05 - 4/14	5/19	50% (1/2)	79 days	100 (1/1)
'85	1	3/12 - 3/25	5/14	100% (5/5)	67 days	100 (5/5)
'86	3	3/29 - 4/15	5/09 - 5/31	100% (7/7) (3/3) (5/5)	67 days	100 (15/15)
'87	3	3/26 - 4/24	5/15 - 6/11	100% (6/6) (3/3) (8/8)	67-70 days	94 (16/17)
'88	3	3/14 - 4/11	5/09 - 5/21	94% (6/6) (3/4) (7/7)	64-70	50 (8/16)
'89	-	-	-	-	-	-
'90	-	-	-	-	-	-
'91	-	-	-	-	-	-
'92	7	3/15 - 5/15	4/23 - 5/17	67% (1/3 3/3) (0/2 4/4 4/4) (4/4 0/3)	75-78 (at 25° C)	94 (15/16)
'93	7	3/30 - 5/08	5/03 - 6/26	62% (0/5 4/4 1/2) (4/4 4/5) (2/6 3/3)	64-68 (at 30° C)	83 (15/18)

to a total of 47 to 63 days for the eggs to develop from copulation to egg-laying in my specimens, which is similar to Applegate's (1989) findings of 25 to 58 days for this time. A nest box of damp sand is used in the majority of cases by the female snake for oviposition. The eggs have been incubated in vermiculite and in a peat moss/sand mixture with excellent success. Fertile eggs hatch in approximately 63 to 70 days at an incubation temperature of 81°F (27°C). As noted elsewhere (Applegate, 1989), *L. pyromelana* do not typically double clutch as do many other species of *Lampropeltis*. A summary of breeding information from my collection may be found in Table 1.

Over the course of the past several years, I have noticed a general reduction in both the percentage of fertile eggs and in the percentage of hatching in my *L. pyromelana* collection. I believe there are several factors that may account for this reduction. For the 1992-1993 breeding seasons, I used a new male that had been captured four years earlier as a small juvenile. Although the motile sperm samples for this snake were "good," they had not been as high as my other two breeder males. My rationale at the time for using this male was that he is a beautiful animal (more so than the other males). I was hoping he

my incubator and will also use all three of my breeder males.

Perhaps, the most specialized aspect of management for this taxon is the care of neonates. Hatchling care can be as challenging as care for hatchlings of the gray-banded kingsnake (*Lampropeltis alterna*) (Cranston, 1991). Virtually all offspring will feed

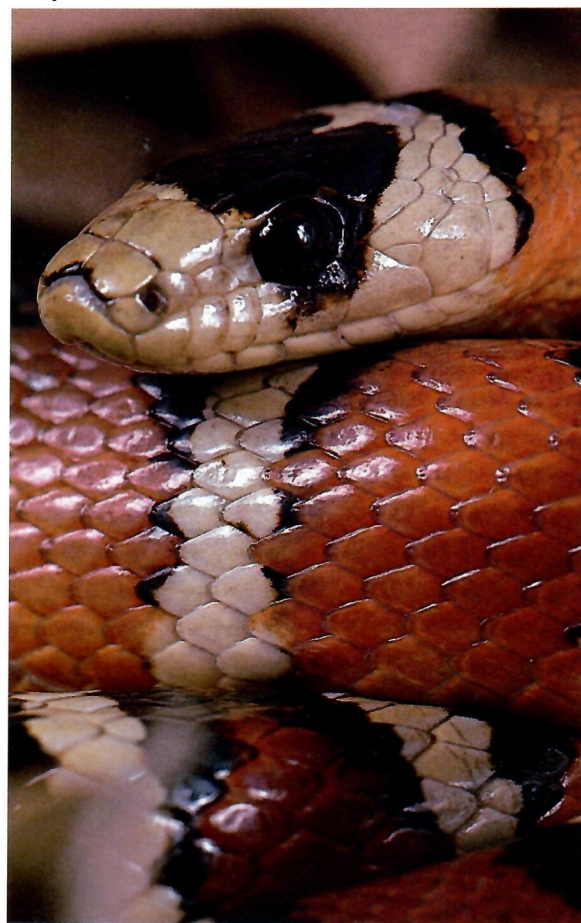
initially on appropriately-sized brumation period; and a diet of healthy domesticated mice. When these conditions are met, these serpents will thrive for many years. In fact, one of my breeding males has been in captivity for close to fifteen years and is still producing viable sperm.

Note to anyone considering field-collecting this snake: Arizona Game and Fish requires that collectors have either an out-of-state Class G Hunting License (or if you live in state, a

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lizards and/or lizard tails. The transition from lizards to pink (newborn) mice is best accomplished by "tricking" the neonates to feed on lizard-scented pinkies. After humanely dispatching the baby rodent, expose a small portion of the brain with a razor blade. This method of exposing the pinkie mouse brain was also described by Applegate for *Lampropeltis pyromelana* and *Lampropeltis mexicana greeri* at the 1987 Northern California Herpetological Society (NCHS) Captive Propagation and Husbandry Symposium. Most hatchlings of any of these species will either take on their own, or can be converted to, pinkie mice before nine months of age.

In conclusion, the Arizona mountain kingsnake is an extremely beautiful reptile that generally does well in captivity. The keys to success are regular fecal exams and treatment, if necessary, to eliminate any injurious internal parasites; correct temperatures with a thermal gradient; a winter



Arizona mountain kingsnake (*Lampropeltis p. pyromelana*). Photo by Jim Bridges.

To PERU in Search of Tropical Anurans

**Article & Photos
by
Dante Fenolio**

For the past several years, I have been gathering data to produce a series of popular books on various groups of tropical frogs and toads. One of the trips I made for this project was to the Peruvian arm of the Amazon River in South America with Bill Lamar. Lamar of the University of Texas at Tyler, is a herpetologist specializing in the venomous herptiles of Latin America. This specialty, combined with his extensive knowledge base of other herp groups of this

were transported to a hotel on the banks of the Amazon. Upon our arrival, we were so anxious to get started that we decided to look along the river bank for our first Amazonian herps. We were unsure whether any herptiles would be observed so close to the city, but we set out anyway. Shortly after searching through several shrubs along the river, we happened upon our first Peruvian frog of the trip. It was a brilliant yellow and brown treefrog (*Hyla leucophyllata*). Further hunting through this riparian (water side) habitat

produced a large number of insects, and two more species of treefrogs (*Hyla mathissoni* and *Scinax rubra*). Giant toads (*Bufo marinus*) were also observed in large numbers on the ground. The next morning, we discovered that just a few dozen yards from our hunting site was the edge of a city dump, which attracted many insects and, in turn, many anurans.

After awakening, we were soon busy photographing our previous night's find and with the more mundane task of loading of our luggage onto the boat for the trip. The remainder of the day was spent traveling down-river, to more remote areas of the Amazon. The variety of life on the riverbanks and in overhanging trees impressed all of us. I saw more shades of green with one glance than I had ever thought possible.

Early the next morning, one of the guides took us from the river boat up a long estuary. Occasionally, an animal would allow us a short glimpse before splashing loudly into the river or trampling off into the undergrowth. I was totally enthralled by these images as we slowly drifted through this environment. We passed a fisherman on the bank who had some fish piled up in the bottom of his canoe. Several large matamata turtles (*Chelus fimbriatus*) had also been captured and had been hoisted onto the muddy bank. The fisherman had snared them in a mesh net and planned to have them for dinner that evening - a true matamata lover's nightmare. We tried to purchase the turtles from him, but had no luck.

We proceeded up the tributary to land at an area where the forest

commonly floods after heavy rains. Daryn, Marcuss, and I began searching through the undergrowth for herps. We turned up several bizarre-looking, cryptically

colored treefrogs (*Scinax garbei*) on the trunks of buttress rooted trees.

Our local guide caught several red piranha (*Serrasalmus natterii*) while fishing from the canoe. He

was quite excited about his catch and the fact that he would now be able to cook a fresh fish breakfast for everyone.

The remainder of the day was spent traversing miles of river bends in our boat, arriving at a fishing village in time for a late afternoon hike. There we turned up a beautiful specimen of the atelopid toad (*Atelopus pulcher*). These small, gaudy-colored toads were once believed to be in the same family as the dart-poison frogs but have since been appropriately regrouped. Several crested toads (*Bufo typhonius*) were also encountered. These toads resemble leaves and are able to elude predators with their cryptic coloration which allows for near perfect camouflage.

Early the next morning, we stopped at a place where the river came within one hundred yards of a landlocked lake which was supposed to be especially good for herps, and also afforded great piranha fishing. We met a fisherman who had just caught a large arapaima (*Arapaima gigas*). Although these giant fishes are threatened, they are still delicacies to the locals who have little regard for national and international regulations.

In the trees overhanging the water, we saw a number of large green iguanas (*Iguana iguana*). Several attempts at capturing one of them failed. When approached, an iguana would quickly move to a higher location before we could climb half the original distance to it. Several crested toads (*Bufo typhonius*) were collected in the surrounding forest, along with two species of small microteiid lizards. Within the undergrowth of the forest, we captured the small, terrestrial frog, *Adenomera hylaedactyla*.

At noon, we came to a small fishing village where we anchored for the night. That afternoon, we found and caught a large green iguana, and acquired a green anaconda (*Eunectes murinus*) in a village on our way back to the boat. I paid a local woman ten dollars for the snake so that I could show it to the others back at the boat and then release it in a suitable habitat.

