

THE VIVARIUM

American Federation of Herpetoculturists Vol. 6 No. 5

\$5.00

Captive Care and Propagation of the California Kingsnake
Notes From a Herpetological Field Trip to New Caledonia
The Mechanics of Python Reproduction

Galapagos Islands—Darwin's Legacy

Giant Salamanders



HERPTIVITE™

Premium Quality Multivitamins for Healthy Exotics.



Photo by Dante Fenolio

ATTENTION DEALERS...

Fax or Mail your business card for free shelf talkers and product support!



Rep-Cal®

Quality Nutrition for Reptiles

Rep-Cal Research Labs
P.O. Box 727
Los Gatos, CA 95031
Phone: 408-356-4289
Fax: 408-356-3687

All-Natural source ingredients...

Nothing artificial.



No Vitamin A toxicity...

The FIRST Reptile Supplement that exclusively uses Beta Carotene, a unique anti-oxidant that is *naturally converted* into Vitamin A by reptiles, thus preventing the threat of toxicity inherent with other supplements.



Nutritional Sea Vegetation Base...

Provides a rich, natural source of essential trace elements and minerals (unlike other reptile vitamins which utilize non-nutrient bases and fillers).



Natural Color Enhancement...

Beta Carotene maximizes the color potential in your reptiles.



Unique...

No other reptile vitamin available today compares to the *quality, comprehensive capabilities and overall nutritional value* of Herptivite.

STAFF

Founder and President

Philippe de Vosjoli

Publisher

American Federation of Herpetoculturists

Managing Editor

Sean McKeown

Assistant Editor

Robert G. Sprackland

Publication Manager

Bridget M. Pilcher

Photo Editor

Philippe de Vosjoli

Graphic Design and Production Assistant

Andrew J. Mansker

Advertising

Peggy Lee Dillon

Andrew J. Mansker

CONTRIBUTING WRITERS

Allison Alberts, Ph.D.

Kevin Wright, D.V.M.

Dave and Tracy Barker

Winston Card

Ellin Beltz

Dante Fenolio

Randall L. Gray

Doug Mader, D.V.M.

David Perlowin

Roy Pinney

William B. Love

Thurgess Cranston

COPY EDITORS

Bob Davignon

Randall L. Gray

Wendy McKeown

AFH ADMINISTRATIVE STAFF

Nancy Alema

Peggy Lee Dillon

OFFICERS

Legislative Action Coordinator

Gaylon Holmes

Legislative Representatives

Louis B. de Armas

Ken Foote

Glen 'Jake' Jacobsen

Julie Layton

Richard Strieber

BOARD OF DIRECTORS

Philippe de Vosjoli, President

Jeff Nunan, Vice President

Bridget M. Pilcher, Treasurer

David Perlowin, Secretary

Dan McCarron, Education Coordinator

Tracy Barker, Member at Large

Manufactured and Printed
in the United States of America.

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

Copyright 1995 by the AFH, P.O. Box 300067, Escondido, CA 92030. All rights reserved. No parts of this publication may be reprinted without the written permission of the AFH.

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

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

On The Cover: Alcedo Volcano Galapagos tortoise (*Geochelone nigra vandenburghi*) on location. Photo by Liza Marie Wallner.

FEATURES

- Notes from a herpetological field trip to New Caledonia (Part I)
Account from the Daily Journals of
Philippe de Vosjoli and Frank Fast 4
by Philippe de Vosjoli

- The Charles Darwin's Research Station:
Darwin's Legacy 26
by Liza Marie Wallner

- Captive Care and Propagation of
California Kingsnakes (*Lampropeltis getula californiae*) 50
by Thurgess Cranston and Erik Loza

COLUMNS

- HERPETOLOGICAL MEDICINE
It's Not a Tumor! 8
by Kevin M. Wright, D.V.M.

- THROUGH THE EYE OF THE AMPHIBIAN:
Giant Salamanders 18
by Dante Fenolio and Michael Ready

- Q & A COLUMN:
Ask the Experts 24
by Winston Card

- PYTHONS & BOAS:
The Mechanics of Python Reproduction 30
by Dave and Tracy Barker

- HERP HORIZONS:
Bits & Pieces 34
by William B. Love



DEPARTMENTS

- HERP NEWS FROM AROUND THE WORLD — by Ellin Beltz 10
AFH BUSINESS 44
COMING EVENTS 45
CLASSIFIEDS 46
ADVERTISERS INDEX 47

Mission Statement of the American Federation of Herpetoculturists

The American Federation of Herpetoculturists (AFH) is a nonprofit national organization whose purpose is to represent the interests of herpetoculturists, those involved in the captive husbandry and propagation of amphibians and reptiles, through the dissemination of essential information to individuals, societies and institutions; to document the accomplishments in herpetoculture through our official publication, *The Vivarium*; to promote responsible herpetoculture through education and legislative action; and to establish a general philosophy of herpetocultural education that could contribute to the conservation of biological diversity.

Notes from a herpetological field trip to New Caledonia, part one:

Account from the Daily Journals of Philippe de Vosjoli and Frank Fast

by
Philippe de Vosjoli

Introduction

For nearly a year Frank Fast and I had been planning our field trip to New Caledonia to gather ecological data on the endemic geckos, notably *Rhacodactylus*



An offshore island form of the giant New Caledonian gecko (*Rhacodactylus leachianus*) on a tree species where it is commonly found. Even though this was photographed during the day, the camouflage pattern of these lizards can be appreciated.



Forest of some of the offshore islets of New Caledonia are dense and difficult to explore at night.

leachianus, the largest living species of gecko, *R. chahoua*, and *R. trachyrhynchus*, the latter one of the few live-bearing geckos in the world. At the onset of such a collecting trip we tried to keep our minds open to the thought that the best laid plans could be tossed aside, either on the basis of a whim or (more likely) on the basis of new information that would probably confront us in the course of our expedition. Indeed, one of the exciting aspects of such trips is how little about them can be predicted. In more ways than one, we go on these expeditions guided by impulse, intuition, and a sense of high adventure.

This account is divided into two parts; Part One is based on entries from our field journals. We felt that they would be valuable to herpetoculturists and amateur herpetologists, particularly in conveying a sense of what this type of herpetological expedition can be like. Also, we felt that these notes from our journals would provide a human dimension that is often missing from scientific notes, thus, we hope, dispelling some of the illusions that members of the public sometimes have about these expeditions. We think our accounts present a story worth reading—with adventure, risk, and the thrill of discovery.

The second part, which is scheduled to appear in the next issue of *The Vivarium*, contains our notes on the ecology of *Rhacodactylus* and information about their husbandry and propagation in captivity.

Accounts from daily journals

Note: This account is a compilation of our daily journal notes and is presented with minimal editing.

November 18: Nouméa, New Caledonia

We arrived last night after 24 hours of travelling and sitting in airports. It is still raining. Outside the back door of the dormitory at the Youth Hostel in Nouméa, the introduced African giant land snails are frolicking about on the lawn. As we will confirm later, these snails tend to be shameless when it rains, being overtaken by a mating frenzy. From our room we have a beautiful view of Nouméa and the ocean. Frank informs me that I have a snore that could wake the dead and a wheeze that sounds as if I may have joined the dying. I inform him that my sinuses are so congested that I can't breathe through my nose. I'm also starting to worry about how this condition may affect any future roommates.

We have breakfast and then proceed to call ORSTOM, the scientific research sta-

tion for the island. We must meet with the director of zoological research in order to obtain information on New Caledonian reptiles and to get approval for the required collecting permits. Frank has been corresponding with this office and with the *Parks et Reserves* department for the past five years. The Director of Zoological Research turns out to be a most gracious individual, willing to help and goes out of his way to provide us with useful information. We talk about issues involving the conservation of the New Caledonian giant geckos. This is a difficult subject. There really is not enough data on the current status of the populations, and I am skeptical that the relatively small numbers allowed to be collected annually could have a significant impact on the wild populations. We do agree, however, that the slow maturity rate and relatively low reproductive rate (at least with *R. leachianus* and *R. trachyrhynchus*) make it imperative to monitor their populations and, above all, to limit collecting. How could the relatively

rangements to contact ORSTOM at the end of our field trips. We then have lunch—ham and cheese sandwiches and soda—an omen of what is to become an unavoidable and dreaded routine.

That afternoon we meet with the director of *Parks et Reserves*, he goes out of his way to help us. We once again talk about issues of conservation, economics, and human population growth. This man truly cares about the conservation of New Caledonian wildlife and impresses us with his knowledge of a wide variety of subjects. We are informed, however, that no permits will ever be granted for commercial exploitation of these animals; only for purposes of research. We are also told that policies are being modified to assure that no lizards can be taken out for commercial purposes under the guise of research. That night it rains again and we stay at the youth hostel. Two other people share our room. I still have sinus problems and subject everyone to an unwanted and tasteless concert.



The New Caledonian crested gecko (*Rhacodactylus ciliatus*). Although thought to be possibly extinct until recently, it is actually relatively common on the Isle of Pines. Most museum specimens of this gecko date from the nineteenth century.

small numbers collected to date compare to the impact of logging and deforestation? Frank and I aren't completely in agreement on this yet. I haven't been into the field, so I may be talking about something I don't know about.

In any case, we agree to provide ORSTOM with field data that we obtain in the course of our field trips. We have planned to obtain information on length measurements and weights, sex, temperatures, time collected, site collected, and height and type of vegetation where collected. The director of *Parks et Reserves* is called and informed that we will be coming by the office. We leave after making ar-

November 19: Yaté

We make a run to the Yaté area and go down the road to the Yaté dam. This is a beautiful spot. The ground is composed of a red lateritic soil that manages to get on everything. There are also dark red as well as black ultrabasic (containing iron and magnesium but little silica) rocks that provide a sharp contrast with the clay. Amid all this are all sorts of odd-looking plants. The flora of New Caledonia is too different for us to have much of a grasp on it, but here among the clay and rocks it seems otherworldly. We eventually come across an area in which, growing out of the red soil, we find



A species of *Bavayia* gecko from the Isle of Pines.



A long necked skink (*Leiolopisma nigrofasciolatum*) from a northern offshore islet.



Phoboscincus garnieri, one of two very rare species of large skinks that inhabit New Caledonia. This specimen was found on a northern offshore islet, out of the known range for this species. *Phoboscincus* are the longest of the New Caledonian lizards.



An orange and black banded sea snake (*Laticauda colubrina*) along the shores of another offshore islet.

carnivorous plants—pitcher plants, *Nepenthes vieillardii*, and a small sundew, *Drosera neocaledoniae*. We find no herps near the dam but some interesting skinks among rocks off the road that leads to the Yaté area. They promptly hide in crevices out of our reach. We think there is always a possibility that these may be undescribed, but this idea must remain a fantasy at this point. The weather is turning again, so any prospect of looking for *Rhacodactylus* in the tropical forest around Goro goes down the tubes. We drive back to Nouméa. We have pizza for dinner. We are definitely not on a

and we start scanning the trees for *Rhacodactylus* as I drive between 2 and 5 miles (3 and 8 km) per hour. This is one of the several methods useful for finding these geckos. I am worried about how people are going to react when they see a car with a spotlight driving through their neck of the woods. We spend a lot of time looking at trees and vegetation in our search for geckos but don't have much luck, even though *R. auriculatus* is supposed to be common here.

Around 10:00 p.m., Frank spots a gecko in a large tree on the right, on the other side



Another New Caledonian giant gecko photographed on location. On smaller islands where the vegetation is lower, this species is found closer to the ground than on the Isle of Pines or Grande Terre. Generally, a high degree of nighttime tree climbing skills is required for collection or close observation of this species.



The vegetation near Yaté, in combination with the maroon red earth, is otherworldly in appearance. Having a better grasp of the flora of New Caledonia was one of our goals.

health food kick. We are now five in the room at the youth hostel.

November 20: The Goro forest

The weather has improved and we go first to have lunch at one of the many renowned Nouméa beaches, where beautiful women supposedly sunbathe topless and in G-string bikini bottoms. (Let it be known that what they say about the beaches near Nouméa is absolutely true.) Later we drive two and a half hours to the primary forest around Goro, a favorite spot for herpetologists hoping to find *Rhacodactylus*. At dusk we have a ham and cheese sandwich on French bread, chocolate-filled croissants, and fresh lychees, which are absolutely delicious.

We pass time talking until dark, then get out the spotlight and flashlights. Frank sits on the hood of the car holding a powerful spotlight plugged into the car lighter socket,

of barbed wire. He puts on lineman's spikes and his rappelling gear and proceeds to climb the tree. I keep a strong flashlight on the tree as he is climbing so he can see, and he also has a headlamp on. Once in the area where the first branches fork off the main trunk, about 18–20 feet (5.5–6 m) from the ground, he looks up and sees a New Caledonian live-bearing gecko, *R. trachyrhynchus*, at the entrance of a hole, and at the next branch fork he also sees some *Bavayia*. Frank proceeds to climb to the next branch, and of course the geckos hide down inside the hollow branch, out of reach. He shines his light and sees a second *R. trachyrhynchus*. Frank manages to catch a couple of the *Bavayia* and then is thinking of ways to get the *R. trachyrhynchus* out. Unfortunately, a good portion of the tree has a hollow center; in fact, it is hollow all the way down to the base of the trunk. We note the position of the tree and make plans to



The New Caledonian crested gecko has highly developed color changing abilities, including this bright yellow-orange coloration. We were very excited about finding this species.

come back at another time. On the way back at around 11:00 p.m. Frank spots a male *R. auriculatus* at about 8 1/2 feet (2.6 m) from the ground on a branch or a fallen small tree. I keep a light on it and he successfully grabs it. We don't see another lizard for the rest of the night. Around midnight we decide to stop "spotting" trees and to head back, another two-hour drive. By the time we get to bed, it is past 2:30 in the morning and we are beat. We have to

meet with the director of *Parks et Reserves* at 8 a.m. We only get a few hours of sleep.

November 21: Change of plans

Little did we know that today would be a turning point of our trip. We are introduced by the director of *Parks et Reserves* to a biologist who has a live male specimen of *R. ciliatus* that she collected on the Isle of Pines. What's more, she is willing to give it to us! We are blown away. Here is a lizard that a year ago was thought to be so rare that rumor was that it could be extinct. This was one of the most amazing geckos we had ever seen. We talked for a while with this delightful woman, and obtained some information on where she had collected it. She told us that this species had been re-



A pitcher plant (*Nepenthes vieillardii*) near the Yaté dam. This species is quite variable, with pitchers ranging from solid red or solid yellow to red-mottled yellowish to green. Seeing *Nepenthes* in the wild was a great thrill.

cently found on the Isle of Pines and that the renowned herpetoculturists Wilhelm Henkel and Robert Seipp had collected several specimens earlier this year. We informed the director of *Parks et Reserves* that we might consider a trip to the Isle of Pines within the week. As things happened, we started talking as soon as we left his office and convinced each other that finding *R. ciliatus* was of the highest priority. We went to Air Caledonie and booked a flight for that afternoon. We went back to the department of *Parks et Reserves* to get information on possible contacts on the Isle of Pines. The director generously made available to us the use of his tent. We're on the four o'clock flight on the propeller plane to

Isle of Pines. Here our adventure really begins.

As soon as we arrive at the airport we are greeted by an agricultural technician, Charles, who tells us he was called to provide us with information and assistance during our stay. Charles is a very helpful person but he can speak only French, so I find myself acting as his translator. He drives us to the *gite* (probably best translated as "bungalow complex"), where we have managed to find a bungalow for the next three days. The owners of the 'gite' will also rent us a car. The first step is to obtain permission from the *grand chef* (chief) of the Isle of Pines to carry out research on lizards. Charles offers to talk to him and arrange an appointment for us. He also offers to show us a few forest trails on the following day that we may find useful for gaining access to various areas. He tells us of one trail close to the 'gite' that we can check out tonight. After settling into our bungalow and having a decent dinner, Frank finds some *Bavayia sauvaigi*, as well as house geckos, around the bungalow porch light. Around other porch lights he also finds *Lepidodactylus lugubris*. At 8:30 p.m. we head toward what we think is the northern forest, but we take a wrong turn and get lost, as we discover later, and end up in the forest to the east of the central mountain ridge. Backtracking, we decide to explore one of the trails off the road. We take out our high-power flashlights and enter the forest. Within the first half hour (9:15 p.m.), I spot a *Rhacodactylus* on a diagonal tree limb about 12 feet (3.6 m) above the ground. Frank climbs the tree and grabs it, a male *R. chahoua*. It is lacking a tail, but besides that, it is unusually large and absolutely beautiful, bright green with a red lichen-like pattern. This may be a first record of *R. chahoua* on the Isle of Pines. *R. chahoua* has proportionately some of the largest and most beautiful eyes of all the *Rhacodactylus*, and this specimen impresses both of us, even though up to this time, I have not been the greatest *R. chahoua* fan. We explore the forest around our gite on our way back with no success. We carefully note that we can't wander too far away from a trail or road. It is easy to get lost in a tropical forest at night. A section of forest illuminated on the way in by flashlight looks completely different on the way back and the visual references are minimal compared to the daytime.

November 22: Isle of Pines

We do a little morning exploring before having breakfast. At the edge of the forest



A new variant, or possible subspecies, of *Tropidoscincus variabilis* from the northern island which attains a larger size than specimens of this species collected to date.



Egg of a *Bavayia* in a termite-hollowed stump.



Herbie, the coconut crab (*Birgus latro*), shared our living quarters for nearly a week. Although he slept sound as a crab during the day, at night he would make a ruckus, escape, and proceed to climb the walls. We now have a new sense of crustacean intelligence.



A blue and black banded sea snake (*Laticauda laticauda*) hiding among shore-line rocks near a boat ramp in Kuto, Isle of Pines.

Continued on page 12

It's Not a Tumor!

by

Kevin M. Wright, D.V.M.

Infectious disease, a condition that can be transmitted from one organism to another, accounts for the majority of illnesses noted in captive amphibians and reptiles whereas disorders resulting from inappropriate diets probably comprise the next largest group of diseases. Other categories of diseases are uncommonly reported in herptiles. However, as both husbandry and the veterinary care of amphibians and reptiles have advanced in recent years, captive herptiles are experiencing increased life spans, with a corresponding increase in age-related non-



Figure 1. White-lipped treefrog (*Litoria infrafrenata*) with a fibroma (tumor of connective tissue) of its mandible. Photo by Kevin Wright.

infectious diseases, not transmittable from one organism to another (i.e., not caused by virus, bacteria, fungi, protozoa, or multicellular parasites). Certain noninfectious diseases such as tumors are reported with increasing frequency in the veterinary literature concerning amphibians and reptiles.

"It's not a tumor!" shouts Arnold Schwarzenegger when a cheeky preschooler suggests that his headache is probably due to a tumor. This scene in "Kindergarten Cop" is a reflection of the horror that this word generates in most people—people who equate the diagnosis of a tumor with a death sentence. In fact, the word "tumor" is used to refer to any abnormal mass that arises from the unusual spontaneous growth of any kind of tissue, and many types of tumors are not death sentences to their bearer. Neoplasm, a word that translates from its Latin roots as "new growth," is another word used for an abnormal mass. Both neoplasm and tu-

mor are general terms for a variety of conditions, some of which are serious illnesses known as "cancers." It is difficult, if not impossible, to tell if a tumor is cancerous without taking a biopsy (a sample of tissue from the affected organ or region) of the growth and having it evaluated by a pathologist. Until this is done most veterinarians prefer to avoid using a buzzword like "cancer" to describe a patient's problem.