Early that evening, we split into two groups. Daryn, Marcuss and myself accom-



A red-bellied piranha (*Serrasalmus natterii*) showing the business end.

region, made the trip an incredible learning experience.

I was personally accompanied by two colleagues from California, Marcuss Collins and Daryn Baker. The three of us flew to Florida, met up with Lamar, and then flew to Iquitos, Peru as a group. We landed in Iquitos on a typically humid evening, and



A typical Amazon peasant farmer dwelling near the river.



This Amazon water lily is 4½ feet (1.5 m) across!

panied Bill Lamar in search of nocturnal herps in the rainforest. The other group took motorized canoes, searchlights, flashlights, and nets to hunt for crocodilians: the common caiman (*Caiman crocodilus*), the Schneider's dwarf caiman (*Paleosuchus trigonatus*) and the rare black caiman (*Melanosuchus niger*).



Sunset on the Amazon River.

The night hike proved to be successful. We heard loud frog calls early in the hike. Lamar explained that the loudest were "mountain chickens," or South American bullfrogs (*Leptodactylus pentadactylus*). We came across several of these large anurans as they were calling from the forest floor. We used our flashlights to cause them



Representative Peruvian air transportation.

THE VIVARIUM

to freeze in place, very much the same way that deer are frozen in the headlights of cars. Lamar remarked on how the skin toxins of these frogs adversely affect some people to varying degrees. After I had captured one, it took no time for me to realize that I was going to react. My hands began to itch uncomfortably. Fortunately, I was able to snap some great photographs of this frog the following morning.

Another interesting and unusual find was the "false dart frog," *Lithodytes lineatus*, which mimics color patterns of some dart-poison frogs. They are often mutualistic with leaf-cutting ants of the genus *Atta*. They are found on or in the mounds the ants build. Amazingly, the ants do not bother them, and the frogs consume only other insects that come on or near the mound, some of which have the potential to harm the ant colony. To locate the *Lithodytes*, we simply followed their calls to the nearest ant mound. The difficult part was finding one of these frogs on the outside of a mound.

Numerous crested toads (*Bufo typhonius*) were observed climbing in foliage five or six feet above the ground, which was unusual behavior in a bufonid toad that one usually thinks of as being terrestrial. We also found the treefrogs *Hyla punctata*, *H. geographica*, and *Scinax rubra* in the undergrowth. A small specimen of *Hyla geographica* which we spotted had especially stunning coloration and pattern.

Our local guide and Bill Lamar pointed out the occasional *Bolitoglossa equatoriana*, a small, mud-colored arboreal salamander, as we backtracked towards the boat. These amphibians have very flat feet, enabling them to climb trees and other nearly vertical objects. This adaptation permits this nocturnal salamander to hunt for insects in normally hard-to-reach places where there may be more insects available.

Arriving back at our motorized canoe, we moved quickly down the waterway, approaching the illuminated riverboat. We saw our companions on the lower deck, and it was obvious that they had also had good luck that night. A three foot caiman (*Caiman crocodilus*) rested on the old, wooden planks of the deck. Several others had been captured too, but this one was kept to show us. After a few quick photographs, we released the disgruntled reptile into the waters of the Amazon, following its reflective eyes with our flashlights until it disappeared around a bend in the river.

As we continued our journey, two very large treefrogs (*Hyla boans*) were discovered on leaves overhanging the water. The loud calls of these arboreal frogs could be heard clearly from quite some distance. A massive giant toad (*Bufo marinus*) was also observed.

The toad was easily longer than both of my hands are wide.

Most of the next day was spent meandering through the winding river pathway towards a small village surrounded by large banana groves. These groves were lush and looked promising for that evening's search. The hike began when the captain of our boat returned with a guide from the village. We treaded up the muddy paths of the embankment into the banana fields. This new habitat contained the miniature treefrog *Sphaenorhynchus lacteus*, *S. carneus*, and *S. dorisae*, along with another species of *Sphaenorhynchus* which we could not identify. These tiny treefrogs varied in hue from lime green to deep forest green and resembled small emeralds as they sat on the darker green leaves of secondary forest vegetation.

At the edge of a nearby pond, the vocalizations from several different species of frogs were no less than an "orchestra," with noise levels comparable to sitting in front row seats at the symphony. Some of the contributing frogs and toads included *Hyla geographica*, *H. lanciformis*, *H. funera*, *H. leucophyllata*, *H. boans*, *H. parviceps*, *H. punctata*, *H. rhodopepla*, *Pseudopaludicola ceratophytes*, *Adenomera andreae*, *Leptodactylus pentadactylus*, and *Bufo marinus*. This pond offered a myriad of micro-habitats without fish predators on anuran eggs and tadpoles, making it irresistible to a wide variety of frog and toad species.



The mosquitoes around the pond were like small carnivorous clouds. Our mosquito repellent seemed to offer little, if any, protection. We were unable to remain at the pond for long as it seemed as if we were being eaten alive. We returned to our path in the direction of the boat, taking our time so as to see as many herps as possible. The number of large tarantulas and other arachnids active at night throughout the secondary forest and large banana grove was amazing. The highly reflective eyes of these arachnids made the trip along the trail even more



Hyla punctata.



Hyla geographica.



Hyla leucophyllata complex.



Hyla leucophyllata complex.



Hyla lanciformis.



A giant tree frog (*Hyla boans*).

exotic as our flashlights lit the way. Many other spectacular forms of insects were encountered as well, including two or three species of fireflies. A small terrestrial frog, *Hamptophryne boliviana*, was found at the base of one of the large banana trees. These hard-to-spot terrestrial frogs would reveal their positions from under the cover of dead leaves and fallen branches by their recognizable calls.

At sun-up the following morning, our boat set a course for the mouth of a small river. There, we were dazzled by freshwater dolphins which frequent the place where the two rivers meet. I had read about these dolphins, but the descriptions did not do them justice. They were no less than captivating. Their activities and social behavior kept us



A crested toad (*Bufo typhonius*).



Leptodactylus wagneri.

watching them for the remainder of the afternoon.

That evening brought another night hike. We walked through an area of partially farmed land that degenerated into a soggy marsh as it neared the river. The unfortunate presence of the clouds of mosquitoes made things uncomfortable at times, but we managed to hunt into the early hours of the morning. Frequent rain showers helped to keep these invertebrate pests partially in check.

The miniature treefrog *Sphaenorhynchus lacteus* was observed on several occasions within the marsh area. Loud calls from a species of phyllomedusine frog were heard, but these amphibians themselves were never actually seen. South American bullfrogs (*Leptodactylus pentadactylus*) was also present in the marsh. The "human-like" cry of this species created an eerie atmosphere during our nocturnal trek.

Lamar instructed us to move slowly through this habitat, and to carefully monitor where we placed our feet. This was a perfect setting for the fer-de-lance (*Bothrops asper*) and an assortment of other venomous snakes of which I hoped we might catch a glimpse. Eventually, we returned to our canoes and set our course for an area that was famous for its dart-poison frogs. This was the stop for which I had especially been waiting. At dusk, Daryn, Marcuss and I set

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A miniature tree frog (*Sphaenorhynchus lacteus*).



A South American bullfrog (*Leptodactylus pentadactylus*).



A dart-poison frog (*Dendrobates ventrimaculatus*).

From Sawdust to Lizards: A VISIT WITH BERT LANGERWERF

by
Randall L. Gray

As I drive towards Montevallo, Alabama, I think back to when I first met Bert Langerwerf. It was 1984 and he was still living in the Netherlands but had come to the United States to present a paper at a reptile captive breeding symposium. Even before we met we had already been corresponding for several years and I had even obtained a few species of lizards from him. During that visit he was my house guest for a night and we spent most of the time talking about lizards. I remember being thrilled to have someone to talk to about lizards in such detail.

In the early 1980s it seemed that you had to look abroad to find someone with a passion for lizards. Then, as now, most herpetoculturists (we didn't call ourselves that then) focused on snakes. Of course there were some notable

exceptions in the United States, such as Dick Bartlett, Philippe de Vojoli, Bob Mailloux, Sean McKeown, Jeff Nunan, Tim Tytle, Rick Hudson and Ron Tremper. These pioneering lizard breeders have done much to bring lizards into the forefront. Since then, the number of people working with lizards has grown and new advances are constantly being forged.

I have to focus back on my driving when three whitetail deer run in front of my car just before I turn onto the dirt road leading into Bert Langerwerf's rural home. I am eager to see an old friend and filled with great anticipation about viewing his extensive lizard collection.

I did not have to wait long. After a quick cup of coffee with Bert and his charming and beautiful wife Hester, we grab a flashlight and head outdoors to "shine" a few lizards. Bert guides me to his chameleon enclosures since we can more easily view them at night as they often sleep out in the open on the tip of branches. As I stumble in the dark behind Bert, we pass many other vivaria where other species of lizards have retired to their burrows. The sight of so many outdoor enclosures, cloaked in the cover of darkness, promises delight when the morning sun rises.

As I remembered, Bert is full of energy and extremely productive. He doesn't sit still very long, but even then he is writing. He has written over 60 articles on herpetoculture in four languages and has presented papers all over the world in English, Dutch, German, French, and Russian. If you are serious about lizard husbandry, you must be stuck in a *Uromastyx* burrow not to have heard of him.