Tumors are unwanted growths of tissue that in some cases cause little or no damage to the animal. These types of tumors are called "benign." The animals afflicted with a benign tumor generally does not require medical treatment unless the size and location of the abnormal growth somehow disrupts its quality of life. Dogs often develop a type of benign tumor of the fat cells known as a lipoma. A lipoma is a soft fleshy lump that can be palpated (felt) immediately underneath the skin. In most cases a lipoma does not need to be surgically removed, but in some instances the lipoma will develop on the chest in a place where the foreleg rubs the tumors. This unwanted mass may interfere with the dog's ability to walk normally, or the constant rubbing of the tumor may cause it to ulcerate and bleed. In either case, since the benign tumor is affecting the dog's quality of life, a veterinarian will often suggest surgery to remove the tumor. Benign tumors are occasionally noted in amphibians and reptiles. The optimum treatment is complete excision (removal) of the tumor, but this is not always possible. A white-lipped treefrog (*Litoria infrafrenata*) developed a firm flesh-colored growth on its lower jaw (see Figure 1). When the tumor affected the frog's ability to catch food, surgery was attempted to remove the growth. Unfortunately, the tumor was firmly attached to the bone and could not be completely removed (a process known as "debulking" since the tumor is reduced in size, but not excised). A biopsy of the tumor revealed it to be a benign growth of connective tissue known as a fibroma. Since the fibroma was not completely removed, over the course of several months, the tumor grew back and had to be debulked again. Many herptiles tolerate this type of surgery well, and are back to normal within hours to days of such a surgery. With such a condition the herpetoculturist must evaluate



Figure 3. The liver of this Eastern diamondback rattlesnake (*Crotalus adamanteus*) depicted in Figure 2 has already been infiltrated with tumor cells from the squamous cell carcinoma, a process known as metastasis. Photo by Virginia Piesce, VMD.

whether the quality of life lost between surgeries is outweighed by the experience of the surgery and recovery period.

In contrast to benign tumors are "malignant" tumors, tumors that are quite aggressive as they grow and invade and replace normal tissue. Malignant tumors directly interfere with normal bodily processes and are often termed "cancers." Cells from a malignant tumor may break off and be carried in the blood and lymph to other parts of the body. When the tumor cells grow at the new site, the process is known as "metastasis." One malignant tumor can metastasize and become hundreds of tumors, each one of which will grow and wreak havoc where it lies. Certain types of malignant tumors are especially prone to



Figure 2. An Eastern diamondback rattlesnake (*Crotalus adamanteus*) with a squamous cell carcinoma (malignant skin cancer). Photo by Virginia Piesce, VMD.

metastasize. The squamous cell carcinoma, a type of skin cancer, quite often has metastasized before it is diagnosed. A 6-ft (1.8 m) eastern diamondback rattlesnake (*Crotalus adamanteus*) was noted to have a brown crusted lesion on its ventral scales, but otherwise appeared to be in good health (see Figure 2). The biopsy revealed squamous cell carcinoma, and in a matter of weeks, the snake was dead. A necropsy determined that the cancer had already spread to the liver and had almost completely destroyed the liver at the time of death (see Figure 3).

Not every tumor is a death sentence for the herptile. Many benign tumors can be completely excised and never bother the patient again. Some types of malignant cancer can be diagnosed in time for surgery and medical therapy to significantly prolong the patient's life and perhaps cure the patient. And in some cases, tumors go away without explanation, a process termed spontaneous remission (an unexplained curing of the disease where the tumor disappears or lessens in severity without medical treatment).

Any unusual lump on or in a herptile should be evaluated. The vast majority of these will turn out to be abscesses or some other form of infectious disease, such as a parasitic cyst, and can be simply treated by excising the infected tissue and using antibiotics and anthelmintics (medications used to treat infections by nematodes, flukes, or tapeworms), if appropriate. However, if the mass is not obviously an abscess, or if the mass keeps recurring despite the antibiotic treatment, further diagnostic work such as a biopsy is recommended to determine exactly what is going on. Sometimes a tumor may not be obvious—vague signs such as inappetence and lethargy may be noted and only extensive diagnostic tests such as blood work and radiograph or ultrasound will reveal a tumor as the underlying cause. In either case, if a benign tumor is diagnosed, then surgery and other treatments might be an option. If a malignant tumor is diagnosed, further work should be done to determine if the tumor has spread before deciding what course of treatment is warranted.

One of the big hindrances to the developing field of treating tumors in reptiles and amphibians is the fact that the therapy required can be quite expensive when compared to the absolute monetary value of the patient. This has discouraged many herpetoculturists from pursuing treatment for the animal diagnosed (or even suspected) of having a tumor. Of course, it is

a relatively recent phenomenon for herptiles to be brought to veterinarians at all, so in that context, it is encouraging. As herptiles become more enmeshed in the life of the "normal" person (that same person who has a deep attachment to a cat or a dog while growing up, and for whatever reason now has a pet green iguana, ball python, or red-footed tortoise), the veterinary profession will find itself in the position of being able to offer appropriate treatments for the tumorous herptile without as much flinching by the client about the cost. Of course the large-scale herptile

rancher will have to respond in a strict economical fashion to most specimens with a diagnosis of cancer. Most will not have the time nor money to subsidize an unproductive animal (one of the ethical decisions to think about before embarking on such a venture). However, the faithful pet green iguana that has grown up with the kids will undoubtedly receive "pampered pet privileges" should it develop a tumor—at least, I hope so.



PEARLCO

CERAMIC HEATING ELEMENT

- Emits NO Light
- Natural "SUN-LIKE" Heat
- Easily Absorbed
- Resists water splashes
- Designed for animals only
- Long life - Up to 10,000 Hrs.
- Can be used with 250w lampholder & reflector
- Improves health-lowers stress
- 60w- 100w-150w-250w Sizes

The Leader in Infrared Ceramic Heating for Animals

*Cone shape design - Vast improvement over dated "toadstool" shape
The Choice of Professionals for Reptiles - Birds - Mammals - Livestock*



NEW from RAM Network

"The HOOD" (\$159.95)

A Revolutionary NEW Infrared Heat and Fluorescent Lighting Unit for Reptiles!

FEATURING: The ENERJOY RADIANT HEAT MODULE™ SSHC

- WILL NOT Burn You or Your Animal • Emits NO Light
- Natural "Sun Like" Infrared Heat
- Creates a perfect heat gradient • Heat module is GUARANTEED 5 Years
- Constructed in Brushed Stainless Steel
- Built - In 18" full spectrum light fixture
- Separate switches for module and light
- On / Off indicator light on module
- Fits 2 ft. X 1 ft. tank with full screen top

DEALER INQUIRIES WELCOME!



RAM NETWORK

6860 Canby Avenue, #115 • Reseda, California 91335

Tel: 818-345-0484 • Fax: 818-345-3324

HERP NEWS FROM AROUND THE WORLD

by
Ellin Beltz

IT'S A WEIRD, WEIRD WORLD WE LIVE IN

• A 22-year veteran of the U.S. Postal Service was arrested and charged with theft after undelivered mail and 88 live and dead birds and turtles were found in his condo in Washington, D.C. [*USA Today*, October 19, 1994 from David A. Webb]

• Government agencies and wildlife agencies are supporting toad hunting in northeastern Australia in an attempt to control the cane toad, an introduced species. *Bufo marinus* was deliberately imported to the island continent in 1935 in an effort to rid sugar cane fields of the grayback cane beetle. The toads generally ignored the beetle and reproduced wildly in the absence of predators. The skin toxins produced by these toads can kill native mammals and birds as well as dogs foolish enough to try to eat one. [*San Francisco Chronicle*, October 22, 1994 from Matthew & Laurie Aikawa]

• An elaborate ceremony was held near the South Korean port of Pusan in an effort to appease "guardian dragon deities of the oceans." What had happened was that two sea turtles were captured in fishing nets about three months previously. They were held in captivity and it was believed that their captivity led to three months of drought and poor fishing. The Buddhists gave the marine chelonians an elaborate ceremony and a maritime police patrol boat carried the turtles back to the open ocean where they were released. [*San Francisco Chronicle*, October 1, 1994 from Matthew & Laurie Aikawa]

• "When I hear that someone's been eaten by a crocodile or shark, I just get all gooeey," said rocker Tori Amos as quoted in *Rolling Stone*. She added, "If I had to get tortured by a human being or eaten by a crocodile, I'd take the croc any day . . . The reason is that it's not personal. You were lunch." [*Tacoma, WA News Tribune*, November 4, 1994 from Marty Marcus]

• A multi-millionaire and wife were robbed at gunpoint last year on the French Riviera of \$10 million worth of goods (honestly, I'm not making this up) including jewelry and an alligator purse, allegedly worth \$10,000. A sharp local police officer saw the purse while checking a parked car. Authorities captured the perpetrators. [*The Toronto Star*, November 30, 1994 from Captain Wes von Papineau]

• A cross-country foot race for all-female running teams was canceled after the lead runner saw a southern Pacific rattlesnake laying in the course at the Malibu Creek State Park, CA. [*The Kingston Whig-Standard*, September 26, 1994 from Captain Wes von Papineau]

• A 7-inch-long two-headed grass snake was found in a compost heap in Winchelsea, East Sussex, England. Named "Four-eyes," it was taken to the Living World Centre at Exceat, near Alfriston. A senior keeper at the London Zoo's reptile house said, "It is unusual . . . for a snake to be born with two heads . . . If both heads can feed, then it may survive, but there are usually complications." [*International Express*, London, September 21-27, 1994 from Captain Wes von Papineau]

• Reuter's reports that workers who were building a school near Beijing, China discovered more than 300 three-legged frogs in a pit. The cause of the deformity was unknown according to the Xinhua, the official Chinese news agency. [*Salt Lake Tribune*, September 17, 1994 from David A. Webb]

• The "hanging judge" of the Philippines, Maximiano Asuncion is reported by *Agence France-Presse* to have said "that people convicted of capital crimes should be obliged to wrestle with cobras inside an aquarium open to public gaze." [*The Toronto Globe & Mail*, September 20, 1994 from Captain Wes von Papineau]

• From a letter to the Metropolitan Diary column in *The New York Times*: "... I find the urban street peddling of miniature live turtles to be an offense against nature. New York University students can be seen walking down the street carrying little plastic 'turtle houses' or, worse yet, plastic bags containing live turtles. However, I had to smile at the conversation I overheard between a potential customer and turtle vendor. Customer, peering into a bowl of swimming turtles: 'What is it?' Vendor: 'Nice turtle, good pet! Only needs water and a little food. Good pet!' Customer: 'What kind of batteries do they use?'" [from P. L. Beltz, November 22, 1994]

REMOVED, LOST, STOLEN, STRAYED, OR FOUND

• Neighbors of the Tanks Alot pet shop in North Las Vegas, Nevada blame the shop for a 3-foot python they found coiled in the toilet one morning. The owner of the nearby wood shop said, "We had to remove the toilet off its base because [the snake] balled up . . ." They claim this is not the first snake to have slithered away from the pet shop. The owner of the pet store says that the whole thing is the latest round in a long-standing feud between the two stores. He suggests the wood merchants are buying the snakes and then "finding" them in their shop. The owner of the wood shop said, "If I was going to do something, I would flatten his tires, I'm not ridiculous." Animal control took the animal and is waiting for someone to claim it. [*Las Vegas Review-Journal*, September 9, 1994 from Bob Pierson]

• The U.S. National Park Service spent many thousands of taxpayer dollars in what has been called the "Great Snake Bust." In a highly controversial sting operation, 27 people from Texas to Florida were nabbed by federal agents posing as amateur herpetologists and would-be buyers. Unaware that gray-banded kingsnakes eat lizards and not rats, one of our nation's top news magazines bought into the USFWS accusations hook, line, and sinker. They reported that the effects of the wild snake poaching in the Big Bend National Park included a plague of rats, which have apparently bred wildly in the absence of ophidian predators. [*Time Magazine*, August 22, 1994 from Captain Wes von Papineau]

• Keepers at Louisiana Purchase Gardens and Zoo in Bastrop, Louisiana were horrified to find that someone had used a key to open cages at the zoo and remove more than \$10,000 worth of snakes. The taken include: four green tree pythons, four emerald tree boas, two D'Albarts pythons, two Bismark ringed pythons, two Honduran milk snakes, and three Brazilian rainbow boas. The keeper said, "The

person who took these is not someone who is just going to sell them or collect them; it most definitely is a breeder. My guess is that whoever took them is not here anymore." [Monroe, LA *News-Star*, October 30, 1994 from George M. Patton]

• The *Indianapolis, Indiana Star* [November 5, 1994] reports: "Police and fire officials rescued a 4-year-old Northeast side boy Friday night who was all wrapped up in a 14-foot python . . . [they] arrived . . . to find the pet snake entwined around the boy's legs and chest. They had been advised to leave the snake alone until animal control officers arrived unless the snake was threatening the boy's life. After the nonpoisonous snake bit the boy, a rescue worker cut off its head to free the boy . . . the family had owned the snake, a python, for some time." [from Erin K. Berger]

• A 9-foot-long Burmese python was found by some youngsters while fishing in a Flamborough Township, Ontario, Canada pond. One boy said, "I wasn't that scared of the snake; it wasn't that bad." The Provincial Police had no speculation on how someone could lose a 9-foot, 32-pound snake. A man who lives near the pond reported he saw the animal's apparent owner "swimming in the water with the snake" recently, and it wasn't the first time, either! [*The Toronto Star*, September 1, 1994 from Captain Wes von Papineau]

• When a Salt Lake City, Utah man climbed a ladder recently to trim his pear tree, he came face to face with a python. Three Salt County sheriff's deputies arrived, and one lured the snake down. The animal promptly wrapped itself around the deputy, giving her a big, snaky hug. The other two deputies had to pull it off her. [*The Salt Lake Tribune*, October 3, 1994 from David A. Webb] You know, for years, we've been singing a mangled version of that holiday song and ending it with "and a python in a pear tree." Life imitates art, I suppose.

• A worker with the Toronto Humane Society captured a runaway green iguana off the roof of a house where he had apparently gone to warm up near the family's holiday lights. [*The Kingston Whig-Standard*, October 14, 1994] In the same area, Mongo, the monitor, is still on the loose as reported in the same paper September 21, 1994. Contributor Captain Wes von Papineau wrote: "Interesting is the Humane Society officer's comment that 'this was the first [lizard] to have gotten away from him in a while . . . I'm not sure that the idyllic village of Kingston is overrun with rampaging, tree-climbing, cat-eating Monitor-iguanas with Godzilla complexes! Cheers!"

"GATOR-RAID" NETS CAIMANS

"Leapin' lizards!" screams the headline in the *New York Daily News*. [1994 from Kevin Palestino and Sean Kraft] Apparently fire inspectors discovered a tropical paradise in a Brooklyn, New York loft apartment including six loose spectacled caimans. *Newsday* [same day from Frank Calogero] reports: "The alligators (sic) were the best known secret . . . in . . . Brooklyn for two decades. Hardly a kid had not seen them . . . Yesterday . . . a zoo expert and animal rescue workers moved in for a roundup. They left with a menagerie that included . . . six spectacled caimans ranging from four to six feet . . . a

turtle and a green iguana. They left behind an angry green iguana and an assortment of small reptiles who made their homes in the jungle habitat created for them . . . [by] the loft's owners . . . [who] would be cited for health code violations." According to the Salt Lake City *Deseret News* [same date, from David A. Webb] the director of the ASPCA's Brooklyn animal shelter said it is illegal to keep a wild animal in the City [of New York]. The next day, the *Daily News* reported the reaction of the couple from whose loft the animals were taken. The woman said, "The major tragedy is that when the police took the animals, our lone female, Buena, who's 8 years old, was protecting her nest. It's just under the microwave, made from dirt and sand and grass. She always checked it every day to listen for her babies. We expect them to hatch momentarily." Police said the couple would be charged with keeping dangerous animals without a license. The couple said they would fight back, saying that they were supported by the New York Herpetological Society. They claim that they've had the animals for more than 20 years and that they have been used for educational purposes. [from Sean Kraft] It's kind of a shame to see all this administrative effort being used to protect "the public" from some "wild animals." I just wish that our major cities would enforce the laws about human "wild animals" with the same diligence.

SEA TURTLE BRIEFS

- Five loggerhead sea turtles were found dead, stranded on the Delaware coast during one week. Authorities say a storm could be responsible for the beachings. No cause of death was reported [USA Today, September 23, 1994] A total of eight dead turtles have been found along the coast since September 20. [same paper—October 14, both from David A. Webb]

- Stairwell lighting which disoriented baby turtles may cost a beach condo complex \$45,000 in fines, according to Melbourne Beach, Florida officials. [USA Today, October 11, 1994 from David A. Webb]

- Environmental activists filed suit in San Francisco Federal Court claiming the Clinton administration is ignoring the slaughter of endangered sea turtles in Mexico so as not to jeopardize the North American Free Trade Agreement. Federal border officials have seized 9,350 turtle products valued at over a half million dollars from 1988 to 1993. [USA Today, November 1, 1994 from David A. Webb]

- A pro-shrimper organization called the "Environmental Group of America" says that a sea turtle hatchery might help restock endangered turtles without loss to shrimpers who are often blamed for the animals' deaths. [USA Today, October 20, 1994 from David A. Webb] The conflicting nature of this issue and the high passions aroused on both sides deserve a little explanation and background: Carole Allen, director of HEART (Help Endangered Animals Ridley Turtles) has supported the Galveston Head Starting facility from its inception to its demise at the hands of National Marine Fisheries personnel last year. She told me that several of the shrimp fishing groups have created "environmental groups" hoping to reopen turtle "hatcheries." After their "good faith" was proven in this manner, the groups would then go to government and ask that the turtle excluder device [TEDs] provision be removed from the U.S. Commerce Department regulations. I've still never figured out why the shrimpers don't embrace the TEDs wholeheartedly: For every pound of shrimp, nine pounds of fin fish and turtles are caught. The weight of the fin fish and turtles mangles the shrimp during the drag and increases the amount of diesel fuel used by the boat to trawl. The nine pounds of fin fish and turtles are mostly wasted,

being dropped over the side of the boat as "garbage." Some fin fish are retained since they are of commercially valuable species. If the shrimpers want fin fish, why don't they buy a rod and reel? They'll have money left over from their fuel bill after they install a TED. Not to mention how much more shrimp will be sold after they decide to become law abiding shrimpers with TEDs! Remember the tuna fish wars? At the end, they couldn't give the stuff away until they stopped drowning dolphins. Anybody out there looking for a good cause? Write Carole for more information: HEART, P.O. Box 681231, Houston, TX 77268-1231.

SURVIVAL OF THE COOLEST?