His contributions to lizard husbandry are an important foundation on which herpetoculture has been built.

Bert's interests are not confined only to lizards. He has a large collection of folk music from all over the world. His living room houses a large telescope for star gazing, and he likes to study languages. He even enjoys tree climbing which is obvious from the ladders built on many of the trees around his property. Where he finds the time to do all of these things is a mystery considering how much effort his large collection takes to sustain it and produce the large number of offspring.

"I turn sawdust into lizards," asserts Bert Langerwerf with a strong Dutch accent the following morning as we walk past a large pile of sawdust on his lizard farm. Bert is referring to the fact that sawdust is one of the main foods for his giant mealworms (*Zophobas* sp.) which are raised as one of several insect food items for his lizards. As we shall see, recycling the byproduct of lumber mills is only one way that Bert embraces recycling in his large scale herpetoculture facility.

After leaving the Netherlands in 1985, where he was both a high school physics teacher and a large scale lizard breeder, Bert and his family set up "lizard keeping" in the Canary Islands for two years. Then, on to New Zealand for a look before coming to America. Bert felt that the United States offered better business opportunities for producing lizards on a large scale. They settled in the state of Alabama at the invitation of Dr. Mark Paris and then established what is probably the world's largest facility for the propagation of lizards.

I spent the day following Bert around the facility and could easily have spent two or three days, because nowhere else have I ever been where I could view so many different kinds of lizards. The Langerwerfs are presently working with over 40 species of lizards representing several thousand individual animals.

In 1992, they produced over 3200 lizard offspring. This included 500 green basilisks (*Basiliscus plumifrons*), 290 eastern water dragons (*Physignatus lesueurii*), 250 Natal midland dwarf chameleons (*Bradypodion thamnobates*), 60 panther chameleons (*Chamaeleo pardalis*), 500 Caspian green lacertas (*Lacerta strigata*), hundreds of jeweled lacertas (*Lacerta lepida*), and over a thousand leopard geckos (*Eublepharus macularius*). Bert expects to eventually focus on only twelve to fifteen species that are well suited to the climate of Alabama and are in demand for the herpetoculture industry. However, knowing Bert's penchant for taking on new herpetocultural challenges, I somehow do not envision this happening in the near future.

In addition to lizards, Bert supplies the pet industry with giant meal worms, *Zophobus*, and several species of crickets, including one which



The larval stage of these beetles, known as King mealworms, were initially developed for herpetoculture by Bert in the 1970's. Photo by Sean McKeown.



Bert and Hester Langerwerf feed and water the lizards in each enclosure. Photo by Randall L. Gray.

doesn't make a chirping sound! This is great news for those of us who are serenaded by escaped crickets every night. Bert introduced the giant mealworm to herpetoculture when he still lived in Europe, and now it is an important part of his business, Agama International. In addition to the sawdust used as food for the giant mealworms, Bert visits the dumpsters at grocery markets for vegetables to feed to his crickets. As Bert demonstrates, if you are enterprising there are plenty of low cost, but quality alternatives when feeding your animals.

Bert has always been a strong advocate for using outdoor vivaria since he believes natural sunlight is the best provider of ultra violet light from which a lizard can generate vitamin D3. Vitamin D3 is necessary for calcium absorption; therefore it is an important husbandry consideration. My early acquaintance with both Bert and Dick Bartlett of Ft. Myers, Florida sold me on outdoor terraria long ago. Bert believes that daily exposure to natural sunlight and a diet of properly fed insects generally precludes the use of vitamins during the summer months. During the winter, he supplements both vitamin D3 and calcium.

Bert's outdoor vivaria consist of both simple sheet metal rings surrounding a piece of ground and more elaborate enclosures, which were all dug by hand (I told you he was full of energy!). The enclosures are sunk into the ground to protect recessed portions of the enclosure from extremes of temperature, therefore allowing many species of lizards to spend the winter underground in burrows or under a series of flat rocks outdoors. Many of the vivaria contain a tomato plant which is used to determine if the internal cage temperature drops below the frost line. Bert offered proof of his design's effectiveness when he shared a picture of his enclosures covered with snow during an unusual cold period in March of 1993. Just prior to the storm hitting he had applied additional insulation by placing clear plastic and old used carpets, which he recycled from dumpsters, on top of both the wire and tempered glass panels which form the top of the vivaria. Oh yes, I must tell you that he recycles jars by gluing them to the tempered glass to serve as handles for the enclosure covers.

In addition to the several hundred outdoor terraria, Bert has several buildings and a basement which he uses for breeding mice, crickets and giant mealworms. These building are also used for winter housing of the more temperature sensitive lizards. These facilities are heated by wood stoves that Bert some how finds the time to chop wood for.

As we move through the compound we pass a large pile of compost derived from mouse bedding and insect cultures. Here we stop to pick up shovel fulls of black soldier fly larvae which we take to the chameleon cages for food. Not far away are boxes of decaying fruit retrieved from the dumpsters at the market. These boxes are producing fruit flies by the thousands and we place one in with the baby chameleons. On the back side of the compost pile are planted many recycled pineapple tops which will eventually be introduced into the cages for cover and as watering sites for the

chameleons. Eventually Bert's family eats the pineapples grown in the cages.

After feeding the chameleons, we move to the green basilisk vivaria, Bert notices that the sandy soil has been disturbed. He quickly drops into the enclosure and begins to dig out eggs. "I have worked with lizards so long that I think like them," he states as he crawls around inside the enclosure knowing where the best spot for a cache of eggs would be. Soon, he passes a handful of eggs to me and we place them in vermiculite.

As you can imagine, the size of the area demands a full day of work. In addition to Bert and his wife, there are two other full time helpers. Bert starts his day early, and continues to work well into the night. "There is always something to do and new cages to be built," exclaims Bert as we stopped for a few moments to take lunch. He then adds, "I work outside until it gets dark and then I go inside to build more cages." His task is never ending, but it is a labor of love.

I must leave, but I keep stalling. I just want to see a few more lizards, but I finally succeed in forcing myself away. As I drive back to the airport, I reflect on my two-day visit. I am heartened by the large scale production of lizards here in the U.S. and admittedly, a little overwhelmed by the immensity of the task. I am also very glad to have another lizard fanatic so close, someone whom I can share common ground with. In addition, I am equally pleased by the fact that Bert is an avid recycler who is using America's throw aways to help produce works of art in the form of living lizards. [Editor's note: The author, Randall L. Gray, former president of the North-

ern California Herpetological Society, is a wildlife biologist for the USDA Soil Conservation Service, and works on wildlife habitat conservation throughout the southeastern U.S. and Puerto Rico. Randy has been keeping reptiles, especially lizards, for over 35 years. He has previously served as a land resources coordinator with the Navajo and Tohono O'odham (Papago) Indians in Arizona.]



Sheet metal ringed enclosures are protected from bird predators with overhead netting. Photo by Randall L. Gray.



Aerial view of the Langerwerf lizard farm near Montevallo, Alabama. Photo by Bert Langerwerf.



Basilisks of several species bred by Bert at his Alabama facility. Photo by Sean McKeown.

Ultraviolet Light and Lizards: More Than Meets the Eye

by
Allison Alberts, Ph.D.

Few herpetoculturists would dispute that one of the most important features of any lizard's physical environment is the duration, intensity, and spectral quality of light it receives. Light is traditionally divided into three wavelength groups: infrared light, which most vertebrates sense as heat, visible light, which is somewhat anthropocentrically defined as what we humans see, and ultraviolet (UV) light, which many other organisms can see, but we cannot (Silberglied, 1979).

The wavelengths of ultraviolet light of interest to herpetoculturists can be further categorized as shortwave or middle-UV (285-315 nanometers (nm)) and longwave or near-UV (315-400 nm), which accounts for more than 90% of the solar ultraviolet reaching the ground.

The amount of ultraviolet light that reaches the earth's surface depends on several factors, including latitude, atmospheric conditions, the sun's elevation, and the degree of cloudiness. In general, ultraviolet radiation is strongest at high elevations where the air is thinnest, and in the tropics where the sun's rays are the most direct. The concentration of ultraviolet light reaching the ground can also be especially high

in desert environments, suggesting that ultraviolet light may have special importance for desert lizards.

For most diurnal lizards, regular exposure to ultraviolet light may be beneficial, even essential, to health and survival. All lizards require an adequate supply of vitamin D to allow proper absorption of calcium from the gut and normal bone min-

eralization (Phillips, 1986). When this demand for vitamin D is not met, bone pathology and stunted growth may result. In nature, exposure to ultraviolet light in the 295 to 305 nm range induces a chemical reaction in the skin which converts vitamin D₂ into D₃.

Although it has been suggested that UV exposure may be unnecessary if vitamin D₃ and calcium are included in the diet in the appropriate proportions, some studies suggest that dietary D₃ may not take the place of D₃ that is produced cutaneously from D₂. In a study conducted with green iguanas (*Iguana iguana*) at the National Zoo, Bernard et al. (1991) found that iguanas fed a diet rich in calcium and vitamin D₃ and iguanas injected with supplemental vitamin D₃ fared poorly compared to iguanas that were exposed to a daily dose of ultraviolet light. Interestingly, they also reported that their green iguanas "appeared to become less irritable after exposure to UV light."