- Global warming may contribute to a shortage of male lizards, turtles, and crocodiles according to a paper published in August in the *Proceedings of the National Academy of Sciences*. Population biologist, Frederic J. Janzen found that in the warmest of the six summers he spent studying painted turtles nesting on an island in the Mississippi River, nearly 100 percent of the eggs that hatched produced female offspring. [San Jose, CA *Mercury News*, August 30, 1994 from Valerie Haecky]

- Geologist Paul Markwick of the University of Chicago presented his work on a computerized analysis that traces global fossil records of crocodiles, alligators, and their relatives over the last 100 million years at the annual meeting of the Geological Society of America in Seattle. He points out that ancient crocodiles thrived while dinosaurs were declining and disappearing at the end of the Cretaceous Period. Lethal climate change following a meteorite impact has been suggested as a possible model for this extinction event by Luis Alvarez and other workers. Markwick disagrees, "If the dinosaur extinction were caused by a climate shift, you would

expect to see something with crocodiles, because they are very climate-sensitive. But there is nothing." [Fresno, CA *The Fresno Bee* November 3, 1994 from Wendy McKeown]

Thanks to everyone who contributed and to: David A. Webb, Marty Marcus, Lee W. Roof, John & Shelli Doremus, Daniel Riley, Richard F. Welch, and Mark Lawson for interesting materials either used before, or too tough to summarize. You can contribute too! Attach the date/publication slug and your name to the clipping with tape (no staples) or photocopy the whole thing (much preferred!) and send it to me, Ellin Beltz, in care of the AFH at the address on the masthead. I always pick out one new and one regular contributor per issue for a reply in addition to recognizing everyone who contributes in the column. Letters only can be sent to my e-mail address uebeltz@uxa.ecn.bgu.edu. We don't yet have a graphic interface.



109 West Cherryhill Road • Reisterstown, MD 21136

Phone & Fax: 410/ 526-4184

1000's of Discount Books and
Related Herp Supplies.

Send legal size S.A.S.E. for a Free catalog.
Dealer Inquiries Welcome



The Reptile Service

Trying our best
to get you the best
**Reptiles, Amphibians,
Mammals & Arachnids**
at the best possible price. . .
. . .and succeeding!

The Reptile Service

740 S. Deerfield Ave. #1

Deerfield Bch, Fla. 33441

(305) 428-8005 Fax: (305) 698-0012

MID-ATLANTIC REPTILE SHOW 1995

Sponsored by the Maryland Herpetological Society

September 16th & 17th 1995

Saturday 10:00am to 4:30pm (Lectures 7:00 pm to 11:00pm)

Sunday 11:00am to 6:00pm (Speakers to be announced)

Proceeds purchase rainforest through the Ecosystem Survival Plan

In 1993 we donated \$18,000 and saved 131 acres! In 1994 we donated \$22,000 which will save even more!

Captive-born Reptiles and Amphibians
Equipment and Books for Sale

Location: Maryland State Fairgrounds (Show), Timonium Holiday Inn (Lectures)

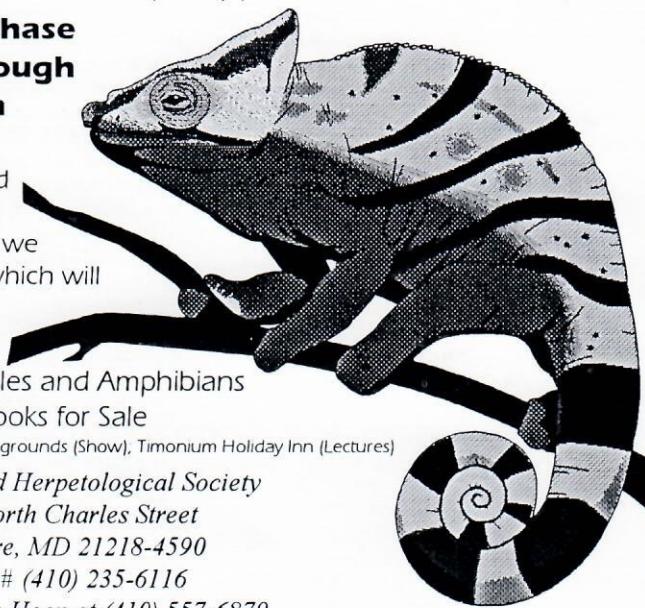
The Maryland Herpetological Society

2643 North Charles Street

Baltimore, MD 21218-4590

Phone # (410) 235-6116

or contact Tim Hoen at (410) 557-6879



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

New Caledonia - Continued from page 7

behind our gite are fallen wood and limestone outcroppings. Frank notices thin long-necked skinks, which we later find out are a type of *Leiopisma*, very likely a form of *L. nigrofasciolatum*. There are also small bronze skinks around the rock outcrops and leaf litter. We make a mental note to explore this area later. After breakfast we meet up with Charles, who tells us that the *grand chef* has been informed and has approved our collecting lizards. He tells us to come later in the afternoon when he is free so he can show us some trails. We head back to the gite and explore the forest behind our bungalow.

Frank gets his collapsible fishing rod and thread to noose some *Leiopisma*. He manages to noose a couple. They are surprisingly attractive and remind us of small monitor lizards because of their long necks. We attempt sexing these skinks, using manual eversion of the hemipenes, and find that the method works. We aim to bring back at least one pair of these skinks to the United States with us.

In the afternoon we meet Charles, who plans to show us several possible forest trails to explore at night. Not too long after we set out, a large red truck comes toward us around a corner at blazing speed in the

middle of the road. Fortunately, my reflexes took charge and drove us off the side; otherwise we would all be dead. Charles curses and mentions the dangers of drunken truck drivers. If we had been in a turn we probably would not be alive now. Our little Renault 4L, which is costing us close to \$70 per day to rent, looks and feels like a tin can on wheels.

After we recover from this near accident, Charles shows us a trail into the southern forest near a gite, as well as one in an area in the western forest and another in the western forest site. In the southern forest we get bitten by tiny ants about 1/8 inch (3 mm) long that pack a wallop and seem to drop out of nowhere. Charles informs us that these are known as "fourmis electriques," electric ants. The acute burning sensation from their bites lasts 10 to 15 minutes. I think we get them on us when we brush by certain vegetation. In any case these ants are no fun and by the time we leave we've both been bitten several times. Two or three of these bites going on at one time will definitely get your attention, a little like a mouthful of jalapeños. In forest site 2 is also a fallen *Araucaria* pine, which is generating an odd sound. As we get closer we realize it is full of holes, and after pulling off a section of bark we notice nu-

merous beetles and grubs. The sound is now louder. There are hundreds, possibly thousands of these insects under the bark, eating the tree away. It is the crunching of wood under powerful mandibles that we have been hearing, an eerie sound that resonates in the silent forest. Charles then takes us to two other trails and shows us two fabulous caves, the kind of places that would have become major tourist attractions in other parts of the world. One is relatively small and has stalagmites and stalactites that are in some cases fusing into columns. In the back is a deep pool, where supposedly divers sometimes go. The other cave is huge and is inhabited by large numbers of bats and swifts. Fabulous stuff, and one of the great sights of this beautiful little island.

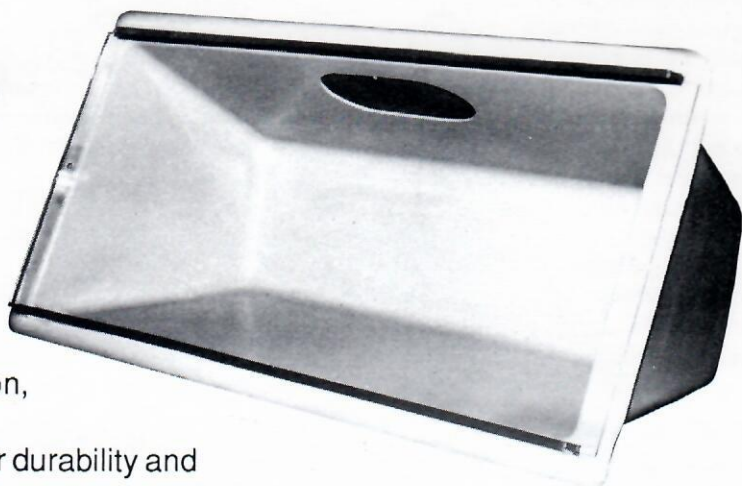
Later we head back toward Kuto 2 to the rocky shores near a boat ramp. Charles takes us along the shores and shows us beautiful blue-and-black sea snakes among the rock crevices. We never realized these animals could be so beautiful. They are called "tricots rayes" which I would translate as "striped or banded sweaters." According to Charles, the people here are not frightened of sea snakes. Although sea snakes are highly venomous, they are also known to be very reluctant to bite and not to bother anyone unless persistently irritated. We proceed to climb down among the rocks for a better look and to take photos. This species is *Laticauda laticauda*, an egg-laying taxon that spends part of its life on land adjacent to the ocean.

That evening we plan to explore the forest trails shown to us earlier by Charles. We set out at around 8:15 p.m. for the southern forest. But right away we see that something is wrong: the sides of the entrance to the trail are on fire. We quickly drive our car through anyway. After an hour or so of checking trees and shrubs with flashlights, we still haven't spotted anything and suspect that the smoke, which is now clouding and smelling up the whole area, may have something to do with it. We leave and decide to head for the northern forest site. As we exit the forest some young children spot us and start yelling "Aux fumeurs! Aux fumeurs!" People are coming out of their homes in an uproar and it seems that we are being accused of starting the fire. We take off, figuring we'll have to talk to Charles, who knows everyone here, to explain that we had nothing to do with it.

We make it to the northern forest rather late and proceed down a trail that goes supposedly about a mile (1.6 km) into the forest, carefully lighting trees and examining trunks and branches of the primary forest

Continued on page 14

Reptile Cages



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

24" Reptile Cage

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

36" Reptile Cage

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



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

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

48" Reptile Cage

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

72" Reptile Cage

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

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

NEODESHA PLASTICS, INC.

TWIN RIVERS IND. PARK (316) 325-3096

P.O. BOX 371

NEODESHA, KANSAS 66757-0371

VISA/MC Accepted

Custom Cages

14 Dry Run Road
River Falls, WI 54022

1-800-766-6354

1-715-425-8888



High Quality Reptile Housing

New Caledonia - Continued from page 12

trees as well as saplings and bushes for the elusive crested gecko (*R. ciliatus*). After a while I spot a gecko up in a tree. It turns out to be a New Caledonia giant gecko (*R. leachianus*), but because we did not anticipate needing the climbing gear, it is out of our reach. Frank goes off the trail quite a distance and spots two more *R. leachianus*, also out of reach. This confirms the claim that *R. leachianus* occurs on the Isle of Pines.

Meanwhile, we are getting swooped by bats, and, in fact, the number of bats flying along the trail and through the forest is amazing. Bats with about an 18-inch (46 cm) wing span are common and flying close to our heads. There is also the occasional flying fox, a large fruit-eating bat with wing spreads almost 4 feet (1.2 m), which we get a chance to see and admire. Frank and I both love bats, so we are in heaven. *Swoop all you want*, we think as these creatures fly close to our faces, creating tiny whirlwinds. They are attracted by the insects drawn to our lights. This is a great experience. There are also many owls here and we can hear their calls with some regularity.

Around midnight Frank spots a *R. ciliatus* in a low shrub maybe 3 feet (90 cm)

from the ground. Surprisingly the lizard was among the foliage. According to Frank it was the reflection of the light in its eyes that allowed him to spot it. He maintains the light on it while I catch it. We are both thrilled; it is a female with a gorgeous yellow-orange coloration. We already know that we will have at least one pair of this rare species to bring back, and we are jazzed. We also realize that it's going to take a totally different kind of search image (a general image held in the mind while searching for an animal) to find additional *R. ciliatus*. While we look for the other *Rhacodactylus* on trunks and branches, the *R. ciliatus* appears to be active at a lower level in the foliage. We continue down the trail another 20 minutes and decide to turn back. It will take us at least 90 minutes to get back if we scan the trees and vegetation again, which we do to no avail. We drive back to the gite tired but content. The *R. ciliatus* was a major find.

November 23: Island A

We decide that we should explore one of the offshore islands. After examining our maps we decide on a northern island (Island A) because, to the best of our knowledge, the herpetofauna of this island has never been surveyed. We are caught up in

fantasies of "treading where no one has gone before." The finding of *R. ciliatus* may have gone to our heads. With Charles' help (how can we thank him enough?) we have arranged for a small boat to pick us up near our bungalow and take us to Island A in the afternoon. Charles also tells us that the giant arboreal geckos (in contrast to the small geckos around lights that are called "mabouias," although some French call them "tarentes,") are called *caméléons*, not because they blend but because of the widespread local superstition that "caméléons," once they cling onto you, will never let go. Thus many local people here have a fear of these lizards. Fortunately, as we will find out, few of the people residing here have ever seen the large native geckos, simply because they do not wander into the forest at night with flashlights like some crazy herpetologists from the United States, which is probably beneficial for these geckos. They are not exploited in any way.

We make a quick run into the main town to the grocery store and pick up oranges, canned meats, French bread, and cookies, as well as four bottles of water. We plan on spending the night in the tent that has so generously been lent to us. At one o'clock in the afternoon we go meet the boat, and after a 20-minute ride (where we and our gear get wet because of the wind and waves) we finally make it to a sandy beach on the northeast side of Island A. We get our gear above the beach on dry land and proceed to set up our tent.

There is litter around this area close to the only sandy shore, and there are remnants of old fires suggesting that this may be a stopping place for fishermen and possibly hunters. As we have been informed before, a flock of wild goats inhabits this island and people sometimes come here to hunt them. As soon as our tent is set, we take off to explore the island so that we can have a sense of direction at night. Among other things, close to the shore, we notice hacked coconuts on stakes. Later we discover that they are to attract the giant coconut crab *Birgus latro*, essentially a giant land hermit crab which carries no shell.

After about 15 minutes I discover a termite-eaten stump which I proceed to take apart. Before too long I spot a heavy-bodied *Bavayia* which I eventually capture, and I notice others among the termite tunnels. I call Frank because he is such a *Bavayia* nut. He loves these little geckos, which he perceives as miniature *Rhacodactylus*. He takes the stump apart some more and captures several *Bavayia* of two species. The type that we first collect we think could be a new species, so of course we are excited.

He also finds eggs. We take photos and we leave about half the stump intact and decide to leave future termite-eaten stumps alone. We have two males and four females of the *Bavayia* and do not want to destroy what may be limited suitable habitat.

After awhile it becomes obvious that this is a difficult island and forest to work. It is full of toppled trees and saplings (fallen in a west-northwest direction) as well as vines, some of which have thorns, and trees with aerial and buttress roots, including screwpines (*Pandanus*) and banyans (*Ficus*). The ground is irregular and has limestone outcrops as well as potholes and sinkholes—some several feet (~ 1 m) wide and as much as 12 feet (3.7 m) deep. *What are we going to get ourselves into we wonder?*

On the western side I spot some interesting medium-size skinks on the leaf litter. They have keeled scales and a pattern somewhat reminiscent of that of an alligator lizard. I call Frank, who has the rod and noose. As I direct him to where the skink is, I notice another small skink with a screaming yellow line along its side, maybe 4 inches (10 cm) total in length. Frank decides to focus on the large skink first and go after the small one later, but this big skink is wary and takes off. As Frank goes after it, he notices a huge skink near a tree. He yells, "Philippe, you won't believe this thing; it's half as big around as my wrist." He directs me so that I can block it from taking off. At one point it goes inside a tree, entering it from a hollow space at the base. It emerges a brief moment and I get a glimpse of it. The thing is huge compared to most New Caledonian skinks. It takes off again and Frank goes after it, eventually losing it inside a tree.

We explore the western side of the island some more. At first I move ahead of Frank and run into the flock of wild goats. I return through the center of the island, which is less tangled and easier to walk through. By the time camp is in sight, I have a scratch across my forehead and several scratches on

my legs. My T-shirt has been ripped on a limestone rock. On my way back, about 12 yards (11 m) from the tent, I spot another specimen of giant skink, which proceeds to take off and ends up inside a fallen tree. I decide to check the shoreline for sea snakes but find none.

Frank returns to camp almost an hour later. He looks like he's had a rough time. His legs are all scratched and bleeding. He has made it to the south end where the *Aracauria* forest stand is and back, and it was hell. The northern island is going to be a difficult forest at night. We settle in the

shrubs—we realize we're probably not going to catch any *Rhacodactylus* tonight, even though we both heard a *R. leachianus* calling earlier. Frank comes across a fair-size coconut crab that is as awesome as any description we have read; we are amazed and fascinated. Maybe as a consolation for our failure to find *Rhacodactylus*, we set our sights on finding a small specimen of coconut crab to bring back. As Frank says, "They are living sculptures." These crabs are rare in this area, so we are grateful to see any at all. Frank eventually spots others and they are all good size. At

—from Philippe de Vosjoli's notes

Few people can fully grasp the near mystical feeling of walking in a tropical forest at night. It is initially a confrontation with the self and its fear of darkness and fear of the unknown. Somewhere in the back of our minds is also the uneasy fear of getting lost. But before too long, once the little fears have faded, an excitement seeps in—we are entering the core of a mystery—sacred land—one step at a time, one leaf litter crackle after another. Insects are buzzing, crickets are chirping, and odd bird calls break the soft silence. As our flashlights scan the trees and shrubs, we are slowly entering the heart of the beast.

During a short break in our progress we come to the sudden realization that what we are seeing and what we have seen is the privilege of only a very few who have dared to enter the night world of the forest with flashlights and a spirit of adventure. We look at each other suddenly and there is silent agreement, "Isn't this something!"

Above us in the big trees, in the upper world, stretches the domain where the giant geckos, New Caledonia's dragons, live out their secret lives. Finally, a flash of movement way up in a branch and we spot him, a dragon blending with the tree bark, pupils faintly reflecting light. Several minutes later there comes the moment of capture when we finally hold one of these creatures in our hands. Like a trapped alien, it looks at us with puzzled eyes, and we make what would correspond to "contact." At that moment it feels as if we may have entered a land of fantasy and science fic-

tion in some kind of dream, but even after we shake our heads the dream remains. This is the real thing.

We have found and entered a gateway on Planet Earth which has led us to this other world, populated with these strange and alien creatures—little elves with gold eyes in velvet-skinned dragon suits. We have been told that these creatures fit into a category of consciousness called "reptiles," but for just a moment we are like children and our minds are thinking "what if this were something really new, what if we somehow made a transdimensional breakthrough to . . . okay, so they are reptiles and not ET."

As our spirits soar, we also realize, in those precious moments, that these gateways and aboveground worlds must be protected. The joy of finding is invariably accompanied by the anxiety of possibly losing. The evolutionary course that led to these dragons into the treetops is more than we will ever be able to imagine. To ever allow for these beings and worlds to disappear would be tantamount to the extinction of a dimension of being. We begin feeling for this world we have entered because, unlike the geckos, we know what is out there beyond the limits of the forest and the islands.

It will be several weeks later that, like students, we will be sitting in front of the transposed dragons in our living rooms, waiting for the lessons that somehow never cease to amaze. Not a word is ever spoken, but we are slowly being transformed. What are we to become?

tent and proceed with our dinner: pâté, French bread, sour oranges, and cream-filled cookies; a herper's soul food. We then decide to take a short nap so we can be alert for the evening. It makes little sense to go out too early, as *Rhacodactylus* seldom are out before 9 p.m., according to Frank, who has been to New Caledonia before. Unfortunately we have no sleeping gear except for one blanket, which we lay out on the floor of the tent. The floor of the tent is hard and slanted. We pile some dirty clothes together as makeshift pillows and fall asleep in our clothes. We toss and turn and maybe sleep a half hour.