Although over-exposure to the shorter wavelengths of UV can be dangerous, potentially resulting in blindness, skin damage, and death (Logan, 1969), moderate exposure to longer wavelengths can increase activity levels, induce basking behavior, and promote feeding in reluctant animals (Laszlo, 1969). Through its influence on the pineal gland, ultraviolet light may also affect reproductive cycles in some species (Gehrmann, 1987).

Moehn (1974) studied the effects of ultraviolet light from mercury-vapor sunlamps on captive groups of desert iguanas (*Dipsosaurus dorsalis*), collared lizards (*Crotaphytus collaris*), and rainbow lizards (*Agama agama*). He found a dramatic increase in the number of threat and challenge displays performed by males during those minutes when the sunlamps were on. These responses were virtually immediate, invariably occurring within the first two minutes after the lamps had been turned on. Although the physiological mechanisms responsible for the increased activity of lizards under UV remain unknown, recent evidence suggests that a visual sensitivity to ultraviolet light could be part of the explanation.

In a study of five species of anoles from Puerto Rico, Fleishman et al. (1993) discovered that UV-sensitive cone cells with absorption maxima at 365 nanometers were present in the retinas of all individuals examined. Just as exciting was the finding that their dewlaps possessed ultraviolet reflectance patterns invisible to the human eye but apparently quite obvious to the anoles themselves. The dewlaps of *Anolis cristellatus* and *A. krugi*, which generally live in sunny habitats, are very bright in UV, those of *A. evermanni* and *A. gundlachi* are dark in UV, and that of *A. pulchellus* is half dark and half bright. All species possess a



Collared lizards (*Crotaphytus collaris*), show a dramatic increase in the frequency of display behavior when exposed to ultraviolet light. Photo by John Phillips.



These desert iguanas (*Dipsosaurus dorsalis*), appear capable of seeing images in the ultraviolet part of the light spectrum and may use this ability to locate otherwise inconspicuous femoral gland deposits. Photo by Joanne Pedersen.

brightly reflecting UV spot at the corners of the mouth, revealed primarily during threat displays. The finding that the communication systems of at least some lizard species are highly dependent on ultraviolet light ranks as one of the most exciting developments in herpetology in recent years.

My own earlier studies had also suggested visual sensitivity to ultraviolet light in desert iguanas (Alberts, 1989). In this species, however, ultraviolet light may be used to enhance detection of a chemical signal rather than acting as a visual signal alone. One striking property of the femoral gland secretions of desert iguanas is that they strongly absorb longwave ultraviolet light (Alberts, 1990). This absorbance of UV results in a weak emission of green light as visible fluorescence, which is too faint to be detected by humans under sunlight, but which can be seen under a blacklight if no visible light source is present. To an animal with a UV-sensitive eye, UV-absorbing substances like these would probably appear dark against brightly reflective surfaces like sand.

When provided with a commercial sunlamp, which emits UV strongly, captive desert iguanas were much more successful at locating femoral gland deposits than when provided with an incandescent bulb, which gives off no UV (Alberts, 1989). To test whether desert iguanas were actually seeing femoral gland deposits as dark spots in the UV, I ran a series of tests using an ultraviolet absorbent ink that is invisible to the human eye. In the first set of tests, each lizard was placed in an enclosure lined with paper on which one randomly chosen square out of 308 possible squares was painted with UV ink. The enclosure was lit by both a UV-emitting blacklight and an incandescent bulb.

To make sure the lizards were not finding the inked square using smell, I presented each lizard with a randomly inked square in a second set of tests that was identical to the first, except that this time the enclosure was lit only by the incandescent light. If the lizards were locating the UV-absorbent square visually, they would not be expected to find it as often under these conditions because a UV light source is needed for absorption of ultraviolet light to occur.

When the UV light source was provided, I found that 62% of the lizards located the UV square successfully, while only 8% of the lizards located it when incandescent lighting alone was used. This experiment indicates that the ultraviolet-absorbing properties of desert iguana femoral gland secretions may help lizards find them, after which they tongue-flick secretion deposits for more detailed information. Ultraviolet vision may also aid desert iguanas in finding food. The petals of many desert species of plants strongly absorb ultraviolet light (Frohlich, 1976). Perhaps, desert iguanas detect buds and flowers as spots poor in UV against brightly reflecting backgrounds.

Because there is still much left to understand, the role of ultraviolet light in the health and behavior of lizards will undoubtedly remain one of the most exciting areas of

herpetological research for many years to come. For the herpetoculturist, the message is clear: if you can provide UV light, do. Three different approaches are available to herpetoculturists who want to give their animals adequate exposure to ultraviolet light. The easiest and least expensive is to ensure that lizards have access to natural sunlight, ideally for at least 30 minutes a day. This must be in a suitable outdoor, screened enclosure (NOT GLASS) that affords both sun and shade. When this is not possible, lizards can be housed in enclosures constructed of plastic material transparent to UV light, such as UVT Plexiglass designed for greenhouses. Finally, certain types of sunlamps, blacklights, broad-spectrum, and plant lights, especially in combination with aluminum reflectors to concentrate the available light energy, can provide at least some of the necessary ultraviolet wavelengths (Gehrmann, 1987). For details about the ultraviolet output of specific types of lamps, be sure to watch for Dr. William Gehrmann's excellent technical review in one of the upcoming issues of *The Vivarium*.

References

- Alberts, A. C. 1989. Ultraviolet visual sensitivity in desert iguanas: implications for pheromone detection. *Anim. Behav.* 38:129-137.
- Alberts, A. C. 1990. Chemical properties of femoral gland secretions in the desert iguana, *Dipsosaurus dorsalis*. *J. Chem. Ecol.* 16:13-25.
- Bernard, J. S., O. T. Oftedal, P. S. Barboza, M. E. Allen, S. B. Citino, D. E. Ullrey, and R. J. Montali. 1991. The response of vitamin D-

deficient green iguanas (*Iguana iguana*) to artificial ultraviolet light. *Proc. Am. Assoc. Zoo Vet.* 1991:147-150.

Fleishman, L. J., E. R. Loew, and M. Leal. 1993. Ultraviolet vision in lizards. *Nature* 365:397.

Frohlich, M.W. 1976. Appearance of vegetation in ultraviolet light: absorbing flowers, reflecting backgrounds. *Science* 194:839-841.

Gehrmann, W.H. 1987. Ultraviolet irradiances of various lamps used in animal husbandry. *Zoo Biol.* 6:117-127.

Laszlo, J. 1969. Observations on two new artificial lights for reptile displays. *Intl. Zoo Yrbk.* 9:12-13.

Logan, T. 1969. Experiments with Gro-lux light and its effect on reptiles. *Intl. Zoo Yrbk.* 9:9-11.

Moehn, L.D. 1974. The effect of quality of light on agonistic behavior of iguanid and agamid lizards. *J. Herpetol.* 8:175-183.

Phillips, J.A. 1986. A holistic view of reptile physiology. In R. L. Gray (ed.), *Proceedings of the Northern California Herpetological Society and Bay Area Amphibian and Reptile Society 1985 Conference on Captive Propagation and Husbandry of Reptiles and Amphibians*, pp.25-38.

Silberglied, R.E. 1979. Communication in the ultraviolet. *Ann. Rev. Ecol. Syst.* 10:373-398.



Under a blacklight, desert iguana femoral gland secretions strongly absorb longwave ultraviolet light, resulting in a weak emission of green light. Photo by Doug Bolger.

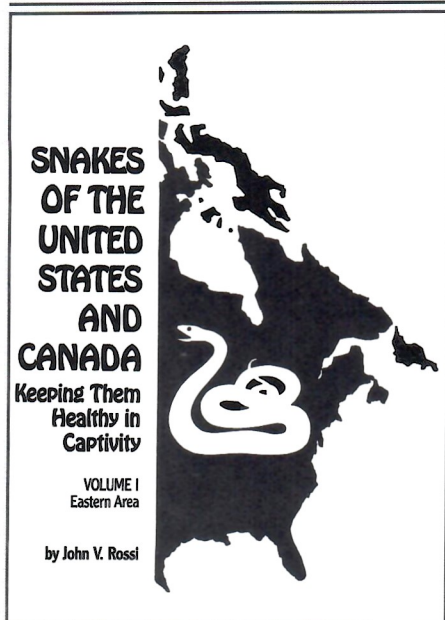


If this giant anole from Cuba (*Anolis smallwoodi*) is like its Puerto Rican relatives, this plain-looking dewlap may actually have ultraviolet reflective patterns we cannot see. Photo by Allison Alberts.

reviewed by Michael J. Balsai

Snakes of the United States and Canada: Keeping Them Healthy in Captivity Volume I. Eastern Area.

John V. Rossi. 1992. Krieger Publishing Company, Malabar, FL. xiii + 209 pp. About 100 color plates, 17 black and white photographs, 43 maps. Hardback. ISBN 0-89466-590-0. \$42.50.



Snakes are a very popular group among herpetoculturists and useful information about their captive maintenance has been scattered among a large number of books and periodicals published since the late 1970s. Dr. Rossi, a veterinarian and a herpetoculturist, has attempted to provide a single reference (in two volumes) for people interested in the husbandry of North American species. This first volume treats those species east of the Mississippi River and includes information for both venomous and non-venomous snakes.