At 8:45 p.m. we prepare ourselves to go out. We are hoping for a great night of *Rhacodactylus* collecting. To avoid getting lost we plan to stay along the western side of the island within earshot of the ocean. By 10:45—after examining trees, saplings, and

around midnight we decide to head back. We have of course wandered too far inland and have lost our bearing. The sky is too overcast to spot the moon so we simply have no reference points. I ask Frank to check his compass. He taps it to make sure the needle is set free. After a while, "North is this way," he states. We end up walking through a tangled mess that eventually becomes physically exhausting. Frank finds a smaller coconut crab about grapefruit size and decides to try to wrap a rubber band around its claws and take it back, but the thing keeps getting its claws out. Eventually it clamps with both claws onto Frank's hiking boots and just won't let go, no matter how much teasing and aggravation Frank subjects it to. Frank decides to take off his boot and to carry it that way toward the camp.

Helix Controls

The Leader in Environmental Control Systems

Proportional
Accurate
Versatile
Reliable
Safe
Modular
User Friendly

Modular design of systems and accessories allow unlimited expansion. All systems use a temperature probe that is completely isolated from the 110v supply and employ other unique safety features. All products designed and manufactured in the USA.

Basic System

Provides a day and night temperature setting with LCD display. Continuous incremental power adjustments maintain a constant temperature. Controls heat sources up to 500 Watts. Accessories expand system to 5000 Watts. Synchronize lighting with day and night temperature cycle. Provides minimum and maximum temperature readout and more!

Other options include gradual day and night temperature change, analogue output suitable for computer monitoring, and a preset for both day and night temperatures.

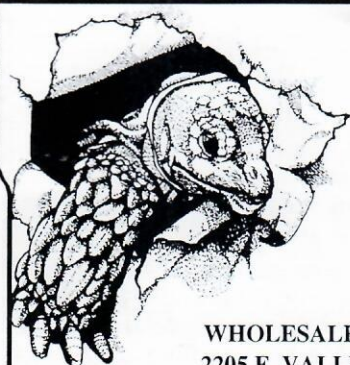
Super System

Incorporates all the features of the basic system. Unique design allows easy connection of various heating and lighting devices. Controls a combination of heat and light sources up to 1500 Watts. Controls incandescent lamps to simulate dawn and dusk periods of about one hour. Activates UV lights after dawn and before dusk minimizing stressful changes in light intensity.

Ideal for
Iguanas
and
Bearded
Dragons.



For more information please write or call.
Helix Controls · 8535 Commerce Ave. San Diego, CA 92121
Phone 619-566-8335 Fax 619-566-9472



REPTILE HAVEN

1,000's IN STOCK
Captive-bred & Imported:

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

WHOLESALE • RETAIL • BUY • SELL • TRADE
2205 E. VALLEY PKWY, ESCONDIDO, CA 92027

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

TEL# (619) 741-0127

FAX# (619) 489-6778

New Caledonia - Continued from page 15

12:30 a.m.

Frank and I are both soaking wet with sweat. Our clothes are drenched. Walking this island is a workout of the highest order. Jane Fonda could make an aerobic exercise video out of this island experience. Unfortunately, we are noticing symptoms of dehydration and we haven't brought water with us. Before too long, I notice *Araucaria* pine seedlings on the ground and eventually *Araucaria* trees. "Frank," I call out, "this seems all wrong. I never noticed any *Araucaria* near our tent." Frank at this point checks his compass, taps it and says, "the

thing got stuck and we have been going the wrong direction. We need to go back, following the eastern edge near the ocean so we don't get lost." The northern island during the day is hard. At night it can be a living hell.

Frank decides to pry off the coconut crab with his knife and lets it go. Our primary concern at this point is getting back. During the hour and 15 minutes that follow, we are confronted over and over again with such a tangled mess of roots and lianas that our minds keep going *Not again! How do I get through this? Don't panic: one step at a time.* Getting through one tangled mess of

roots and lianas and potholes and saplings only opens the way to the next one. We are both at our wits' end, drenched with sweat, our legs weak from having to climb over fallen trees and duck under branches. Our backs hurt from falling into potholes. We have enough scratches that our legs resemble complex road maps, particularly those of Frank, who is wearing shorts.

At one point a twig at eye level goes behind my glasses and lodges itself in the corner of my eye and breaks. I have to pull it out, but fortunately my eye is OK. Frank experiences rumblings in his chest that disturb him. Spider webs are inconveniently at face level, and we get "netted" on more than one occasion with spiders and webs in our faces and hair. Our minds have reached the point here where we are thinking, *This is not fun anymore. OK, keep it together, one step at a time.* At 1:35 Frank sees the tent and I see some of the land snail shells that I hung on branches as markers. At 1:45 we reach our tent, scramble to the water bottles, and drink. After settling in the tent, we drink again, then toss and turn the rest of the night on the hard floor. This has definitely been one of those nights.

November 24: A giant skink

We get up at 6:30 a.m., take down the tent, and decide to do one last run of the

western side, in the hope of catching one of the giant skinks, a species we think will put us on the map. (After all, we're not having such great luck catching geckos.) The small fishing boat is supposed to be back at 8 a.m. to pick us up. We feel worn and tired. We're going to have to move to another gite today, the result of our last minute reservations, because they are booked where we have been staying.

By 7:50 a.m. I am back at the camp. Frank makes it back by 8 a.m. He has a big smile on his face. I can't believe it—he has not only found one of the skinks, but he must have caught it. And sure enough, he pulls a giant skink out of a cloth bag. We are both thrilled. The trip to Island A will have been worth it after all. If there is one quality that Frank has, it's persistence. He is a great field collector: acute, determined, obsessive, and successful. We take pictures. We have the illusion that this may be a major find. The boat picks us up and we head back toward our gite, exhausted, grimy, and in serious need of a shower and food. Soon after we get back, we hear a knock on the door, and the woman at the receptionist's desk is asking to see the lizards. Before too long the word gets around, and we get other visitors, including the hotel manager, an attractive woman who was kind enough to let us take some blankets on our island trip. Most of the people gathering are fascinated by the *R. ciliatus* and the *R. chahoua*. The response is a combination of fear and attraction that we so often see toward reptiles. As I have often observed, they are alien, and like the dragons of myth come to life.

We manage to catch breakfast at the gite: coffee, orange juice, and toasted French bread. There are no other choices; this is the standard breakfast fare here. We shower, pack our gear, and take off toward the southern forest and the gite near there. We discuss plans for the next few days. We conclude that we need to extend our trip here, but Frank needs to go back to Nouméa to get us additional supplies, take care of our supplies stored in the youth hostel, talk to the Director of *Parks et Reserves* about getting permits for skinks—and possibly additional herptiles—and above all bring back his lineman's spikes. If he cannot climb trees we are going to miss out on any of the offshore island forms of *R. leachianus* that we were hoping to bring back. A problem is that the weekend is coming up and that tomorrow (Friday) we have no gite at which to stay. We of course go back to Charles for advice on Frank's flying back and to tell him we will be staying until Monday. We also make an on-the-spot decision to hire a boat to go to



BEASTS & BABES

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



GLADES HERP

P.O. BOX 50911 • Ft. Myers, Florida 33905 U.S.A.

HOURS: 11:00 a.m. - 5:00 p.m. Monday - Saturday

PHONE: 813-693-1077 • FAX 813-693-1901

Island B Friday night. We can sleep there in our tent, thus taking care of the housing problem. We also have hopes of finding *Rhacodactylus* there. After preliminary arrangements are made, we have lunch: ham and cheese sandwiches again. We're getting to the point where we can't stand the sight of these things. The way things are here we basically have the choice of the meal of the day served at a gite only between such and such a time at a fixed price of about \$19 per person, whether lunch or dinner, or—ham and cheese sandwiches served all day long. We will probably never eat anything resembling a ham and cheese anything after we get back. Our only consolation is that the

high nitrite level in the ham may reduce the likelihood of food poisoning.

We settle in our bungalow at the gite, explore the surrounding area, and crash for several hours in the afternoon. We have dinner at the gite. The meal of the evening turns out to be lamb. Unfortunately, it smells so strong that it is barely edible. (I initially thought it might be goat.) We fortunately have chocolate cookies in our room. I am beat and decide to stay in. Frank, obsessed as he is, decides to go explore the trail of the western forest. He comes back at eleven. He saw two *R.*

Continued on page 36

GIANT SALAMANDERS

by
**Danté Fenolio
and Michael Ready**

When someone hears the term amphibian, most likely a small frog or perhaps a newt comes to mind. As "herpers," we generally consider a few snakes, lizards, turtles, tortoises, and almost all crocodilians to be the giants of the herpetological world. Amphibians are, however, represented in the "giant" category in both the prehistoric and modern times. Several early, now extinct, amphibians attained enormous proportions. One of the most ancient amphibians, *Ichthyostega*, a labyrinthodont of the upper Devonian Period (about 370 million years ago), was 3.5 ft (1.1

m) in length and bulky in appearance (Moore, 1958). Some Temnospondyli amphibians of the Carboniferous Period (290 million years ago), such as *Mastodonsaurus* and *Eogyrinus*, were truly massive, attaining lengths of 15 ft (5 m) with heads over 3 ft (1 m) wide, with tooth-laden jaws to match (Moore, 1958). Now that's a mud-puppy!

Fossils of an ancient salamander have been found in Germany and North America which date back 150 million years. The largest of these animals, *Andrias schuechzeri*, grew to an impressive 7 ft (2.3 m) in length.

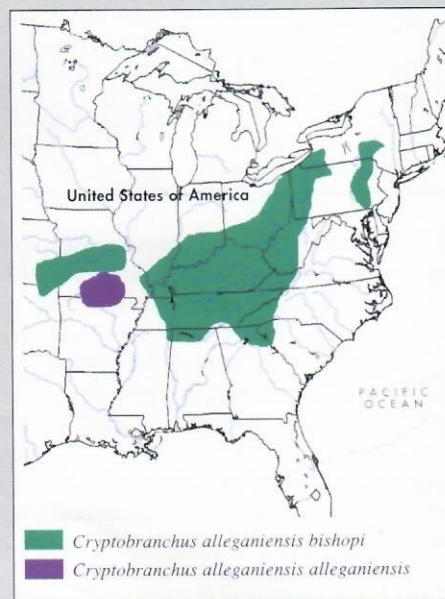
Although these colossal, permeably skinned creatures have been extinct for many millions of years, a few relatives exist today. These are the Chinese giant salamander (*Andrias davidianus*), the Japanese giant sala-

mander (*A. japonicus*), and the American hellbender (*Cryptobranchus alleganiensis*). Collectively, they are the surviving members of the family Cryptobranchidae.

Aside from being the modern-day amphibian giants, the Cryptobranchidae possess several other characteristics which make them unique. Cryptobranchid fertilization is external, without amplexus. The female deposits eggs while the male releases milt into the surrounding water. (Most other female salamanders pick up the male spermatophores with their vent so that fertilization is actually internal.) Also, most salamanders go through a larval stage and eventually metamorphose into the adult form. The cryptobranchids, however, undergo an incomplete metamorphosis. According to Duellman and Trueb (1986), the adults lack eyelids and retain their larval dentition. The larval state is rather lengthy, usually three to five years, before their limited metamorphosis. Though the adults reabsorb their external gills, one species, the hellbender (*C. alleganiensis*), may retain one gill opening. Also, the bones in the lower jaws of cryptobranchids are separate rather than fused, as in most other salamanders.

Giant salamanders are fully aquatic denizens of clear, cold, mountain streams with specific adaptations for this type of environment. All are somewhat flattened out from the snout to the base of the tail. The tail is laterally compressed into a strong, wide paddle. Folds of loose, highly vascularized skin along the flanks provide surface area to facilitate oxygen absorption. To enhance oxygen exchange through the use of these folds, they have been observed rocking from side to side to keep water flowing around the folds (Duellman and Trueb, 1986). Exhibiting this behavior excessively in captivity may indicate poor oxygen content in the water of the enclosure. More water surface agitation may be required. Cryptobranchids are usually colored various shades of grays and browns with

Distribution of the giant salamanders.



Actual localities occur within specific waterways within the shaded areas.

spots of black or dull orange. This color scheme helps them cryptically match the rocky stream bottom. There have been a handful of *A. japonicus* collected in the wild that were a red color and deemed the "red phase" of that species (*Collecting and Breeding Magazine*, 1960). Cryptobranchids are incredibly long-lived species. Specimens of both genera have survived in captivity for up to 55 years (Duellman and Trueb, 1986). One specimen of *A. japonicus* was kept in captivity by two generations of the Saichiro family in Japan for at least 74 years where the animal was estimated to have a total age well in excess of 100 years (*Collecting and Breeding Magazine*, 1960).

The Chinese giant salamander (*A. davidianus*) reaches lengths of about 6 ft (180 cm). The Japanese giant salamander (*A. japonicus*) grows to a length of about 5 ft (150 cm) (Lanza et al., 1992). These salamanders feed upon aquatic arthropods, fish, and worms. In some areas, as much as 80% of the Japanese giant salamander's diet has been found to consist of freshwater crabs (Yoshihiro, 1963). The following taxonomic information was derived from Frost (1985). The Chinese giant salamander (*A. davidianus*) was described in 1871 by Blanchard. Originally, it was classified as *Seiboldia davidiana*. The Japanese giant salamander (*A. japonicus*) was described in 1836 by Temminck. It was originally classified as *Triton japonicus*. A junior synonym of the genus *Andrias* was *Megalobatrachus* which shows up in some of the older literature.

Both of the Asian species are considered endangered and are listed in CITES appendix I (Frost, 1985). Habitat destruction, pollution, human consumption, and over-collection have contributed to the erosion of population numbers. Captive reproduction projects have



The Japanese giant salamander is currently being worked with in captive reproduction projects worldwide such as the Asa Zoological Park in Japan and the Cincinnati Zoo and Botanical Gardens in the USA. Photo courtesy of the Cincinnati Zoo and Botanical Gardens.



The American hellbender (*Cryptobranchus alleganiensis*) has very small eyes and uses lateral line organs to aid in hunting prey items. Photo by Dante Fenolio, Courtesy of the Amphibia Research Group.

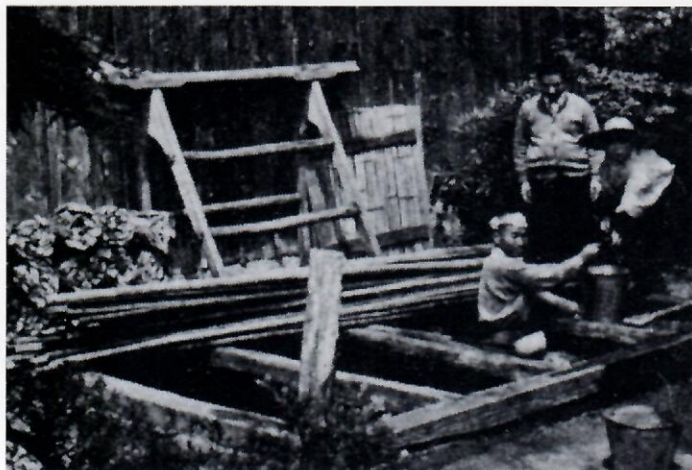


This Chinese Giant Salamander (*A. davidianus*) was photographed while yawning, exposing its large, white mouth. Photo by Dante Fenolio, Courtesy of Steinhart Aquarium, California Academy of Sciences.

been designed to ensure the survival of *A. japonicus* and, to an increasing extent, *A. davidianus*, in zoos worldwide. The Chinese



This Chinese giant salamander is comparatively small considering that individuals of the species can attain lengths up to 6 ft (1.8 m). Photo by Dante Fenolio, courtesy of Steinhart Aquarium, California Academy of Sciences.



Two generations of the Saichiro family kept a Japanese giant salamander in these ponds for 74 years. At one point, three small male salamanders were added to the pond which were promptly eaten by the larger, presumably female, salamander. Photo is from *Collecting and Breeding Magazine* (22)7,8,9 and (15)2.

giant salamander ranges from Qinghai to Jiangsu south to Sichuan, Guangxi, and Guandong, China (Frost, 1985). The Japanese giant salamander ranges through the southwestern portion of the island of Honshu northeast to the Prefecture of Gifu, Shikoko and on the island of Kyushu only in the Prefecture of Oita, Japan (Frost, 1985).

The Japanese giant salamander is also known as "Hanzaki" in some Japanese folklore. This name refers to a mythical belief that if a salamander should happen to be separated in half, the parts would regenerate into two, new, whole animals (Yoshihiro, 1959). This species has also become a point of intense interest to the Japanese government as populations have dwindled. Deemed a "Natural Monument," the amphibian was given legal protection in Japan (Kuwabara et al., 1989). Habitat destruction has been a major factor in the decline. An elaborate captive reproduction project at the Asa Zoological Park in Japan has been underway since the park's opening in 1971 (Kuwabara et al., 1989). The salamanders had been captive reproduced only once, the breeding occurring at the Amsterdam Zoo in Holland in 1904 until the Asa Park team succeeded in 1979. The recent success is potentially monumental as it provides hope for the preservation of the species if combined with release programs.

The following is a summary of the system used in the reproductive attempt with the salamanders at the Asa Zoological Park. Four plastic tubs arranged in a circle were connected to one another by pipes large enough for the salamanders to travel through. The plastic tubs were compartmentalized as well with sand used as a substrate in the "nest section." A natural stream was diverted to run through the system so fresh, oxygen-rich water was constantly replenished. Wooden covers were used over parts of the tubs and

netting was used over the other areas. It is believed that photoperiods play a role in the reproductive cycle and the netting allowed for light cycles to naturally affect the salamanders. All of the *Andrias* at the park were taken there by local peoples who collected them from streams with increasingly poor water quality. This demonstrates the increased awareness and concern within the public sector for the conservation of these animals (Kuwabara et al., 1989).

The first group of giant salamanders to reproduce consisted of seven individuals with a 4:3 sex ratio. Saurel (*Trachurus japonicus*), a mackerel-like fish, were the initial food items offered to the adults. Trout (*Salmo gairdneri*) were the second food item offered, both pre-killed and live. The live trout were hard for the salamanders to capture so loaches (*Misgurnus anguillicaudatus*) were then offered as they are slower and easier for these giant amphibians to catch.

As the diets of the salamanders were varied, their weight increased. Cloacal swelling and increased sexual activity was observed. Eggs were deposited in the month of September. The eggs look like "beaded necklaces" as they are attached to one another in this fashion. The salamanders reproduce "communally." A number of males may externally fertilize several female's eggs all at once. The animals roll in circles together with females ovipositing chains of approximately 100 eggs at a time and males spraying milt into the water. Once the spawning is complete, each male constructs a nest. Each individual male, referred to as the "owner male," guards his developing egg mass in his pre-built nest.

In the first spawning at Asa Park, two females yielded a total of 1224 eggs. In 1980, three females deposited 2434 eggs. Total clutch sizes varied considerably from year to year. Egg development to hatch time takes



A large Japanese giant salamander is placed in front of a small child to show size; this animal is estimated to have lived in excess of 100 years. Photo taken from Yoshihiro Ikoma: Notes on the giant salamander (*Megalobatrachus japonicus*). Bulletin of the Tsuyama Museum of Science Education.

approximately 40 to 60 days in 48–66°F (8–18°C) water temperatures. Hatching has taken place in October and November. The food offered initially to the hatchling giant salamander was chironomid larvae. Eventually earthworms, sliced squid, krill, and live loaches were offered, once the larvae had grown to appropriate size to feed on these items.

When kept in crowded conditions during captive reproduction, males have been recorded as having eaten egg masses. Interestingly, males often construct nests in the wild so that a current of water flows from the inner chamber (Iobara, 1985). The reasons for this condition are not understood. The communal reproductive behavior seen in captivity has also been recorded in researchers field notes. However, it was observed in its entirety for the first time in captivity by the Asa Park team during their 1982 breeding success.

An interview with Oscar Shiu of the Scales and Tales Trading Company, an animal exporter in Hong Kong, provided insight into the exploitation of the Chinese giant salamander (*A. davidianus*) in China. Historically, the salamanders have been collected in the spring and summer when they migrate to shallower streams, making them easier to capture. The captured salamanders are typically placed into holding ponds. They are fed fish and shrimp for a year or two to bulk them up for the markets in the "off season" (the winter season when they are harder to find). When the salamanders could be sold in markets legally, like the Canton Market, the animals sold for the exorbitant price of approximately 40 to 50 Hong Kong dollars per pound. It is easy to see that a 50-lb animal would yield a small fortune.

Amphibian cuisine is a very different idea to many, yet frog legs have been eaten for

years, especially in some European cultures. In China, the Chinese giant salamanders are fried with oyster and soy sauce, ginger, and green onions. Chinese traditional belief holds that eating the salamanders increases human health and curbs cancer. A number of sources have told us that another name for the salamanders in China is "wah-wah" or "baby fish" which may have origins with the fact that the animals were sold alongside fish as another aquatic food item.

Another use for the animals has stemmed from superstition. Specimens are housed in aquariums in businesses and are believed to bring good luck. Exceptionally large individuals seem to be preferred. The concept is not novel to the salamanders. A number of animals including fish such as the red arowana (*Scleropages formosus*) are kept in Asia for their "power" to bring good fortune.

The days of the legal large-scale marketing of the Chinese giant salamander have hopefully passed. Since 1992, greater enforcement of protective laws has greatly curbed consumption and collection of these amphibians. Smugglers are fined up to one-half million Hong Kong dollars if caught in violation of the laws. Apparently some smuggling still exists in a few of the markets, but these activities are dwindling, according to our sources.

In the United States, the Hellbender (*Cryptobranchus alleganiensis*) grows to a



This is an old stamp from Switzerland, formerly Helvetia, depicting an ancient ancestor of modern cryptobranchids. Image taken from Yoshihiro Ikoma: Notes on the giant salamander (*Megalobatrachus japonicus*). Bulletin of the Tsuyama Museum of Science Education.

maximum size of 30 in (76.2 cm). The following taxonomic information was derived from Frost (1985). Described originally in 1803 by Daudin, the amphibians were initially classified as *Salamandra alleganiensis*. The animals also received the junior synonym name of *Salamandra gigantea* by Barton in 1808. The differentiation from the *Salamandra* genus into the monotypic genus of *Cryptobranchus* came in 1821 by Leuckart.

CAPTIVE BRED WILDLIFE FOUNDATION

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



JEFF GEE
&
KIM GEE

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

Hellbender? . . . what a bizarre name. In researching these animals, the authors were unable to track down the exact origin of the name. One possible origin comes from Switzerland, of all places. Fossils of ancient, related species have been unearthed in this country with so much public interest that a postage stamp of one of the fossils was generated by the government. Ancient Switzerland was known as Helvetia. In certain Latin-based languages, "v" is pronounced with a "b" sound, thus "Helbetia" could be a pronunciation of the old name of Switzerland. Association with the country where fossils of related species were being found may have led to a derived name, "Hellbender." Another scenario may come from the fact that in years past, the creatures were notorious for taking the baited hooks of fisherpeople. When reeled in, many fisherpeople apparently preferred cutting the line rather than risking getting bitten while removing the hook from the animal's mouth with their fingers. Possibly, the name is a derivative of the phrase "hell bent on doing something." Perhaps the salamanders were named for being hell bent on biting when handled (especially when someone was trying to remove fishing hooks from their mouths). The name may also reference the overall appearance of the animals with their wrinkled fleshy skin and wide head. Many people, especially those without advanced

THE REPTILE RESOURCE INC.

7507 SOUTH TRAIL #64
SARASOTA, FL 34231

Specializing in the
Captive Propagation of Reptiles

• BOAS • LIZARDS
• PYTHONS • COLUBRIDS

Write for price list MARC BIRKNER
(owner)

Carolina Mouse Farms

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



MICE AND RATS

Frozen
Competitive Prices
Discounts for large quantities

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

BURGUNDY REPTILE TRADERS



"From Iguanas To
Chondro Pythons"



Selling Quality Reptiles Since 1981

*Reptiles From All Corners
Of The World*

Wholesale Only / \$450 Minimum Order

*If Quality Matters To You,
We've Got The Lowest Prices*

813-495-0031

P.O. Box 1019, Estero, FL 33928

HOURS
MON-FRI 9AM-6PM
eastern time

formal schooling, or an appreciation of natural history, might consider them especially grotesque.

There are two subspecies of the hellbender: the eastern hellbender (*Cryptobranchus a. alleganiensis*) and the Ozark hellbender (*C. alleganiensis bishopi*). The Ozark subspecies is found in the cool waters of the Black River and White River systems in the Ozark Mountains, of northern Arkansas and adjacent southeast Missouri. The eastern hellbender is more widely distributed. Its overall range covers southern New York to northern Maryland; southwestern New York to southeastern Kansas, northern Arkansas, extreme northern Mississippi, and in the Appalachian Mountains from northern Alabama to western Pennsylvania, USA (Frost, 1985).

Male hellbenders are sexually mature at five years while females typically reach adulthood at six years (Duellman and Trueb, 1986). Reproduction occurs in the late summer and early fall. The male constructs a nest in an area where the stream, in which they live, pools. By removing sand and silt from under a flat rock or log, the male forms a grotto facing downstream. He actively defends his nesting area from other males as he waits for a female(s) to join him. Upon the arrival of a gravid female, if she is so inclined, she will deposit up to 450 eggs in the nest

while the male releases milt into the surrounding water. Several females may deposit eggs in the same male's nest. The male exhibits a form of parental care as he will remain at the nest site with the developing eggs, guarding them, until the larvae hatch out 8 to 12 weeks later (Behler and King, 1979). The larval hellbenders are only about 1 1/16 in (2.70 cm) in length at hatching (Behler and King, 1979). Hellbenders will remain in their larval stage 4-5 years (Duellman and Trueb, 1986).

Due to the protected status under CITES of the two *Andrias* species, American hellbenders are the only members of the group that are occasionally available to the private herpetoculturist, from those states in which they are not protected. However, pollution and damage to natural waterways, causing excessive siltation, have reduced the hellbenders range to a point that most states protect this species. Herpetoculturally-bred specimens from legally collected adults may soon become the sole source of captive specimens. These salamanders are really only suited for the advanced herpetoculturist who can provide quality water systems. These large amphibians should be maintained in 40-gallon (182 liter), or preferably larger, aquaria. Water temperatures must be maintained at approximately 50-60°F (10-15°C). Food items

may include earthworms, appropriately sized crayfish with their pinchers removed, grass shrimp, freshwater prawns, goldfish and/or other small fish, and small pieces of squid presoaked in fresh water. Water conditions need to be kept **very** clean. Excessive surface agitation or the use of a wet/dry trickle filter is necessary. By using ceramic flower pots, smooth tile pieces, and smooth river stones, small hide areas can be created for the hellbenders. While researching these animals, the authors received numerous hellbender "horror" stories concerning bites; thus handling should be restricted as much as possible both for the health of the salamander and for the handler.

The authors would like to thank the following for their assistance with this article: Ed Maruska, Robyn Saunders, and Johnny Arnett of the Cincinnati Zoo, Oscar Shiu of the Scales and Tales Trading Company in Hong Kong, Louis Porras of Zooherp Inc., Bill Lamar of Green Tracks - RAINFOREST EXPEDITIONS: (1-800-9-MONKEY), Ken Howell, the California Academy of Sciences, and Yuji Arai for translation of some Japanese material.

Literature Cited

- Behler, J. L. and F. W. King. 1979. The Audubon Society Field Guide to North American Reptiles and Amphibians. Alfred A. Knopf, New York.
- Collecting and Breeding Magazine. 1960. 22(7), 22(8), 22(9), 15(2). Japan.
- Duellman, W. E. 1993. Amphibian species of the world: Additions and corrections. The University of Kansas Museum of Natural History. Special Publications No. 21.
- Duellman, W. E. and L. Trueb. 1986. Biology of Amphibians. McGraw-Hill Book Co., Inc. New York.
- Frost, D. R. 1985. Amphibian Species of the World. Allen Press Inc., and The Association of Systematic Collections, Lawrence, Kansas.
- Ikoma, Y. 1963. Notes on the giant salamander (*Megalobatrachus japonicus*). Bulletin of the Tsuyama Museum of Science Education. Tsuyama, Japan.
- Ikoma, Y. 1973. Collected works of the giant salamander (*Megalobatrachus japonicus*) in Japan. Tsuyama Museum of Science Education. Tsuyama, Japan.
- Kobara, J. 1985. The Japanese giant salamander. Tokyo: Doubutsushya. [in Japanese]
- Kuwabara, K., N. Suzuki, F. Wakabayashi, H. Ashikaga, T. Inoue, and J. Kobara. 1989. Breeding the Japanese giant salamander, *Andrias japonicus*, at Asa Zoological park. The Zoological Society of London. 28:22-31.
- Moore, R. C. 1958. Introduction to Historical Geology. McGraw-Hill Book Co., Inc. New York.
- Yoshihiro, I. 1959. Hanzaki Note II. Bulletin of the Tsuyama Museum of Science Education. Tsuyama, Japan.
- Yoshihiro, I. 1963. Notes on the giant salamander. Bulletin of the Tsuyama Museum of Science Education. Tsuyama, Japan.





We Take The Work Out Of Reptile Care...

Pretty Pets has developed an easy to use food morsel that can be fed either dry or moistened. Pretty Pets products feature nutritionally balanced formulas that offer the proper calcium to phosphorus ratio for reptiles.

Multi-colored, fruit-flavored shapes in several morsel sizes make converting your pets to a prepared diet very easy. Conversion can take as little as three hours.

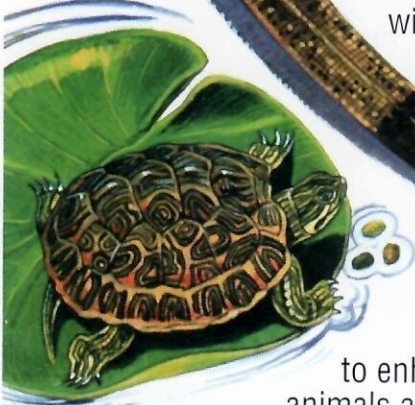
Teach your pets to eat a dry diet and add to your free time. You can feed a two or three day supply at a time without worrying about the spoilage associated with messy fruits and vegetables.

Our Juvenile Iguana formula will produce the proper growth and development for healthy internal organs. Adult Iguana is designed

With three sizes of food morsels available in Tortoise Food, you can feed everything from a baby desert tortoise to an adult Galapagos tortoise. Excellent growth and development is easily achieved.

We also carry a full line of bird food products including daily diets, breeder diets, specialty foods, and handrearing formulas.

For Your Nearest Distributor
1-800-356-5020



to enhance the life span of your animals and promotes good color development and increased activity levels.

Our Aquatic Turtle Diet is designed specifically for an aquatic situation and features a long float time, excellent acceptability, and balanced nutrition for optimum growth.

Pretty Pets®

Ask the Experts

by Winston Card



Q. I recently constructed a large outdoor pond for a group of 10 mid-sized semiaquatic turtles of the genera *Trachemys* and *Pseudemys*. The pond has a recirculating water system that seems to keep the water clean most of the time. However, when the turtles are fed at their regular three-times-a-week intervals, the water becomes so dirty I almost always have to drain the pond and refill it. Can you recommend some way to help keep the pond clean without adding an expensive filtration system?

Orange City, FL

A. There are several things you can do to reduce the amount of waste in your pond. You do not indicate how large your pond is, but as a general rule of thumb, for the size of the turtles you are maintaining, you should provide at least 50 gallons (190 liters) of water per specimen. Overcrowding not only creates a management problem for you, but also stresses the turtles. These conditions also create ideal breeding grounds for harmful bacteria and internal parasites.

In addition, adding some aquatic vegetation will help keep the biological system in your pond healthy. The food particles and excrement left by the turtles putrefy, with the help of bacteria and other microorganisms, into chemical substances. These substances can then be consumed by the plants. If you are using one of the commercial pond liners instead of a natural soil bottom, it might be advisable to sink a few planters filled with clean coarse sand into

the pond bottom. The use of leaf mold, peat, or artificial fertilizers is not recommended. These substances are less penetrable than sand and may lead, in time, to anaerobic putrefaction, arising from the insufficient supply of oxygen. In time, nutrients provided by the turtles waste should be enough for the plants to thrive. It will probably be necessary to furnish the pond with mature plants with larger roots and rootstocks so that they have a sufficient amount of reserve nutrients until the biological system in your pond becomes established. Plastic milk crates lined with mesh make ideal planters for outdoor ponds as water and nutrients can flow more evenly through these than through an enclosed planter. Once the biological system becomes established in your pond, avoid frequent water changes as this will destroy the healthy organisms that help keep the water clean. When you must remove water, only remove half the total volume, so as to maintain a biological balance. Although these same principles generally apply to smaller indoor fish tanks, they usually don't work for indoor turtle tanks because the amount of waste produced by most species requires water changes be made too frequently.

Additionally, there are several floating commercial turtle diets available that maintain their integrity in the water. These help to reduce the amount of detritus that results from food particles that settle on the bottom before specimens can consume them. You can also make your own floating diet. A diet I've used in the past with some success

consists of ground beef, fish, chicken, and a variety of vegetables, especially some of the dark green leafy vegetables. It may help to add one of the commercial pellet diets to this mixture to ensure a well-balanced diet. These ingredients should be thoroughly minced together in a food processor. This diet can then be mixed with unflavored gelatin, first using the directions on the package to prepare the gelatin mixture. This mixture can then be spread into a large baking pan about an inch (2.5 cm) deep and refrigerated overnight. Once the mixture gels, it can be cut into portions and frozen for later use.

Q. In the article regarding breeding sand boas (*Eryx* sp.), that appeared in *The Vivarium* 5(1), the author didn't indicate when feeding should resume after the winter cycling period.

San Diego, CA

A. In general, it is best to fast snakes for at least two weeks before beginning a winter cooling period. Reptiles cannot digest food items when temperatures are below the thermal optimum necessary for them to metabolize properly. If specimens are fed during this period, food items will putrefy in the digestive tract causing enteritis and, sometimes, death. While food should not be offered during cool down, it is vital that specimens be provided with fresh water during the cooling period to prevent possible dehydration.

The winter cycle should not be terminated abruptly. Raise the ambient temperature about 5°F (3°C) daily until an appropriate temperature gradient has been established. Once your animal has the opportunity to establish its optimum temperature, feeding can resume. It is a good idea to offer a small food item for the animal's first meal after being cooled.

Q. I have just acquired two Asian water dragons (*Physignathus cocincinus*), and I am a bit concerned. We have them in a glass-fronted vivarium and one of them keeps hitting the glass. At the moment, his front lip is damaged and his teeth are showing. Please tell me how to stop this from happening.

Bordon, England

A. This is common for some of the large iguanine (agamid and iguanid) lizards that are found in riparian (living on the banks of a natural watercourse) habitats in the wild. Their flight response is geared to leaping off of branches into bodies of water to escape predators. When disturbed in

The LIZARD KEEPER'S HANDBOOK

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

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

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

To order your copy send
\$9.95 plus \$2.00 shipping to:
AFH Orders
PO Box 300067
Escondido, CA 92030-0067



captivity, these lizards employ a natural defensive tactic by leaping in the direction they perceive as escaping danger. These lizards do not tend to recognize transparent barriers, such as glass or wire, and are often injured in their attempts to escape through them. Injuries, such as the one described in your letter, can also occur when barriers are inadvertently struck by the lizards during an attempt to flee. Abrasions most commonly appear in the rostral area, exposing the lizard to potential infection (ulcerative stomatitis). Treatment for this condition, should it develop, can be long and involved and the animal will probably never be display quality. Considering the stress already incurred by newly acquired specimens, preventative measures may be the best course to take with new acquisitions as well as recovering specimens to prevent future damage.

Glass barriers can be temporarily covered on the outside with paper, cloth, or soap. Over time, small strips can be re-

moved to slowly acclimate specimens to the captive environment. The amount of time it takes to acclimate individual specimens may vary, but strips can usually be removed every other week or so. Any abrasive wire should be covered with a dark window screen to allow for a smoother surface and to be more easily seen as a barrier. Flight distance (the distance an animal will allow you to approach before fleeing) increases with enclosure size, so it may be helpful to house newer specimens for a time in smaller enclosures until they begin feeding well and exhibit a measurable weight gain. Once specimens are introduced into larger enclosures, it may still be necessary to cover transparent surfaces for a time until the lizards become acclimated to their new environment. Some lizard specialists prefer to keep basilisks and water dragons in enclosures that are non-transparent on three sides.



Kenyan sand boa, *Eryx colubrinus loveridgei*. Photo by Clay Garrett.

Written by Professionals
for the
Serious Herpetologist

A VETERINARY GUIDE TO THE PARASITES OF REPTILES:

Vol. 1, Protozoa

by Susan M. Barnard & Steve J. Upton
Orig. Ed. 1994 ISBN 0-89464-832-2
164 pp. \$26.50

REPTILE CLINICIAN'S HANDBOOK:

A Compact Surgical
and Clinical Reference

(based on BIOMEDICAL AND SURGICAL
ASPECTS OF CAPTIVE REPTILE HUSBANDRY)
by Fredric L. Frye

B.Sc., D.V.M., M.Sc., CBiol, FIBiol,
Fellow, Royal Society of Medicine

Orig. Ed. 1994 ISBN 0-89464-783-0
288 pp. Paper \$24.50

FEATURES

- Compact Size
(4 3/4" X 6")
- Wire-O Binding

INCLUDES

- Formulary of Drug Dosages
- Conversion Tables
- Index and Cross References

SNAKES OF THE UNITED STATES AND CANADA:

Keeping Them Healthy in Captivity,
Volume 2, Western Area

by John Rossi & Roxanne Rossi

Orig. Ed. 1994 ISBN 0-89464-808-X
Price Not Set
(Volume 1, Eastern Area is also available)

In Preparation for 1995

REPTILE AND AMPHIBIAN VARIANTS: Colors, Patterns and Scales

by H. Bernard Bechtel
ISBN 0-89464-862-4

CORAL SNAKES:

Biology, Identification, Venoms

by Janis A. Roze
ISBN 0-89464-847-0

Please call or write for our
FREE Herpetology Catalog

Domestic orders, please add \$5.00 for first book, \$1.50 each additional (Paper - \$3.00 for the first book, \$1.00 each additional) to cover shipping charges. Foreign shipping costs available upon request.



KRIEGER

PUBLISHING COMPANY

P.O. Box 9542, Melbourne, FL 32902-9542
(407) 724-9542
Direct Order Line (407) 727-7270
FAX (407) 951-3671

The Charles Darwin Research Station: DARWIN'S LEGACY

by
Liza Marie Wallner

The Galapagos Islands, a living laboratory of evolution, are located 600 miles (665 km) west of the Ecuadorian coastline, northwest of South America. These islands are home to some of the most unique reptiles and birds and one of the most renowned scientific research stations in the world today.