Rossi is particularly concerned with the husbandry and feeding of each of our native species, some of which have not been commonly maintained in captivity. He provides specific as well as general information. I applaud this author for making readers particularly aware of the many dangers that can be overlooked by some herpetoculturists prone to placing several snakes of different species together in one enclosure, and of the probable consequences of failing to place all new acquisitions through a proper quarantine period. Based upon what I have observed in some collections, these warnings cannot be stressed enough, particularly for novices.

In addition, I found his warnings concerning the potential parasites and other hazards that may be associated with the injudicious use of various wild-caught prey items as food enlightening. These subjects are greatly underemphasized by the majority of other field

guide/herp care writers. At one point, this author presses home that if the potential food item does not appear healthy, it should not be fed to any captive snake. I have frequently seen this advice ignored by pet dealers. Rossi also emphasizes the need to obtain clean, healthy feeder rodents from reputable dealers and not to use cheap, low quality animals that may be had from certain less caring pet stores and wholesalers. He points out that your snakes (and other herps) are what they eat, so it is important to ensure they are eating quality prey items that themselves have been fed a nutritionally-balanced diet.

Rossi's book has four sections. The first is concerned with the general aspects of snake care and covers such areas as selecting a snake, housing it, temperature, humidity and its captive environment. He also touches on such things as sexing, breeding, keeping records, first aid, parasites, infections, shedding problems, and a host of other general considerations. Rossi gives some discussion here to inbreeding and selective breeding. These topics have concerned other authors as well. I only wish I could feel as optimistic about the possibilities for normal-colored snakes vs. albino and amelanistic specimens as this author does. I somehow find it creepy to think about the power of the dollar governing this kind of selective breeding. Especially when Rossi gives frequent mention to breeding snakes as one hedge against their extinction or serious reduction in the wild. On the whole, though, this section is well done and provides information of use to both experienced and novice herpetoculturists. His training as a veterinarian is of particular value here.

The second section of the book covers details about the captive maintenance of non-venomous species and approaches this topic on a species by species basis. When related taxa can be kept in a similar manner, Rossi says so, but gives some additional interesting attributes for each. He also provides a range map and other details for each species as a figure/table. Here he uses a criterion he calls "Maintenance Difficulty Index." The reader can, at a glance, determine whether this is a suitable snake for beginners or whether it will be a challenge even for very experienced herpetoculturists. Quick notes about food, cage size, substrates and preferred temperatures are also included as part of these figure/tables.

The third section is devoted to venomous snakes. The same quick reference system introduced in the non-venomous section is continued here as well. Rossi notes that keeping venomous snakes is not a pastime to be taken lightly and provides some notes on the special precautions which are needed. He also recommends finding out before acquisition of specimens where the sources for the appropri-

ate antivenin is available in case of a future emergency. He makes a strong case that venomous snakes should be kept in a locked enclosure and should never be kept in the same area or room to which other people and/or warm-blooded pets have routine access. We all are aware of and frequently read in the newspapers how often this advice is ignored. Rossi notes how individuals who have carelessly kept venomous snakes, have often brought the wrath of municipal authorities down on the majority who do not behave so casually with their specimens.

The book's final section is short. It relates a series of anecdotes concerning disasters with snakes that happened to the author or some of his associates in years past. These incidents usually ended up with extremely unpleasant or even fatal consequences for the snakes involved. Covered in this section are a variety of poor management techniques including failing to quarantine specimens, simultaneously feeding more than one cohabiting specimen, failure to take precautions against overheating or improper use of water containers resulting in drowning, to name a few. Most of these unfortunate incidents involved boid snakes, but they are generally applicable to all serpents. I must commend the author's candor concerning the embarrassing and unpleasant consequences of those incidents. The book concludes with a list of regional and professional herpetological societies and a bibliography.

I believe any herpetoculturist interested in the care and maintenance of native U.S. and Canadian snakes will find this book to be a gold mine of useful information. It provides material that would be difficult to find in any other single source, and it uses an easy-to-find arrangement of material. The major criticisms I have about this book are directed more towards the publisher. The many color plates should have been larger. Also, this book would have benefited from more careful editing. The photos are typical of the type of postage stamp-like pictures seen in many other herp books published by Krieger. I would plead with Krieger Publishing to publish the photos in a somewhat larger format in the revised edition. Rossi's occasional lengthy phraseologies were at times amusing and sometimes a bit distracting. Better attention to editing by the publisher would have corrected this flaw. I do not totally agree with Dr. Rossi that captive breeding may be the only hope for the continued survival of many of these species (we must worry about their habitat and the maintenance of adequate wild populations, as well, or all is probably lost anyway). I also believe his attitude toward the release of captives back into the wild needs more parameter refinements. I still think almost any herpetoculturist interested in snakes will find this book valuable. I am looking forward to seeing Volume II (co-authored with Roxanne Rossi) on western North American snakes, which should appear within the next year.



THE VIVARIUM MAILBAG

Dear AFH,

I live in Sweden and am writing to you about my country's regulations for reptiles. Here in Sweden, we have a total ban on the importation of reptiles, except for zoos, universities and for research facilities. This took effect beginning in 1971.

The result of this oppressive legislation is a large illegal market, with at least 10,000 to 15,000 reptiles and amphibians smuggled into Sweden every year. Ninety-five percent of the animals are wild-caught. They typically arrive in terrible condition, usually having originated from large pet wholesalers. Most of these animals soon die.

I know what I am talking about because I have actively sought to purchase reptiles, and I've seen what it's all about with my own eyes. The profits in this reptile blackmarket are huge. For example, a common red-eared slider (*Trachemys scripta elegans*) can cost more than \$100 each in Stockholm. Ten times this amount is not uncommon for more valuable reptiles. One of the biggest problems with this system is that the government can't tell the difference between illegal wild-caught, foreign captive-bred and domestically captive-bred reptiles.

The government wildlife officials are typically bureaucrats. They don't think that people in other countries commonly keep reptiles as pets because they haven't read about it. One result of the gestapo-like mentality of these government bureaucrats is that most hobbyists are even afraid to take a specimen which needs treatment to a vet for fear of being turned in. Thus, few can get any veterinary care for their reptiles.

Like most of my countrymen, I am against commercial collecting of wild reptiles, but I am just as strongly for the importation of healthy, captive-bred reptiles. I am now working to try to get the responsible authorities to allow the importation of captive-bred reptiles. Ironically, this would shut down the illegal trade in wild-caught specimens. No one in Sweden wants sick, stressed-out wild-caught animals. They want nice neonates or juveniles from bonafide breeders.

The people that smuggle reptiles in large numbers do so only for the money. They do not care about the animals.

For Europe anyway, Sweden must be the number one country for "how not to make responsible wildlife laws." Despite the aggressive authorities, the trade with these wild-caught reptiles is not stopping. In fact, I think that it is increasing instead.

Swedish people are not ignorant. They know that people elsewhere in Europe are allowed to have reptiles. There are many people in Sweden that have herpetoculture as a hobby. It is good and interesting work. Unfortunately, Sweden is an ex-

ample of what happens when you try to stop people from doing harmless things which they wish to do. As a result, otherwise entirely honest people are forced to break the law to experience a little bit of nature. Good management of specimens cannot be increased because people are worried to talk to other people. Specimens that need vet care or even testing for internal parasites cannot get it as people are afraid to go to the vet. That increases the number of unhealthy reptiles in the country.

My favorite reptile is the boa constrictor (*Boa constrictor*). Because they are one of the very few reptiles which are captive-bred in Sweden, they are not smuggled in. While this is nice, all the specimens here are very inbred.

There are 8 1/2 million people living in Sweden. We are literate and reasonably intelligent. Why can't we get the government to do something to stop this large illegal trade in sick, wild-caught reptiles and instead permit the legal importation of legally captive-bred reptiles from other countries? What has happened to freedom, common sense and knowledge in Sweden?

Is it possible that AFH members could write the Swedish government to first, voice their complaint about these unjust laws and second, to explain that large numbers of reptiles are in fact legally captive-bred in the United States, Canada and in Western and Eastern Europe. Also, could you attest to the positive qualities of herpetoculture, its actual widespread existence and conservation ethic. Perhaps, if

breeders only would also send their pricelists of **captive-bred** herps to this agency with a note that the parents of all specimens were legally obtained and the reptiles themselves are entirely captive-bred, that would also help to make these officials open their eyes. The Swedish government needs to understand that both conservation in the wild and captive breeding should be equally supported and encouraged. Swedes wish to import legal, non-endangered captive-bred reptiles. The responsible department that you can write to is:

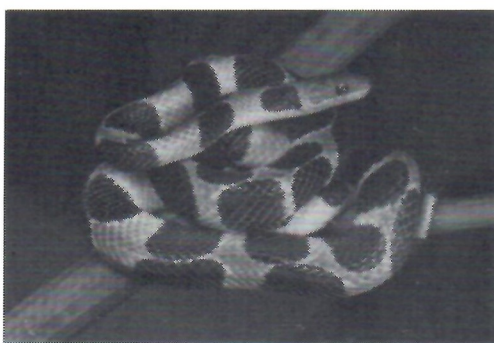
General-direktör
Svante Englund
Statens Jordbruksverk
551 82 JÖNKÖPING
SWEDEN

(Name withheld at writer's request)
Stockholm, Sweden

[Editor's note: Assuming that all your facts are accurate, it is indeed very sad that a country so internationally respected for both its fairness and freedoms would take such a stance on herpetoculture. Readers are encouraged to write respectfully to the Swedish authorities encouraging a re-evaluation of their policies.]