The Charles Darwin Research Station was built near Puerto Ayora on Santa Cruz Island, which is one of the 13 to 15 major islands of the Galapagos Archipelago. The station was named for the famous English naturalist and visionary, Charles Darwin. Darwin used observations made on the Galapagos Islands in 1835 to develop his theory of evolution by means of natural selection, which has become the foundation for modern biological science.

The Galapagos Archipelago was first discovered by humans in the 1500s. During the following 300+ years, sailors, whalers, and explorers exploited the giant Galapagos tortoises in great numbers. In the days

before refrigeration, trips to the Galapagos islands could be the difference whether or not sailing ship crews might survive their long voyages. The endemic island tortoises were a source of fresh meat and balanced nutrition which did not spoil. The tortoises were inhumanely stacked below deck until they were ready to be served up. Since Galapagos tortoises have such extremely slow metabolisms, they could live up to a year without food or water when "stored" in this manner. These insular, trusting, slow-moving tortoises were an easy target for the crews of these sailing vessels. Until the islands gained some protection, these gentle chelonians were taken in unbelievable numbers. Several individual island populations of these giant reptiles had been pushed into extinction, many of the others were brought close to the brink of extinction.

Supertramp (undesirable, aggressive, introduced) species of domesticated animals were introduced by man to the islands. Many of these later became feral. These aggressive, non-native species out-competed the endemic and native wildlife for food and preyed upon island species directly or indirectly by consuming the vegetation they fed upon. Introduced goats, rats, dogs, cats, burros, and pigs continue to plague endemic island wildlife to this day.

The country of Ecuador, which owns the islands, set aside some of the Galapagos Archipelago as a protected wildlife reserve in the 1930s. However, it was not until 1959 that all uncolonized areas were declared a national park. This park area represents 85-90% of the islands' total land mass. The Galapagos Islands and their unique wildlife have benefitted under this protection to this day.

The World Wildlife Fund (WWF), San Diego Zoo, and several other conservation organizations were instrumental to the initial formation of the station, which began operating in the early 1960s. The major functions of the Darwin Station are scientific research, captive breeding, and repatriation of native/endemic wildlife, as well as conservation/wildlife education.

The buildings at Darwin Station consist of the Van Straelen Exhibit Hall, which provides information on the geological history of the islands, and the tortoise exhibit hall,

which contains displays explaining the evolution of the islands' Galapagos tortoises. Also present are the Galapagos tortoise rearing pens for young tortoises ages 1-5 years, and an open compound containing adult Galapagos tortoises. Visitors to the station may approach these chelonians quite closely here. This is the area where most visitors to the islands actually get to see a living Galapagos tortoise. There are also hatcheries, research, and breeding areas for land iguanas and other more endangered Galapagos tortoises which are not open to the general public due to these reptiles' need to interact without being disturbed by humans.

Fifteen subspecies of Galapagos tortoises were described. The genetics of each of these populations are currently under review. For now, eleven surviving races are currently recognized. Ten are doing well, due largely to the captive-breeding efforts and head-starting efforts at Darwin Station.

However, one taxa from the island of Pinta is represented only by a single individual male named "Lonesome George."

Although he is paired with two females from another island deemed to have tortoises of the closest morphological similarity to him, George has been unsuccessful at producing offspring. If he should die without fathering any offspring to which he can be bred back, the Pinta race will also become extinct.

"Lonesome George," a *Geochelone nigra abingdoni*, can be seen in one of the enclosures at the Darwin Station. He is a reminder of the havoc modern humans have brought to island ecosystems throughout the world.

The conservation efforts of the Charles Darwin Research Station are directed at addressing the specific threats to each race of Galapagos tortoise and to the land iguanas, whenever possible.

After an incubation of 2-7 months Galapagos tortoise (*Geochelone nigra*) hatchlings use a specialized egg tooth to begin the pipping process. Hatching takes from 1 to 5 days. Neonate tortoises weigh approximately 3 oz (80 g).

"Onan," an ancient male Pinzon Island saddleback tortoise (*Geochelone nigra ephippium*). Photo by Fred Caporaso.





Fernandina (Narborough) Island, one of the most pristine of the archipelago, having never been settled by humans. Hundreds of marine iguanas congregate on the cliffs at Punta Espinosa.

By 1965, the station had begun its first rearing and repatriation program for the tortoises of Pinzon Island. This original program has been expanded to include six different populations of Galapagos tortoise (*G. nigra*) and several populations of land iguanas (*Conolophus subcristatus*) from different islands.

The major problem of repatriated tortoises bred, reared for several years at Darwin Station, and then released back into their natural range, continues to be the feral mammals now inhabiting their island homes.

On Pinzon Island, for instance, eggs from nests are transferred to the Darwin Station to prevent them from falling prey to introduced rats. At the tortoise rearing center, the young

are raised to 5 years of age to a size where they can be released back onto Pinzon and survive.

On Santiago Island, feral pigs are destroying the eggs at the tortoise nesting sites. Management efforts by the Darwin Station in this instance include pig eradication/control, nest protection, and the transfer of vulnerable young tortoises for head-starting at the center.

Other problems plague the Galapagos tortoise populations on the southern part of the large island of Isabela. Feral mammals and continuing illegal human predation for food has caused major recent tortoise declines. Stepped-up captive-breeding efforts in conjunction with feral animal eradication pro-



A Seymour Island marine iguana (*Amblyrhynchus cristatus*) on sesuvium plant.



Marine iguanas along the trail on Hood (Española) Island.

grams has been the focus of the Darwin Station on this island.

Dr. Craig MacFarland who has studied the ecology and reproductive biology of the Galapagos tortoises for the past several decades found that there were so few tortoises of certain groups, that males and females would be very unlikely to find each other during the breeding season in the wild.

Hood Island tortoises were just such a group. The entire population of Hood tortoises were collected for a concentrated breeding effort at Darwin Station on the island of Santa Cruz. Unfortunately, 12 females and 2 males were all that remained.

After it was verified that the San Diego Zoo had an adult male Hood tortoise on display, arrangements were made to transfer this male from San Diego to the Charles Darwin Research Station.

On Monday August 1, 1977, this male left San Diego. It arrived in the Galapagos on August 8. Park Superintendent at that time, Miguel Cifuentes was on hand along with Dr. MacFarland for the uncrating. Upon release, the tortoise began feeding immediately and, after a standard quarantine period, was introduced to the other Hood Island tor-



Alcedo Galapagos tortoise (*G. n. vandenburghi*) walking along the volcano rim.



Young Galapagos tortoises (*Geochelone nigra*) being reared at Darwin Station, Santa Cruz (Indefatigable) Island.

toises. It is estimated that this male from the San Diego Zoo has fathered approximately 280 offspring, the great majority of which have been repatriated to Hood Island after head-starting.

In 1988 improvements included the expansion of the tortoise rearing center at the Darwin Station. The interpretation programs for visitors were also upgraded. An emphasis was given to explaining the management of captive populations, the problems caused

deficiencies. Dietary changes were made with the help of Dr. Olav Oftedal from the National Zoological Park in Washington D.C. His previous nutritional work with the Pro (Green) Iguana Verde Program in Central America helped him in the formulation of the new diet for the Galapagos land iguanas. Mortality rates for the land iguanas of Darwin Station decreased dramatically after the new diet was begun. Deaths dropped from an estimated 25% a year to just 1.9% in 1991.

Both the Galapagos tortoise and the land iguana programs at the Charles Darwin Research Station have been, and continue to be, successful. Although the research station has accomplished much, there are still many future goals. Ing. Pablo Larrea, Acting Director of the station and Dr. Linda Cayot, Director of the Department of Herpetology there, list the following objectives for the future of the Charles Darwin Research Station:

1. Maintain and improve the captive-rearing program for the giant tortoises.
2. Maintain and improve the captive-rearing program for the land iguanas.
3. Re-survey all tortoise and land iguana populations.
4. Develop management plans for specific populations of endangered tortoises and land iguanas.
5. Implement the use of Permanent Implanted Transponders (PITs) for long-term identification of individual tortoises and land iguanas.

To make these needed programs become a reality, the Darwin Station is dependent on the

donations from individuals and organizations worldwide. An address for more information will be listed at the end of this article.

While the Charles Darwin Research Station is the easiest place to view Galapagos tortoises on these unique islands, nothing can compare to seeing the giant chelonians within their wild habitat.

The southern rim of Alcedo Volcano on Isabela (Albermarle) Island has one of the highest remaining concentration of wild tortoises found on Galapagos. All travel in

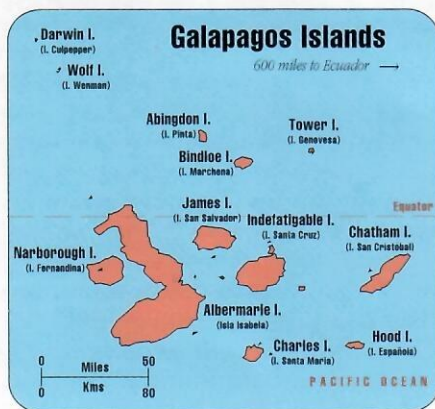


Adult Galapagos tortoise at the Charles Darwin Research Station.

nonhuman populated areas of the islands is restricted to organized groups led by an approved guide. After climbing over 7 hours in 90°F (32°C) heat with a 45-50 lb (20-23 kg) backpack, you can stand on the rim of this active volcano and stare into its huge caldera. Planning and confirming your Alcedo climb in advance is required before you leave for your adventure. You must also stay a minimum of 2 weeks with a group of less than 12 persons to be allowed the possibility of this special option.

Making this hike is well worth the physical effort and advanced planning when you look upon hundreds of giant tortoises in their cloud forest environment inside the rim of this huge shield volcano.

Males of the Alcedo populations can grow to a maximum size of 700 lb (318 kg) while the females rarely exceed half that weight. The carapace of tortoises from



by feral introduced animals, and an overview of the various programs carried out at the station.

Success of the conservation programs for the Galapagos Islands land iguanas proved to be at least as challenging as the tortoise programs. There were two main reasons for this. The first is that there is no age or size when young land iguanas are safe from feral animal attacks, unlike the giant tortoises. Therefore, the emphasis has been placed on periodic wild dog and cat control and, where possible, eradication to solve this problem. Another difficulty has been a high mortality rate of young, captively reared land iguanas at Darwin Station due primarily to dietary



Close-up of Alcedo Galapagos tortoise (*G. vandenburghi*).

Alcedo are dome-shaped and somewhat elongate. The females have smoother, more rounded shells than the males.

The 3500-ft (1067 m) elevation of Alcedos' rim results in the formation of a fine mist known as "garua." The vegetation of this upland ecosystem is lush and green. The tortoises feed at their leisure on the tender grasses which grow here.

The only concerns are the occasional burro and goat sightings. These introduced mammals could pose a threat to the giant tortoises by denuding the vegetation should their numbers increase. The remoteness of the place and the difficulty in traversing the rough terrain largely spared the Alcedo tortoises the mass slaughters from sailors in centuries past.

Alcedo's rim is still a pristine environment boasting an estimated total tortoise population of 3,000 to 4,000 individuals. As they are often found in groups, a variety of behaviors can usually be observed in these social reptiles.

In contrast, Galapagos tortoises which inhabit the drier, flatter, smaller islands in the Galapagos chain often differ in their size, shape, and behaviors. Typically, these tortoises

individual may even stand on three legs on occasion to gain an advantage.

Saddleback subspecies generally browse on the pads of cactus "trees" rather than graze on grasses and small plants. The latter are simply much less plentiful on the drier lowland island habitats. The saddleback tortoises are generally more difficult to see in the wild, and the ones that have survived are extremely wary and alert.

A visit to the Galapagos Archipelago is an unforgettable experience. Trips can vary in length from 3 to 21 days, or even longer, if you have unlimited funds and time. Two weeks is a good duration to get a feel for the islands' unique wildlife and fragile ecosystems. That length of stay may allow time for the Alcedo climb, but remember to arrange it and confirm before your arrival.

Can too much eco-tourism be a bad thing? A growing concern of conservationists is the dramatic increase in tourism through the use of the large 34-90 passenger cruise ships. The low-impact approach of the small 6-12 passenger ships does typically hold more advantages when exploring this island chain. Your party and guide may be allowed access to more remote areas with better opportunities to see the rarer wildlife. This eco-sensitive approach will also cause less damage to the fragile Galapagos ecosystems.

The Galapagos Islands are a special destination. Continued conservation efforts by the Charles Darwin Research Station in conjunction with responsible eco-tourism should be Darwin's legacy.

References

- Bacon, James P. 1978. A tortoise goes home. ZooNooz, Feb.
- Beebe, William. 1924. Galapagos - World's End. G. P. Putnam's Sons, Dover Publications, Inc. New York.
- Cayot, Linda J. and Larrea, Pablo. July 1992 - June 1993. Conservation of giant tortoises and land iguanas in the Galapagos Islands. Charles Darwin Research Station, Galapagos.
- Greely, M. 1983. Little giants: Galapagos tortoise hatchlings. ZooNooz, Sept.
- Olsen, J. 1976. Notes on Galapagos tortoise reproduction. ZooNooz, San Diego Zoo/Wild Animal Park Publications, San Diego, CA. Apr.
- Schafer, Susan F. 1991. The birth of the reptile house and Old Number 5 was there to see it. ZooNooz, July.
- Schafer, Sue. 1979. Tortoise islands. ZooNooz, Dec.



Male Galapagos land iguana (*Conolophus subcristatus*) looking for edible vegetation at Urbina Bay, Isabela (Albemarle) Island.



Female Galapagos land iguana (*C. subcristatus*) on Plaza, a tiny island not far from the large island of Santa Cruz.

More Information

The Charles Darwin Foundation Inc., Dept. 0553 Washington, D.C. 20073-0553. Tax deductible donations of \$25 or more entitle the giver to receive the bilingual publication: The Galapagos Bulletin/Noticias de Galapagos. Contributions of any amount help to support the many conservation programs at the Charles Darwin Research Station, Galapagos.

Wilderness Travel 801 Allston Way Berkeley, CA 94710; ph. 800-368-2794. Eco-sensitive trips to the Galapagos Islands, and destinations worldwide. Unique wildlife viewing adventures including the Alcedo Volcano climb.

Suggested Reading

- Darwin, Charles. 1962. The Voyage of the Beagle. Doubleday Inc. Garden City, NY.
- Jackson, Michael H. 1985. Galapagos, A Natural History Guide. Calgary Press, Calgary, Alberta, Canada.
- Moore, Tui De Roy. 1980. Galapagos: Islands Lost in Time. The Viking Press, NY.
- Rachowiecki, Rob. 1992. Lonely Planet—Ecuador & the Galapagos Islands. Lonely Planet Publications, CA.
- Sephenon, Marylee. 1989. The Galapagos Islands: The Essential Handbook for Exploring, Enjoying, & Understanding Darwin's Enchanted Islands. The Mountaineer's Press, Seattle.



Captive Galapagos tortoises in zoos receive a varied diet. At the San Diego Zoo, daily greens such as parsley, kale, and mustard are expanded with the addition of *Opuntia* cactus, hibiscus, and banana leaves. Sudan and oat hay are given for roughage. Three times weekly the tortoises are fed fruit and vegetables. They show a particular fondness for tomatoes. Fresh water is always available.

than half the size of most of the dome-shaped races. Hood Island Galapagos tortoises can be highly aggressive and territorial toward other males and are part of a strict linear hierarchy. Dome-shaped males on other islands have a pecking order as well. The unusually long neck and legs of saddleback males gives them a more impressive sparring appearance.

Research by Dr. Craig MacFarland and Susan Schafer-Severtson has shown that a male tortoise asserts its dominance and gains breeding rank by being able to raise its head, with mouth open, higher than its rival. An

THE MECHANICS OF PYTHON REPRODUCTION

by

Dave and Tracy Barker

It is during the first quarter of the year that most pythons captive in northern hemisphere collections copulate, grow follicles, ovulate, and lay eggs. This time of the year is often referred to as the breeding season for pythons. There are, of course, exceptions to this general time period. Some species, such as reticulated pythons, *Python reticulatus*, and freckled pythons, *Liasis mackloti*, are typically fall breeders. Other species, most notably the green tree python, *Morelia viridis*, have been documented laying eggs in nearly every month of the year. But most pythons in northern collections are breeding right now.

In this column we will describe in general terms some of the reproductive organs and structures of pythons, and some of the physiological events of python breeding, a topic about which we receive hundreds of questions every year. And we would here like to point out to the avid boa aficionados who read our column because of its title, and who rightly may be feeling a little ignored, that what follows with regard to pythons (excepting the mention of eggs shells) is also true for boa constrictors, and probably the other boas as well.

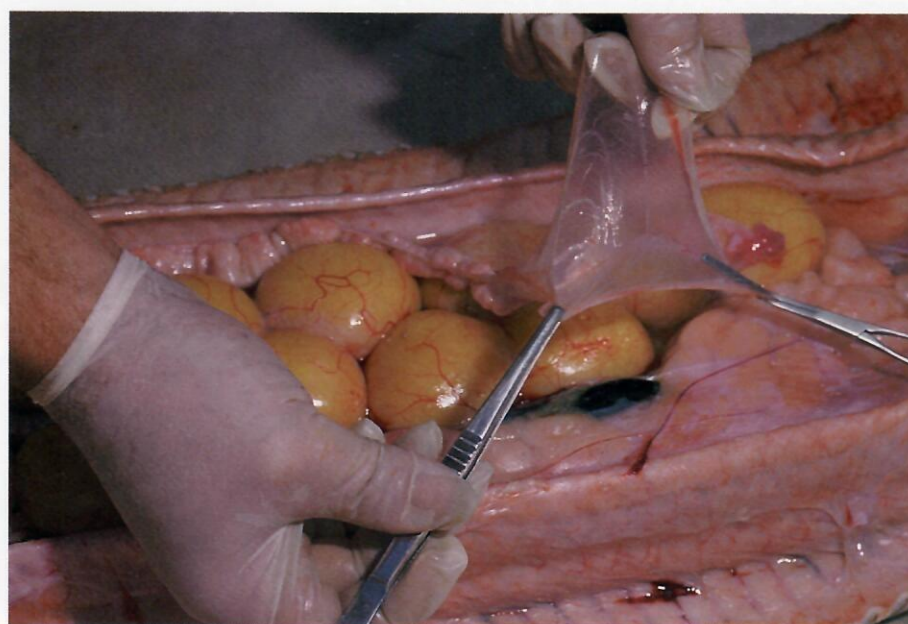
The gonads (sex organs) of male pythons are termed *testes* and the gametes (sex cells) produced by male gonads are termed *spermatozoa* or, more commonly, *sperm*; the gonads of female pythons are termed *ovaries* and the gametes created by female gonads are termed *oocytes*. The gonads of either sex are located in approximately the same area of the body of

pythons (see Fig. 1). In pythons, the right gonad is located more forward in the body than the left. Sperm pass from a testis to the cloaca via the *vas deferens*, which is essentially a long tube. In females there are *oviducts* that provide passage for the eggs from the ovaries to the cloaca. In females that are not reproductively active, the oviducts are slender and straight, resembling *vas deferens* in appearance; however, the

the wall and positioned side-by-side, are two gonadal openings. In a male python the gonadal openings are the openings of the *vas deferens*; in a female python they are the openings of the oviducts and are sometimes specifically termed the oviductal openings. It appears to us likely that the horizontal flap of tissue on the anterior wall of the cloaca folds upward, covering the gonadal openings during excretion, and

folds downward, covering the intestinal opening during reproductive functions. The gonadal openings of both sexes are small and tightly closed, except in females just before egg deposition; at the time of egg deposition, the elasticity of the oviductal openings into the cloaca has enormously increased to allow the passage of the eggs.

On each side of the cloaca, just inside the vent, is a muscular, erectile papilla. At the tip of each papilla is a



Pictured is the ostium of the right oviduct of a Burmese python. The infundibulum can be seen as the convoluted tube that passes from the ostium to the left side of the photo. In the background are yolky follicles that were still undergoing vitellogenesis and were about 3-4 weeks from ovulation when this python died. [The orientation of the snake in the picture is that the head is on the right and the tail on the left.]

oviducts of reproductively active pythons are much enlarged, thickened, and somewhat convoluted.

The *cloaca* is a pouch or chamber in the body of all living reptiles through which pass all products of both excretion and reproduction to outside the body. The external opening of the cloaca of a python is variously termed the anus, vent, or cloacal opening. If one could peer up through the vent into the cloaca of a python, then the internal openings into the cloaca could be observed. On the anterior wall of the cloaca are three openings, each closed by a tightly puckered sphincter: on the lower portion of the wall, close to the venter, is the intestinal opening; above that is a horizontal flap of skin; above that, at the top of

tiny opening, the opening of the scent gland. There are a pair of scent glands located in the base of the tail, each is a small elongate sac connected by a thin duct to its opening at the tip of these papillae. Pythons, usually in a state of excitement, will raise their tail, slightly open their vents exposing the erected scent gland papillae at each side of the vent, and spray twin thin streams of a viscous and, in some species more than others, very odoriferous fluid. We have observed large python species such as Burmese pythons and reticulated pythons to be able to spray these streams a little over 8 feet (2.5 m) with what seems to us to have been considerable accuracy when we were the targets. We have ob-



Immediately above the hands in the photo is the right testis of an adult male Burmese python. Across the body cavity, separated by a large blood vessel and the intestine, is the left testis. The dark green area in front of the left testis is the area of the duodenum, pancreas, and gall bladder; the area has been stained from bile leaking from the gall bladder. [The orientation of the snake in the picture is that the head is to the left and the tail is to the right.]



As can be seen by the presence of the egg in the right oviduct, this Burmese python has died before laying its eggs. The left ovary is held up for inspection, revealing the oocytes already formed for the next reproductive period. Below the ovary is a portion of the intestine, slightly convoluted and filled with air as the beginning of decomposition has set in.



This is the everted and erect left hemipenis of a male Burmese python. Pictured is the sulcus spermaticus, a groove on the medial surface of the hemipenis that, during copulation, is a channel in which motile python sperm swim to the oviductal openings in the cloaca of a female.



Pictured here is a female albino Burmese python that died after laying the eggs in the left oviduct, but before laying all of the eggs in the right oviduct. The empty left oviduct is held up for examination, and the full-term and shelled eggs are seen in the right oviduct.



The cloaca of a dead albino Burmese python is manually held open to reveal the two oviductal openings. They are enlarged from recent egg laying.

served spotted pythons to be able to spray a distance of about 3 feet (1 m).

There are two side-by-side openings on the posterior wall of the cloaca of both sexes of pythons; these openings are not closed by sphincters, and, technically, they are outpockets of the cloaca. In male pythons, each of these open into the space on the inside of an inverted *hemipenis* (it's a brain-teaser, but this area is actually bounded by the exterior surface of the hemipenis). In female pythons each of these open into the similar but smaller space of a structure best referred to as a



The closed forceps have been introduced into the entrance of the right hemipenis of a male Burmese python. The tail has been cut open to reveal the inverted right hemipenis as it lies in the tail. A thumb and forefinger open the vent by pulling the anal scale forward, and the opening to the left hemipenis can be seen across the vent, above the point where the forceps disappear into the entrance of the right hemipenis. Note the right cloacal spur.

hemipenis homologue. A hemipenis homologue is a funnel-shaped structure that quickly narrows posteriorly, becoming a connective ligament that passes posteriorly further to attach to caudal vertebrae on the distal portion of the tail. A hemipenis homologue cannot be everted in the manner of the hemipenes of males. The hemipenis

homologue in the past has been referred to as the "accessory scent gland," but it is neither glandular in structure or function.

Located on the midline of the posterior wall of the cloaca, in-between and ventral to the two openings is a single, unpaired, papilla. We have seen this structure only in our examination of African rock pythons and Burmese pythons, but we suspect it's present in all pythons. We can find no reference to this structure in the literature. It appears to us to be erectile, and if it turns out to be well-innervated, it may be a structure homologous to the *glans* of turtles and crocodilians.

It is our observation that oocytes are always present in the ovaries of mature female pythons; examination of the ovaries of sexually mature female pythons typically will reveal two visible generations of oocytes. This year's oocytes, prior to vitellogenesis, have the size and appearance of individual pieces of cooked tapioca. Next year's oocytes appear as tiny dark dots scattered through the tissue of the ovary.

At the beginning of the breeding season, in response to environmental and physiological cues which have not been thoroughly investigated and are not well understood, a female python will begin *vitellogenesis*, the production of yolk. Yolk is a complex mix of proteins, phospholipids, and neutral fats, and the exact composition of yolk varies considerably among animals. In pythons (based on what is known about all other vertebrates), yolk is not synthesized in the oocytes, but is produced elsewhere (mostly in the liver), transported in a soluble form via the blood to the ovaries, and deposited in the oocytes. During vitellogenesis the oocytes begin to quickly and enormously increase

Position of the Internal Organs of a Female Burmese Python Using Ventral Scales as Exterior Markers

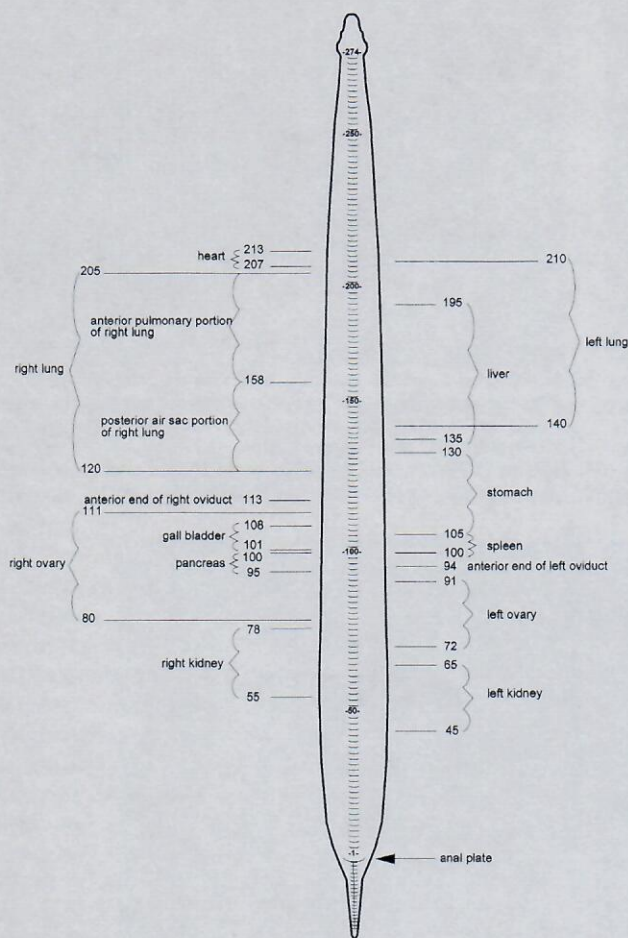


Fig. 1. The ventral scales were numbered as follows: the anal scale was not counted; the posteriormost ventral scale was counted as ventral #1, and the ventrals were counted forward to the anteriormost ventral. This specimen had 274 ventrals.

at the same time. Exactly what triggers ovulation, however, is not known. Among the external stimuli postulated to trigger ovulation are courtship and copulation, increased environmental temperatures, relatively radical and sudden temperature changes, basking, and extreme barometric changes.

Ovulation can occur prematurely, resulting in some or all of the ova being small in size and underdeveloped. This is the most common cause of the small, shelled, infertile egg masses commonly referred to as "slugs" that are sometimes deposited by females at egg laying.

The follicles release ova into the body cavity during ovulation. The ova must then be moved into the oviducts, which are separated from the ovaries. The anterior portion of an oviduct is termed the *infundibulum* (plural, *infundibula*) and the anterior end of the infundibulum flares into a funnel shaped opening termed the *ostium* (plural, *ostia*). The ostium of each oviduct is located anterior to the corresponding ovary (see Fig. 1). There is a mediolateral septum separating the two ovaries and oviducts, so the ova from the right ovary go into the right oviduct; those from the left ovary go into the left oviduct. The ova must be pushed forward in the body, crowding them up into the body to the level of the anterior end of the oviduct, where one by one they pass into the ostium and on into the oviduct. Once in the oviduct, an ovum is most often referred to as an *egg*. Each is fertilized by sperm waiting in the oviduct from the copulations prior to ovulation. The fertilized ova are then spaced down the length of the oviduct. There is no shell gland in pythons; each egg is shelled in its place in the oviduct.

The "lump" is a prominent mid-body swelling that occurs as the ovulated ova are pushed forward in the female's body. When we say prominent, we mean that the lump can be huge, having the appearance of a way-too-large food lump. Upon seeing the lump, most keepers report their first thought to have been "Who the heck snuck in here and fed my snake?" or some other not-so-polite similar thought. The lump lasts only a short time, usually about 8-24 hours. Female pythons may appear smaller in bulk and "less gravid" after ovulation than before, as the oviducts are considerably longer than the ovaries and the ova are more spaced out.

It is the posture and the actions of ovulating pythons that cause the lump. Females literally push the ova forward to the level of the infundibula, something possible only for an animal with such a long and slender body. The ova are physically

their size as they fill up with yolk; at this stage they are termed follicles.

In pythons (and other snakes) there are numerous stimuli which are hypothesized to initiate vitellogenesis, including: exposure to sexually mature males during the previous year; avid courtship by males; copulation; lower environmental temperatures and consequent depressed body temperatures; large amounts of visceral fat in the female; and shortened day lengths. The body of a female python undergoing vitellogenesis becomes larger, distended, even swollen, in the region containing the ovaries (see Fig. 1) as the follicles approach maturity. As the follicles approach full size, the large size and distended diameter of the posterior body of the female python leads many keepers to mistakenly assume that ovulation has occurred and the female is gravid.

The oocytes may mature into follicles at different rates. The ovaries of pythons undergoing early vitellogenesis typically will show a variety of sizes of oocytes and fol-

licles; when vitellogenesis is completed, all of this year's generation of oocytes have become mature yolked follicles, all similar in size.

Pairs of pythons will copulate through the period of vitellogenesis. Typically there is sexual activity at the beginning of this period, a decrease or cessation of activity during the middle, and much sexual activity and frequent copulation at the end of this period. The sperm that will fertilize the eggs are introduced into the oviducts at this time.

Once the follicles in the ovaries are full-sized and mature, it is then time for ovulation to occur. It is our observation that female pythons can carry mature follicles in the ovaries for a period of time, several weeks, possibly a couple of months. *Ovulation* is the event when the follicles are released from the ovary into the body cavity. After ovulation a follicle is termed an *ovum* (plural, *ova*). Female pythons typically have synchronous ovulation, meaning that both ovaries release their follicles

pushed forward in the body as the female python laterally compresses her posterior body and creates tight serpentine coils in the body posterior to the mass of ova creating the lump. Ovulating females alternate between short periods of moving the serpentine coils up into the lump (a motion somewhat remindful of the motions of the anterior body when pushing up a regurgitation) and long periods posed but motionless. Ovulating females may appear to be unwilling to move from their very distinctive pose if disturbed. When pairs of pythons happen to be together at the time of ovulation, the males are typically observed to be quietly sitting apart from the females.

Python breeders do not always see their snakes lumping; not surprising since it may be a fairly short-lived phenomenon. We have witnessed it in 18 taxa of pythons, and we consider it highly likely that all pythons "lump" at the time of ovulation. We also have seen the lump at the time of ovulation in several species of boas, sand boas, *Loxocemus bicolor*, and (not as pronounced/prominent) in several kingsnake species.

One further important note: the successful reproduction of pythons requires year-round proper maintenance, and the most successful python keepers realize that no part of the year is any less important than another. During most of the year female pythons are storing the fat reserves necessary for reproduction; both sexes do best during the winter if they have sufficient fat to be able to go extended periods without feeding. To maximize their chances to reproduce, pythons must be well nourished and healthy all year. We have witnessed many failed breeding projects of keepers who have ignored their pythons throughout the summer and into the fall, then to try to make up for their neglect with a surplus of food as winter approaches.

We are always astounded by the number of things regarding the reproduction of pythons (and other families of reptiles, as well) that are not known, and have not been investigated. Difficulties maintaining and reproducing reptiles, particularly snakes, have always impeded research in these areas. Herpetoculturists have taken great strides in the past decade in the areas of maintenance and captive reproduction. With their cooperation, perhaps the next decade can become an era of important research into the many remaining mysteries of reptile reproduction.



Vida Preciosa International, Inc.

V.P.I. PYTHONS

The Largest and most Diverse
Python Collection in the World

Dave and Tracy Barker

Selling only the finest
Captive-Hatched stock.

65 Years combined experience
Breeding 22 forms of pythons

WE BUY AND BROKER
CAPTIVE HATCHLINGS
AND PRIVATE COLLECTIONS



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

Boerne, TX 78006

Phone and Fax: (210) 537-5000

Reptile Breeders
specializing in:
Pythons
Sand boas
Boas
Kingsnakes
Dragons

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

Send \$2.00 for Price List
se habla español

FLORIDA INTERNATIONAL REPTILE SHOW

Presented in Cooperation with the
Tampa Bay, Suncoast and Manasota Herpetological Societies

**Tampa Convention Center
September 30 - October 1**

- Complete Selection of Captive-Bred Reptiles on Sale
- Amphibians, Cages, Supplies, Books, Artworks & More
- Herp Photography Contest & Display
- Guest Speakers • Book Signings

Bill Haast
Miami Serpentarium Labs
Dr. Richard Funk
Amazon Veterinary Services
Paul Beaver, Ph.D.
Amazonia Expeditions
Rick Hudson
Fort Worth Zoo
Peter Weis
Weis Reptiles

For more information:

Doug Wagner
P.O. Box 2725
Dunedin, FL 34697
PH: (813) 736-1368

Vendor Booths Available Now

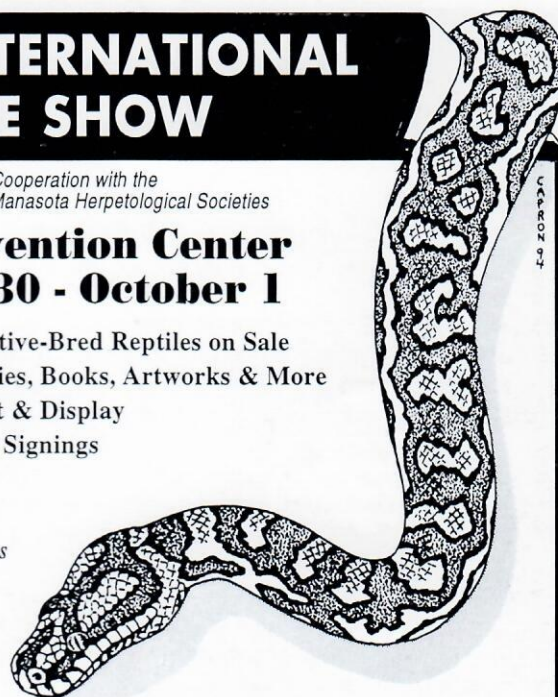
**75,000 Sq. Ft.
Reserved!**

Show Hours: Sat.-Sun. 10 A.M.-5 P.M.

Hotel Reservations:

Holiday Inn
1-800-275-8258
1-800-465-4329
(Request show rate)

Speakers: Sat. 7-11 P.M. Holiday Inn

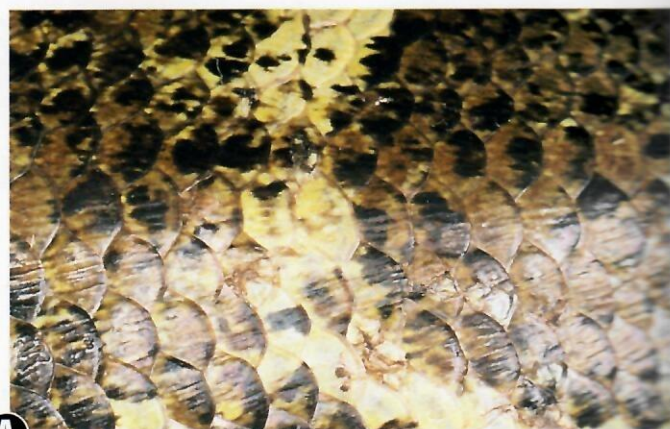


BITS & PIECES

by
William B. Love

As a follow-up to the last herp photography article two months ago, and also as a "lighter" format for this column for a change, try this little quiz: What species (and subspecies, if applicable) are we gazing upon a small portion of, in these shots? The appropriate real-life analogies to this kind of test might be when you're in the field and spot only a tiny patch of reptilian-looking scalation in a knot hole in a tree—or—the difficulty our United States Fish and Wildlife Service (USFWS) and United States Customs personnel face in identifying endangered species by only a section of hide now adorning a belt or wallet among a returning traveller's foreign-purchased souvenirs.