Tropidophis semicinctus Gundlach and Peters, 1865



74 *Tropidophis semicinctus*

Photo by Vlad T. Jiroušek

Type-locality: Cuba.

Synonyms: 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 Mandito, Sorra; 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 *Amblystoma*.

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).

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Lampropeltis g. californiae



TARAHUMARA MOUNTAIN KINGSSNAKE
Lampropeltis p. knoblochi

OTHER SPECIES AVAILABLE

RETICULATED GILA MONSTERS *Heloderma s. suspectum*
ALBINO BALL PYTHONS *Python regius*
HETEROZYGOUS ALBINO BALL PYTHONS *Python regius*
CENTRAL BAJA ROSY BOAS (SAN FELIPE) *Lichanura t. myriolepis*

CALIFORNIA DESERT ROSY BOAS *Lichanura t. gracia*
SAN GABRIEL MOUNTAIN ROSY BOAS *Lichanura t. roseofusca*
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A Herpetoculturist's Guide to Feces and Fecal Parasite Examinations

by

Kevin M. Wright, D.V.M.

The eye may be the window to the human soul, but fecal matter is the window to the internal milieu of amphibians and reptiles. Gastrointestinal parasitism is one of the leading causes of poor condition and outright disease in captive herps. This is especially true for wild-caught animals, although any herp, even a captive-bred animal, may have an intestinal infestation if it was housed in a manner that exposed it to parasites. Given the vast spectrum of parasites, it is prudent for all new herps to have fecal parasite examinations during the quarantine period so that these infections can be detected and eliminated. It is imperative that any animal displaying signs of illness have a fecal exam since parasitism can cause a host of nonspecific signs. It is highly recommended that all animals in a collection be routinely screened for internal parasites to ensure that no parasite slipped through the quarantine process.

It is most practical for a herpetoculturist to work out an arrangement with a competent, experienced herptile veterinarian, veterinary technician, or veterinary parasitologist, for fecal parasite exams. The high cost of a quality microscope as well as the laboratory equipment, and special stains that are needed for detecting an organism such as *Cryptosporidia*, are impractical for most herpetoculturists. Furthermore, although some parasites are easy to identify, others are likely to be overlooked by anyone who is not routinely used to performing and evaluating these exams for reptiles and amphibians.

All herp fecals should be screened for *Cryptosporidia*, amoebas, ciliates, flagellates, and metazoan parasites. Appropriate therapeutic regimes and hygiene should be instituted if a pathogenic (or potentially pathogenic) organism is detected. Of course, all findings should be interpreted with regard to the species of the actual host animal. For example, water turtles are unlikely to be negatively affected by amoeboid organisms, and thus finding an amoebic cyst in a slider (*Trachemys*) or map turtle (*Gratemys*) fecal is not necessarily cause for alarm. Most amphibians carry a moderate to heavy load of flagellate and ciliate organisms as commensals (non-damaging to the host organism), but a ball python (*Python regius*) fecal with a similar flora would indicate that the snake is in immediate need of veterinary attention. Also, one or two fecal parasite exams should

be performed three to four weeks after the last treatment to determine if the parasite was actually eliminated. Continued infection should cause the reevaluation of the pharmaceutical drug of choice as well as the husbandry practices of the herpetoculturist.

Any incoming reptile or amphibian introduced into your collection needs to be quarantined in a separate room from your established collection. Each quarantined herptile should have a **minimum** of three negative fecal parasite examinations, each no less than one week apart, before that reptile or amphibian is released from quarantine. Any animal new to a collection, even a captive-bred neonate, should be processed through this minimal quarantine protocol. More stringent quarantine protocols are suggested for wild-caught individuals, specimens that have come through the pet trade, or for herptiles that are showing signs of illness during the quarantine period.

Anorexia (excessive weight loss), regurgitation, lethargy (abnormal sluggishness), mucoid stools, bloody stools, watery stools, green urates, or mucoid urates, could be the result of gastrointestinal parasitism. Any reptile or amphibian displaying any of these signs should have a fecal parasite exam performed immediately, in conjunction with a thorough physical exam and preliminary case history work-up (anamnesis) by a competent veterinary practitioner familiar with herptiles. Detection of any parasites warrants appropriate medical therapy, again in the context of the clinical picture of that animal. Organisms that may be present in healthy herptiles, such as flagellates in amphibians, can show population blooms in stressed and ill animals. Although a cause and effect is not clearly defined at present, these organisms may exacerbate (make worse) the underlying disease of an animal, and medical treatment to eliminate the parasite is suggested.

Fecal parasite exams are still important for reptiles and amphibians that have been in a collection for a number of years and are not showing signs of ill health. Certain internal parasites (e.g., liver flukes) shed low numbers of ova at infrequent intervals, and thus the parasite can remain undetected without regular screening of the host animal's feces. Other parasites have quiescent (inactive) phases, and may not shed ova during this dormant stage. However, when the parasite is activated and continues its life cycle, a fecal exam will pick up this parasite. Dioecious (different sexed) parasites will not shed ova unless both sexes are present in a host animal. Fecal exams will typically only detect these parasite species in

the event that, at a later date, both sexes are present. Some parasites have a direct life cycle and can rapidly build up to very high numbers in just a few months. If these species of harmful parasites are undetected, the host animal can have a potentially fatal parasitic worm burden despite the negative fecal exam just a few months earlier. Another point to consider is the fact that it is quite possible that some parasites will develop resistance to the current stock of anthelmintic drugs designed to destroy parasitic worms of the intestine. This resistance may initially begin by an adult parasitic worm surviving the deworming process, but being unable to lay eggs for a period of time. Thus, it will initially appear that the therapeutic regimen was effective in eliminating that parasite. However, the few adult parasites that are still alive will, after a time, again start producing young. A suggested parasite screening program for an established collection has a semi-annual fecal parasite examination performed on every specimen in order to detect any of these problems before they have the potential to severely weaken or kill your animals.

The monetary investment of fecal examinations for internal parasites and appropriate therapeutics is negligible when compared to the cost of veterinary care for reptiles and amphibians following an outbreak of an explosive disease such as amoebic dysentery (amoebiasis). The cost for a single fecal exam is typically between \$9 and \$15. The cost of a collection is incalculable when one considers the intrinsic value of the animals as well as the time and effort that was needed to assemble and care for the herps. However, for those who insist on monetary values, I polled several of my friends for an estimate of their monetary investment in herps. The figures ranged from \$125 (for three adult cornsnakes) to breeders' collections worth several thousand dollars. The cost of fecal parasite exams for quarantined reptiles and amphibians, diagnostic evaluation of ill animals, and routine surveying of the established herps, is negligible when weighed against the intrinsic and monetary value of a collection. Preventive medicine is an investment to prevent future heartaches that can result from the introduction of an internal parasitic disease into a collection. As my rather eccentric history teacher once pontificated, "those who ignore sh*t are doomed to repeat it."



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Coming Events

March 5, 1994: 35th Annual Southern California Herpetologists' Herpfest will be held in San Diego, California. For info, contact: San Diego Herpetological Society, P.O. Box 4036, San Diego, CA 92164; ph. (619) 689-2582.

March 25-27, 1994: Desert Tortoise Council Nineteenth Annual Symposium will be held in Tucson, Arizona. For info, contact: Desert Tortoise Council, P.O. Box 1738, Palm Desert, CA 92261; ph. (619) 341-8449.

March 27, 1994: Reptile and Amphibian Showcase will be held in Cleveland, Ohio. For info, contact: Matt, Northern Ohio Association of Herpetologists; ph. (419) 433-3639.

April 2-3, 1994: Symposium on the Status and Conservation of Florida Turtles will be held in St. Petersburg, Florida. For info, contact: Gopher Tortoise Council c/o George Heinrich, P.O. Box 61301, St. Petersburg, FL 33784-1301.

April 8-10, 1994: Herpetology Weekend co-sponsored by the US Forest Service, Kentucky State Parks and Kentucky Dept. of Fish and Wildlife Resources will be held in Slade, Kentucky. For info, contact: Natural Bridge State Park, Slade, KY 40376; ph. (606) 663-2214 or (800) 325-1710 or contact: Stanton Ranger District, Stanton, KY 40380; ph. (606) 663-2852.

April 9, 1994: 17th Annual All Florida Herp Conference will be held in Gainesville, Florida. For info, contact: Dr. David Auth, Florida Museum of Natural History, University of Florida, Gainesville, FL 32611; ph. (904) 392-1721.

April 24, 1994: New York Metro Reptile Expo will be held in New Rochelle, New York at the Ramada Plaza Hotel. For info contact Bruce Lowder evenings at (914) 723-1424.

June 18, 1994: Northwestern Berks Herpetological Expo will be held in Hamburg, Pennsylvania. For info, contact: Troy Reppert, 848 Columbia Ave., Sinking Springs, PA 19608; ph. (215) 678-2616 or (215) 926-6028.

June 25-26, 1994: International Reptile Breeder's Convention will be held in San Diego, California. For info, contact: IRBA, P.O. Box 85152-279, San Diego, CA 92186; ph. (800) 497-3550; fax (619) 263-6898.

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

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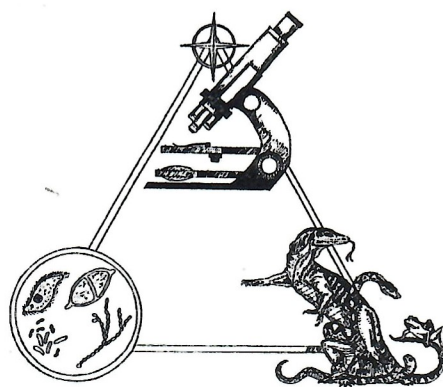
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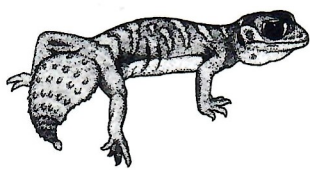


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Q. I have been photographing herps for several years, and I'm now trying to organize the piles of slides that have accumulated. What is the best storage system for photographic slides?

Atlanta, GA

A. As is the case with all good hobbies and interests, the activity of herpetoculture is multifaceted. Because of an original interest in herpetoculture, many keepers acquire experience and skills in what the outside observer might consider to be totally unrelated activities, such as carpentry, glass-cutting, electrical engineering, cricket-farming, rodent production, organic farming, international correspondence, travel, cement work, brick-laying, pond construction and book collecting, to name only a few. We've known keepers that, when first starting out, knew ABSOLUTELY NOTHING about electricity and a year later could tell us exactly how many watts each type of cage heater used and were able to repair a thermostat with a dull pocket knife. People with no apparent interest in carpentry have become interested in snakes, decided to build a cage, and, the next thing you know, they have a \$700 Craftsman® table saw in the garage, and they're building kitchen cabinets (these people have snakes in REALLY nice enclosures).

One of the most common ancillary activities generated by an active herpetocultural interest is photography. Photography is a wonderful means to document the present that, without photos or slides, someday would be only memories. Properly stored and treated, photos and

slides can last several human lifetimes. Photography is also a fairly objective means to describe animals; this is sometimes particularly important in light of some commercially inclined herpetoculturists' apparent inability to correctly see and properly describe any inadequacies of animals that they are trying to sell. Aspiring herpetological photographers should not neglect to photograph their friends. Ours is an interest that often lasts a lifetime, and it is the purest pleasure to look back at our lives. The experiences and the fun of each of those times is best remembered in the faces of the friends who shared those times.

The product physically generated by photography typically is either photographic negatives and prints, or photographic transparencies (usually referred to as slides.) Video tapes and digitally stored images on computer disks are also products of new photographic technologies that are becoming increasingly common. It doesn't take very much photography before any of these to begin to form piles, and each of these types of photography requires different forms of storage. But before any storage takes place, we have these two general comments.

The first is dispose of all the second rate poor photos that aren't what you wanted in the first place. If it's a slide, put it in the trash; if it's a video tape, then erase it and reuse it. It doesn't make any difference if it's your only picture of some rare animal if you can't actually see it in the photo. *[Marginal photos or slides can be custom processed. - Ed.]* Take all those really poor quality pictures that are too dark, too light, unfocused, or for any other reason unidentifiable, unwanted or incriminating, and **THROW THEM AWAY.**

Our second recommendation is to label every photo that you take. Sure, now you know everyone in that picture of the herp society picnic. What about 20 or 30 years from now? Several decades from now will your children even be able to identify you in the photo? Take time now to include as much information as possible with each photographic image. Especially identify the people or animals that are the object of the photo, even if it now seems obvious to you who or what's in the photo. Photography stores carry special pens and other equipment specially made for labeling each different type of photographic image. Nothing else can add more to the value and enjoyment of your photos in the future, both for you and for anyone who might come to inherit or use your photos/slides.

Now, in specific answer to your question about the storage of slides, we use two storage methods, each with strengths and weaknesses. The most common factors that shorten the life of slides are dust, moisture, light, and temperature extremes, so no matter what type of storage container is used to hold the slides, it's necessary to keep your slides in a dry and relatively cool place. Slide boxes provide the highest degree of archival preservation, and they are probably the least expensive and the most space-efficient of the various storage systems that are for sale in a good camera shop. A slide box is a long box that holds a stack of slides, usually constructed of metal or acid-free card-

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board. They are made in a variety of lengths, each to hold different numbers of slides. The weakness of using slide boxes is that the slides cannot be easily viewed without taking them out of the box and placing them on a light table, and one particular slide cannot be found without looking through an entire box. Without good organization, one can literally search through thousands of slides attempting to locate one particular slide. However, if you have outstanding indexing and organizational skills, slides are readily found in slide boxes.

The other method, and the one we employ, is slide sheets. These clear plastic sleeves are not nearly as good for the slides. The main advantage of this method is the ease with which the slides can be viewed, and, for that reason, this is the most common method used by most non-professional photographers and some commercial photographers to store slides. Slide sheets also make it easier to find a particular slide. Good archival quality slide sheets are clear pages of transparent polyethylene with either 20 or 36 pockets made to hold slides. These pages can then be placed in a three-ring binder (a standard school binder will hold a page of 20, but a special binder must be purchased to hold pages of 36,) or hung in a file cabinet drawer. With slide sheets, not only is it easier to look at the slides, but they are covered and protected from dust and fingerprints while they are being examined. On the down side, it's necessary that the pages of slides are stored in a relatively dark place. The flexible slide sheets can allow the slide mounts to become bent or bowed if they are not care-

fully handled. It's harder on the slides to be constantly removed and replaced from slide sheets, in the case that the slides are often used in slide shows. And it takes a lot of time to replace 80 slides from a carousel back into the slide sheets. Be careful to buy archival quality slide sheets; believe it or not, some other varieties actually are made of plastic with fumes that after several years will shorten the life of the color emulsions of the slides. Also, for those herpetoculturists that regularly do slide presentations, it may be better to have a duplicate set of slides made and use these for presentations and your originals for publications.

Individual photographers strongly favor one system or the other. For those that might be undecided, we would recommend slide boxes as the best way to go, particularly if your slides

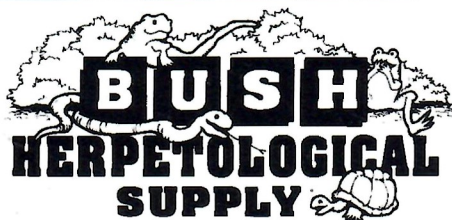
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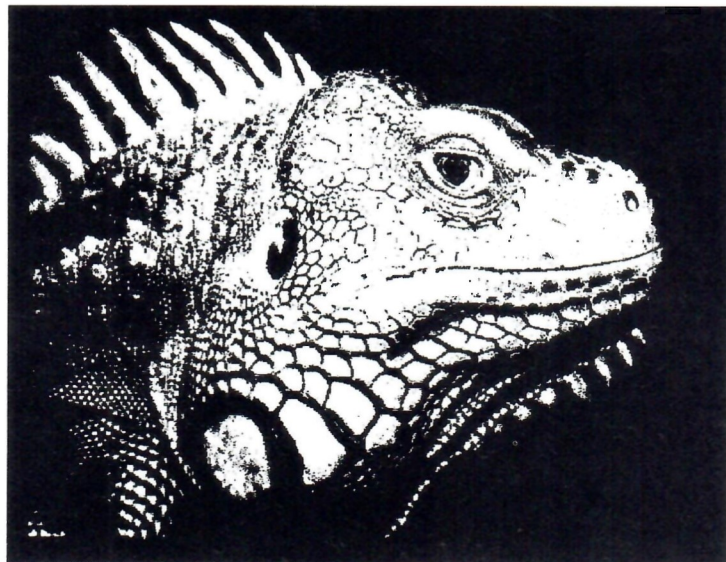
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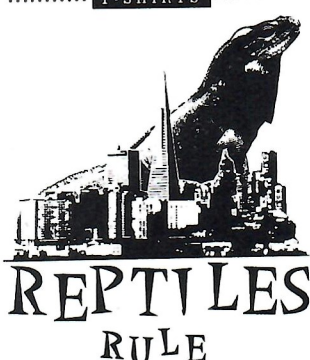
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can be divided up into categories, and each category assigned to a box.

Q. Which is better to feed to small snakes, subadult mice or pinkie rats?

Tucson, AZ

A. Assuming that the weight of the mouse is equal to the weight of a small juvenile (pink) rat, and that your snake will accept either equally, it's our opinion that, a steady diet of mice is better than a steady diet of pink rats. However, we've seen apparently healthy snakes that were raised and bred on a steady diet of pink rats. We're not aware of any studies that have ever been done actually comparing these two diets. But we know that small, juvenile rats have a higher percentage of fat and lower percentage of calcium than do adult mice, and the hair of adult mice adds some fiber and bulk to the stool of the snake and so it seems logical to us (based on very general principles of nutrition that may or may not have anything to do with the nutrition of snakes) that subadult mice are probably a better staple diet for long-term maintenance. There is no reason why a combination of the two food items couldn't be used. Pink rats are often used to bulk up a breeding female snake; fed in quantities, they'll put weight on a snake fast. Also, if you purchase your rodents, mice are usually cheaper.

Q. Why is it recommended that we give protein supplements to green iguanas?

Mundelindin, IL

A. This is a question posed by Stephen L. Barten, D.V.M. in his "Ask the Vet" column in the December 1993 issue of "The League of Florida Herpetological Societies." We mention it here because of the strong interests of many, *The Vivarium* readers in keeping green iguanas (*Iguana iguana*). Dr. Barten correctly points out that natural history studies of green iguanas indicate that these lizards are folivores (vegetarians that eat primarily leaves) throughout their lives. There is little known from the natural history of wild green iguanas that would indicate that their diet in captivity needs to be supplemented with animal protein. Only one study we know of documented a single wild

juvenile green iguana attempting to take an insect. In spite of this, the published diets for captive green iguanas, while basically vegetarian, typically recommend that 5% of the adult iguana diet and 15% of the hatchling diet be supplemented with animal protein, such as insects, dog food or cooked chicken.

Dr. Barten speculates that protein supplements were originally added to green iguana diets in an attempt to correct growth problems of young animals that were actually a result of a poor understanding of the need for sufficient heat and sunlight. He further states that "dietary protein continues to be recommended in most publications because it has "always" been recommended to do so." Dr. Barten does not imply that there are deleterious effects from the supplemental protein; rather, he is questioning whether or not green iguanas derive any nutritional advantage from this supplement.

We do not know the answer to Dr. Barten's question, but we found it thought-provoking with far-reaching implications about all herbivorous lizard diets. We can say that we have seen healthy, rapidly growing, captive green iguanas that were fed a strict vegetarian diet from the moment they were hatched. Based on the published diet of wild green iguanas of all ages, perhaps we should reexamine the total animal protein intake of captive green iguanas. As pointed out by Dr. Barten, domestic vegetarian species of mammals such as rabbits, horses and cattle live long happy lives without animal protein supplements, other than that rendered into their commercial feed.

On the other hand, if the addition of animal protein to the diet does increase growth rates and can correct small growth problems without creating other metabolic problems, then current dietary recommendations are justified. Based on the tens of thousands of green iguanas that have been raised on protein-supplemented diets, it certainly doesn't seem likely that protein supplements in the recommended amounts are a problem — perhaps that is the most conservative action. It would be nice to have some comparative studies done. [The editor knows of only one study which was undertaken by the Center for Reproductive Studies (CRS) at the San Diego Zoo, CA. Lizards from all groups grew well and reproduced. The only detrimental effect was a suspected shorter life span for those fed the all meat diet with vitamin/mineral supplementation. - Ed.]

Also, it might be interesting to obtain more anecdotal accounts from individuals observing wild green iguanas in tropical America or on Oahu, Hawaii to see, in fact, if there is important data that has been missed by most researchers. Any such reports of feeding on live invertebrates or vertebrates or scavenging animal matter observed with wild green iguanas could be presented as letters to the editor of *The Vivarium* magazine.



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Acknowledgments

The author would like to thank the following individuals: Vince Roth, former director of the Southwestern Research Station for his patience in answering my countless questions when I first became interested in these snakes in the late 1970s. Ron Garthwaite has had the often thankless (or should I say fruitless) job of going on several trips with me looking for these difficult-to-find animals. Much of the information presented is based on information originally gleaned from Frank Retes of Tucson, Arizona. In the late 1970s and early 1980s, Frank had to endure a barrage of questions which gave me a better understanding of the natural history of these snakes. Appreciation is also extended to Doug Brown, Barney Tomberlin, and Mildred Cludd for their initial review of this article. Finally, I would like to thank my wife, Eunice, and my oldest son, Gern, for their support and active involvement with this management and breeding program.

Literature Cited

Applegate, R. 1986. Problems with a commercial colubrid breeding program. In R.L. Gray (ed.), Proceedings of the NCHS and BAARS 1985 Conference on Captive Propagation and Husbandry of Reptiles and Amphibians, pp. 97-106. NCHS, Davis, CA.

Applegate, R. 1989. Captive breeding of the Durango mountain kingsnake (*Lampropeltis mexicana greeri*) and the Arizona mountain kingsnake (*Lampropeltis pyromelana*). In R. Gowen (ed.), Symposium Proceedings of the NCHS 1987 Conference on Captive Propagation and Husbandry in Reptiles and Amphibians, pp. 87-95. NCHS, Davis, CA.

Cranston, T. 1991. Notes on the natural history, husbandry, and breeding of the gray-banded kingsnake (*Lampropeltis alterna*). The Vivarium, 3(2): 7-10.

Cranston, T. 1986. Thermal gradients in the Herpatat® modular cage. NCHS Newsletter: 5(1): 6-10.

Merker, G. and R. Mackin. 1989. Herpatat® modular cages: Innovative snake housing. In R. Gowen (ed.), Symposium Proceedings of the NCHS Conference on Captive Propagation and Husbandry in Reptiles and Amphibians, pp.137-145. NCHS, Davis, CA.

Shaw, C. E. and S. Campbell. 1974. Snakes of the American West. Alfred A. Knopf, New York. 332 pp.

Stebbins, R. 1954. Amphibians and Reptiles of Western North America. McGraw-Hill Book Co., Inc., New York. 537 pp.

Stebbins, R. 1985. A Field Guide to Western Reptiles and Amphibians. 2nd ed., revised. Houghton Mifflin Co., Boston. 339 pp.

Wright, A. H. and A. A. Wright. 1957. Handbook of Snakes of the United States. Cornell University Press, Ithaca, NY. 1105 pp.



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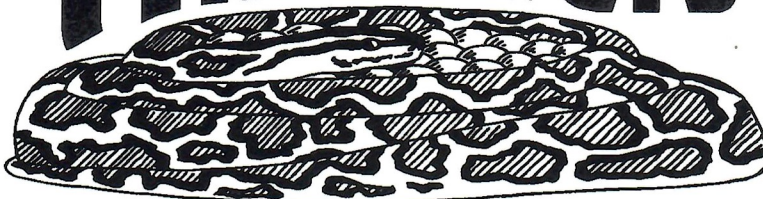
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Anurans - Continued from page 21

off on our night hike, accompanied by a local guide. Checking the foliage alongside a stream feeding into the main river, we found a beautiful lime green and brown specimen of *Rana palmipes*. We proceeded along the trail which gradually took us into a hilly area with steeper terrain. The forest type changed abruptly from secondary forest to primary forest, with amazingly tall trees and less undergrowth.

Finally, we reached an area where some large trees had recently been felled. Many of the epiphytic plants such as bromeliads and orchids still clung to the branches of these fallen trees. We decided to take advantage of this situation and began to search through

these bromeliads for anurans. We quickly found a frog (*Osteocephalus taurinus*) in the axle of a large plant. Searching through several other smaller bromeliads yielded two dart-poison frogs (*Dendrobates ventrimaculatus*) discovered together in the same bromeliad axle. Because dendrobatids are a personal favorite, this was the high point of the trip for me. These particular dendrobatids belong to the *D. quinquevittatus* species-group. At one time, it was believed that the many differently colored and patterned frogs within this group were all one species. More recently, however, this group has been broken into a number of different species, with further separations of the species likely in the future. The key differentiation factors between species have been in skin toxins, behavior and call.

The next morning we found another dart-poison frog, noticeably larger than the other two. In addition to having the yellow and black coloration of the first two frogs, this one had beautiful red stripes that spanned almost the length of its body. This frog is also a member of the *D. quinquevittatus* group and is currently being assigned to a new species.

Later that morning, a dark snake slithered past the group at what seemed like a blurring speed. After a considerable chase, it was later captured and identified as *Chironius fuscus*. A small side-necked river turtle, *Podocnemis sextuberculata* was captured in a nearby, slow moving stream. A rainbow boa (*Epicrates cenchria*) was also seen in a palm-swamp area. Then, far too soon, the adventure was over.

We reboarded the boat to begin the return trip to Iquitos. Once in Iquitos, we walked to a small bar along the banks of the Amazon to get a drink and toast an incredible trip. We had seen so many interesting animals and had experienced quite a bit. Bill Lamar had been an excellent expedition leader who, along with our local guides, had helped us to have a productive and memorable experience in the Peruvian Amazon. Daryn Baker, Marcuss Collins and I would like to thank Bill Lamar and Green Tracks in Tyler, Texas for the incredible trip they provided. In total, we had encountered 76 species of herptiles over the course of the entire journey.



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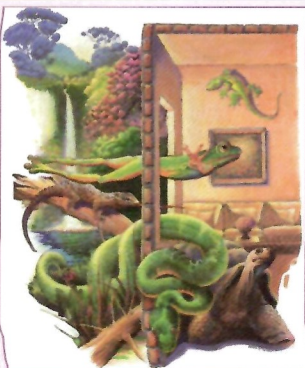
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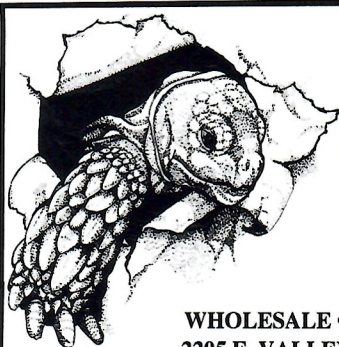
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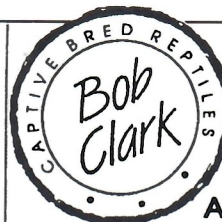


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