This idea was inspired by two main sources: the annual "Identify This Herp" slide show contests by John Tashjian that have entertained many of us during evening socials at recent International Herpetological Symposia around the United States, and the article entitled "Macrophotography" by John Christensen, photos by Henry H. Rueter and John Christensen, in *The Vivarium* 2(6). For the past year especially, I've kept an



A

eye open for unusual and interesting views of herpetofauna that might lend themselves well to this challenge. Here are a few to let everyone have a chance at the fun. *Photos of the "best herps" in their entirety appear on page 39 along with a brief discussion of each subject.*



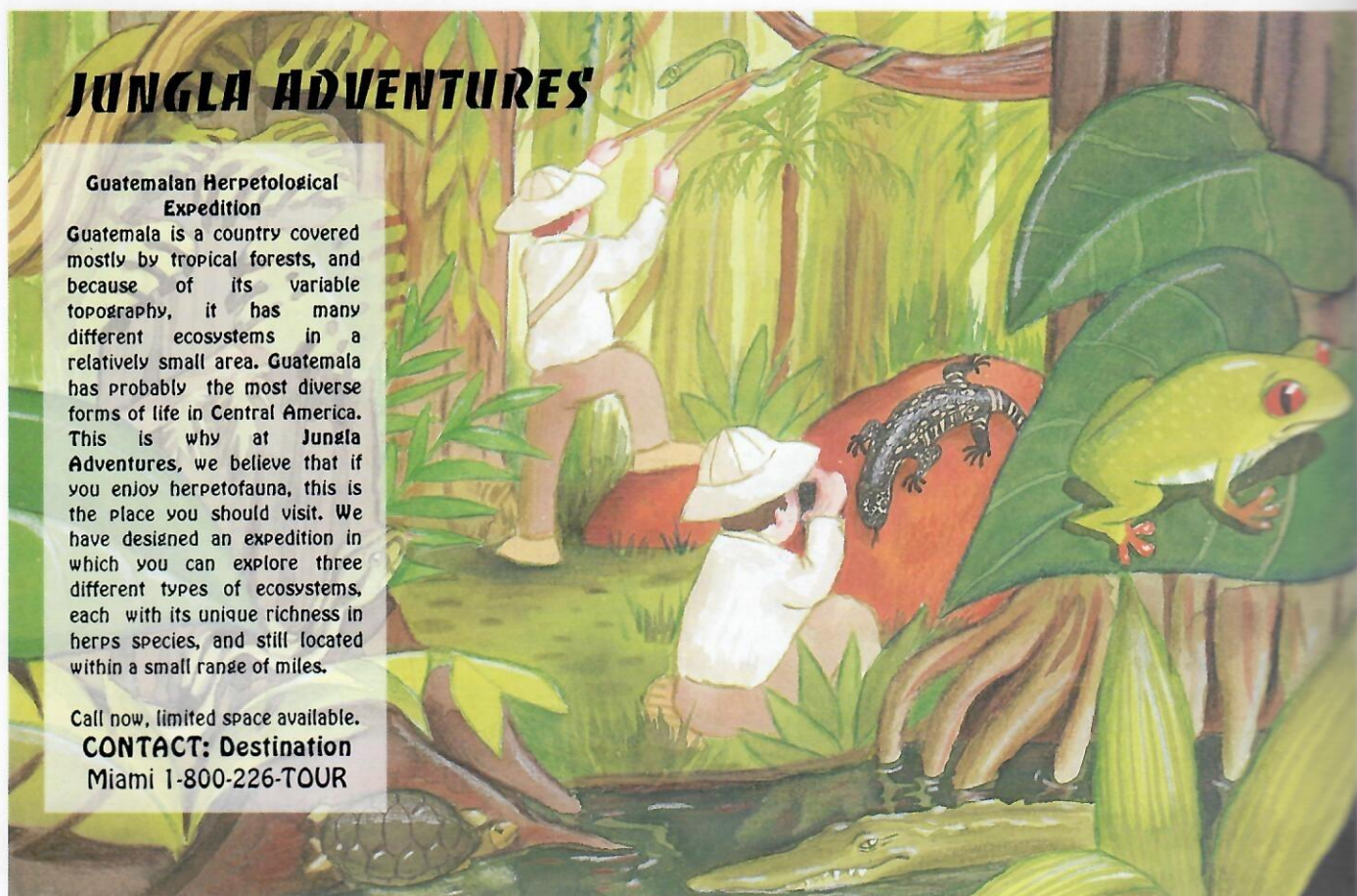
JUNGLA ADVENTURES

Guatemalan Herpetological Expedition

Guatemala is a country covered mostly by tropical forests, and because of its variable topography, it has many different ecosystems in a relatively small area. Guatemala has probably the most diverse forms of life in Central America. This is why at Jungla Adventures, we believe that if you enjoy herpetofauna, this is the place you should visit. We have designed an expedition in which you can explore three different types of ecosystems, each with its unique richness in herps species, and still located within a small range of miles.

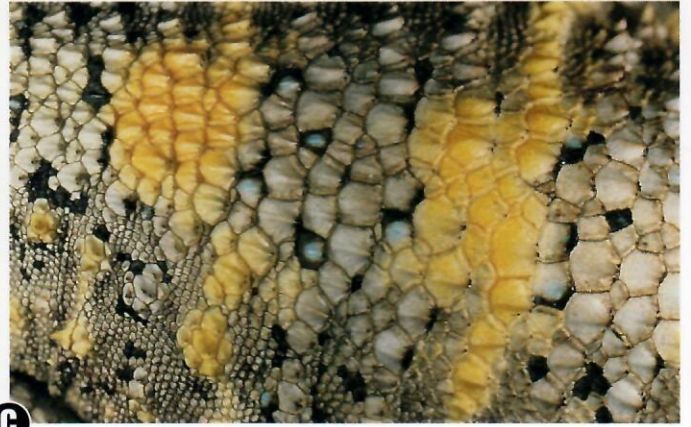
Call now, limited space available.

CONTACT: Destination
Miami 1-800-226-TOUR





B



C



D



E



F



G



H



I

TARANTULAS

From The World Over

Arachnomania PO Box 413 Aurora IL 60507-0413

Top quality captive bred and
wild caught specimens!

We readily offer personal
advice and assistance!

From the black and white patterned beauties of
Sri Lanka to ruthless goliath bird eaters, we
specialize in hard to find exotics!

Avicularia versicolor • *Brachypelma smithi* • *Heteroscodra*
maculata • *Haplopelma lividus* • *Poecilotheria fasciata* • *Psalmopoeus*
cambridgei • *Stromatopelma calceatum* • *Theraphosa blondi*

Free Price List!
Call or write TODAY!

Jeff Swanson
(708) 844-0352

New Caledonia - Continued from page 17

leachianus, but neither could be gotten without his climbing spikes. We have arranged for Frank to take a freight plane, at a special rate, which will leave for Nouméa at 7:30 a.m. We need to be up no later than 6:30 a.m.

November 25: Island B

There was a screw up; the pilot of the freight plane was not informed about Frank in time and refuses to take him. We scramble for a ticket on Air Caledonie. Frank takes off to Nouméa with the two specimens of skinks that we think could be undescribed. An appointment has been set up to meet the Director of *Parks et Re-*

serves, who surprisingly meets Frank at the airport. The director has gone beyond all expectations to be helpful, and we wonder how we can ever return the favor. When one thinks he is the New Caledonian equivalent of director of Fish and Wildlife or Fish and Game for this island, the contrast between his approach and that of the U.S. Fish and Wildlife Service can be appreciated.

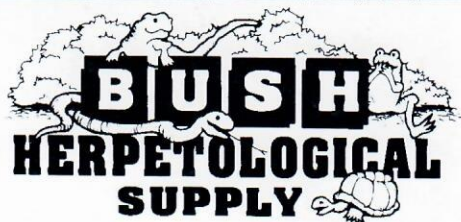
The biologist we met earlier joins Frank and the director to act as translator. Frank also meets with the director of research at ORSTOM, who is impressed by the skinks. The large specimen appears to be *Phoboscincus garnieri*, a rare species known from less than twelve specimens.

Furthermore, we have collected it outside its known range in a different type of habitat. To be able to see live specimens is of considerable interest to these people. *Phoboscincus*, which can reach a length of 2 feet (60 cm), is the longest of the New Caledonian lizards and the second largest in terms of weight after *R. leachianus*. The medium-size skink we found on Island A is, as far as we can tell, a type of *Tropidoscincus*, albeit larger than any on record. Frank explains that we will arrange to leave specimens of these two skinks at ORSTOM and make them available for herpetologists Aaron Bauer and Ross Sadler to examine when they arrive the following month.

Frank gets his spikes, gets our stuff in storage, and takes the Air Caledonie plane back to Nouméa. Meanwhile, I have acquired the necessary supplies for the trip to Island B, arranged for a boat, and taken our luggage and animals out of the gite and stored them at Charles' house.

We leave at 5:30 p.m. for Island B from the beach near Kuto. Just as we are about to leave, a man with whom I had spoken earlier brings us a *Bavayia* that he has found under a piece of tree bark. It appears to be a *Bavayia cyclura*, a large species, but we will have to consult a key when we get back. The sea is rough and the boat is pounding away amidst waves of 6-8 feet (1.5-2.5 m). I decide to go up front with the captain and stand up because my butt is getting sore from slamming into the seat. I have to stand with legs bent to prevent hurting my back because the boat is slamming down so hard. The sea is so rough that the boat can't get too close to the shore of Island B without damaging its hull against the coral rock.

We need to carry our gear across water to the shore which means taking off our shoes and walking on sharp coral rock. We arrange to be picked up the next morning at 10 o'clock. As we get close to shore we notice there are sea snakes along the shoreline, and we see more of them as we climb up a grassy slope. In fact, Frank almost steps on one. We decide to pitch our tent more inland to avoid having to sleep with sea snakes at night. We are thrilled nonetheless at the opportunity to observe sea snakes again. These are black and pastel-orange sea snakes (*Laticauda colubrina*), although there are also black-and-blue ones farther down the shore. Because we just have a few minutes before sundown, we decide to explore Island B quickly to get some sense of orientation, thus avoiding a repeat of our recent experience on Island A. Fortunately, we find that a small trail had previously



1-800-451-6178

Full line of herpetological supplies
Call for catalog

MICROCLIMATE ELECTRONIX

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

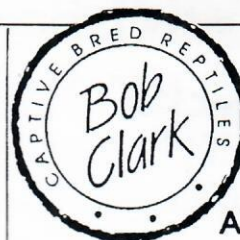


- No stress from flashing lights.
- Accurate temperature scale.
- Heat source gives constant dependable warmth.
- Field tested for over 4 years.
- Remote sensor allows for outside mounting of thermostat.
- Indicator on front panel dims and brightens with heat output.
- Optional capability of maintaining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

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

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

Fax# (405) 749-0798
Tel# (405) 722-5017



**ALL
AVAILABLE
PYTHON
COLOR
AND PATTERN
MORPHS**

Consistently first producing new varieties for the market

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

Other python species also available

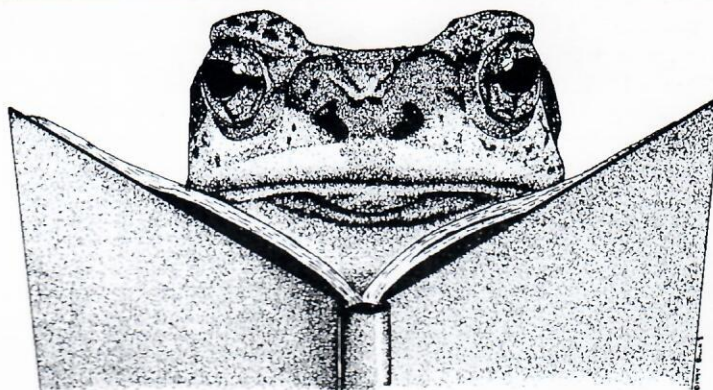
**SPECIALIZING IN THE CAPTIVE
PROPAGATION OF PYTHONs**

12316 Val Verde Drive
Oklahoma City, OK 73142
U.S.A. (405) 722-5017
FAX (405) 749-0798



been cut through the forest, running the width of the island. We are very relieved.

We have sardines with lemon juice, and cookies for dinner because the French bread has turned to stone. We try to sleep for awhile, but Frank is edgy and obsessive as usual and wants to set out early. It is a bad idea because looking for *Rhacodactylus* is very hard on the eyes. It means examining closely hundreds of tree limbs, trunks and saplings, concentrating hard only by the light of a flashlight. The eyes, after just a few hours, get exhausted from straining. To set out early means we will get burned out early. By 8:30 p.m. we have seen nothing and I decide to go back to the tent and rest for awhile. I'm already frustrated and we've barely started. It seems that we might have another bad night. At 9:30 Frank comes and has collected a couple of male *R. leachianus*. Surprisingly he found them on an *Araucaria*, a rough-barked tree on which *Rhacodactylus* is virtually never found. They clearly prefer large, smooth-barked trees in our experience. The two males were engaged in a fight when Frank collected them, and one had just dropped its tail. We suspect that the population density on Island B is very high and that intraspecies competition may be high as well. I spot another *R. leachianus*, but it is too high and soon disappears into the canopy. Between



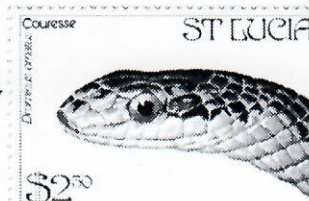
Bibliomania!

195 West 200 North, Logan, Utah 84321

**Herpetological Books, Cage & Field Supplies,
Collectibles**



Herpetophilately
Too!



Write for a free pricelist

NEKTON® NEKTON®

NEKTON-REP

A COMPLETE VITAMIN SUPPLEMENT FOR REPTILES & AMPHIBIANS.



Other fine products for Reptiles & Amphibians from Nekton

TONIC-R

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

MSA

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

REP-COLOR

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

For more information
call or write:

NEKTON U.S.A., INC.

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

NEKTON -PRODUKTE
W.-GERMANY

New Caledonia - Continued from page 37

9:30 and 11:30 p.m. we have collected nine *R. leachianus*.

We found the majority of *R. leachianus* inland from the trail (Frank used his compass for finding his way back), so we are quite certain that their density is not a factor associated with any clearing such as the



Typical habitat for many ground skinks including *Leiopisma nigrofasciolatum*.

trail. We have covered an area that we estimate is less than two percent of the island and examined only about ten percent of the trees in that area. We suspect that *R. leachianus* are very common on Island B. We figure there are at least 1,000 specimens and possibly 2,000 or more on this small is-

land about 1/3 square mile (1/2 km²). The *R. leachianus* here are found on smaller trees and sometimes on fallen trees within easy reach. We note that the *R. leachianus* on this island are smaller than the mainland form around Yate and Goro. They are lighter colored and also have a more defined and extensive light pattern. They may be a separate subspecies or possibly just a smaller insular form. Island B would be a good choice as a natural preserve for this gecko. We are thrilled.

One specimen that Frank collected appears axanthic, as the skin is suffused with black and gray. The labials of many of the other specimens are a pale yellow-orange. Of note is that all specimens we have caught had no tails or newly regenerated tails, one with a forked double tail. We are elated and we stop collecting other *R. leachianus* although we spot them. Near the area of capture, we release one older male that we feel we will not need. Around the tent where we have dumped sardine oil there are numerous land hermit crabs making a ruckus among the dried leaf litter. They are impressive and they include a dark-red hairy species that stands out from the rest. The night sounds as if we are surrounded by wailing children. By spotlight we discover that we are near the burrows of petrels. We see them near the underbrush,

these attractive, sleek brown birds that seem almost friendly. They bicker and wait for more than half the night. The *R. leachianus* are in bags close to our heads. We fall asleep, content. In the morning we will check out the skinks and sea snakes.

November 26: Return to Island A

Upon awakening, we step out of the tent among land hermit crabs still gathered around sardine-smelling litter. It's a beautiful day. We disassemble our tent and proceed down the trail in search of skinks. I see a species that I think is another variation of the *Tropidoscincus* we found on Island A, as well as other small species, but we are somehow not too motivated to do a herpetological survey of this island, mostly because we feel we won't have the time to do a thorough job of it. We observe the sea snakes along the shores and notice that there is one small species of skink, which we suspect is *Caledoniscincus australocaldonicus*. (We plan to check this out on a future trip.) They live among the rocks near the shoreline. The boat arrives at 10 a.m. and the sea is again rough, so we need to make several trips wading out into the ocean to get our gear in. We go in barefoot so we don't get our boots wet, but the coral rock is sharp and painful. On the way back to shore, we make a crazy decision: to go back to Island A tonight. We have no room to stay in anyway, and we think, what if we find another giant skink? We must be gluttons for punishment but that is what we set out to do.

As we land we realize it is too late for breakfast and we dread the thought of (aaargh!) another ham and cheese sandwich. Charles rescues us by pointing out a small snack bar that serves a reasonably priced meal of the day, all day long. We have lunch there—cold fried fish and cold rice—but at least it's something different. We buy cookies and drinks that we'll have for dinner. If anyone is wondering why we don't buy fruits and vegetables, it's because there has been a drought on the Isle of Pines, and fruits and vegetables are scarce until the next boat brings them in from Nouméa. The only fruit we find are oranges and they are terribly sour. It is obvious that our dietary habits are far from exemplary and our families at home would be horrified. We nonetheless look forward to the Pipeto chocolate-covered cookies we will have for dinner—simple pleasures in somewhat difficult times.

As the time is drawing near for our boat ride to Island A at 3 p.m., the weather is becoming progressively worse. Fortunately,

Continued on page 40

BITS & PIECES

—Continued from page 35.

This little quiz may not cause a run on macro lenses and flashes at the world's camera shops, but it may evoke a creative twist in someone's next photo session. Not being a gadget-oriented photographer, I must at least share one hot little "secret" with anyone unfamiliar with a relatively new piece of equipment that simplified the taking of most of these. My Nikon N4004 AF camera, already a dinosaur of yesterday's market, held the Fujichrome Velvia (ISO 50) film that actually took the original

slides. But far more importantly, the task of lighting each close-up shot for me over the past year has gone to a Nikon SB-21B TTL macro speed light. This system, useable only with newer Nikon cameras, essentially takes the guesswork out of getting correct exposure at ultra-tight working distances, allowing me to focus almost totally on composing the best possible scene.



A The caiman lizard (*Dracaena guianensis*) is a seldom-seen inhabitant of riverine environments near Iquitos, Peru and other parts of northern South America. Snails make up a major portion of the diet of this saurian which can reach about 4 1/2 ft (1.4 m) in length. The skin texture is very "crocodilian" in nature, although its coloring resembles the rubber dime-store alligators of toy stores.



B Fire skinks (*Liopha fernandi*) are infrequent imports from the humid, wooded parts of west Africa. They live in and around burrows on the forest floor. Their hardy nature will probably make them a prime project for captive-breeding efforts since the number collected in the wild has remained low for years.



C You get a "B" just for narrowing this one down to "agamid lizard." The painted agama (*Laudakia stellio brachydactyla*) has been appearing in larger numbers lately as an arid-adapted desert species from the Mideast. This male was colored up more spectacularly than its cage mates, probably as a seasonal reproductive response.



D Considerable variation occurs among different populations of prehensile-tailed skinks (*Corucia zebata*) in the Solomon Islands, east of New Guinea. These unusual arboreal lizards have been abundant in the pet trade recently. A CITES Appendix II listing has had little impact on exports from that non-signatory nation of islands.



E Islands amidst a primordial green soupy sea on some distant world? The intricate patterns of the skin of ornate horned frogs (*Ceratophrys ornata*) could double for the Rorschach tests used in measuring the mind's interpretation of abstract designs. And, of course, they're superb pets. Watch your fingers, please.



F Of the three endemic boas on Madagascar, the largest, the Madagascar ground boa (*Acrantophis madagascariensis*), from the northern half of the island is the least-seen in the United States. Its reproductive strategy of bearing low numbers of large-sized neonates is one factor slowing progress in making this attractive species available to more herpetoculturists.



G Never a common species in the animal trade, the smooth-front caiman (*Paleosuchus trigonotus*) is now rarely offered for sale. This diminutive crocodilian, seldom over 3 1/2 ft (1 m) in total length, is sometimes encountered in small, isolated, water-holding pools deep in the rain forests of the Amazon basin where it may reside in a "gator hole" pocket of water.



H This ought to stump most folks. While closing in on a head shot of this casque-headed iguana, ["forest chameleon"] (*Corytophanes cristatus*), an iguanid from Nicaragua, I couldn't help but take this opportunity to frame only this juncture of odd scalations at the base of this forest dweller's crest.



I The color and shape of the shell, combined with the absence of the telltale nuchal scute, confirms this carapace as belonging to an adult Galapagos tortoise (*Geochelone nigra*), not an Aldabra tortoise. That's how I differentiate them from that other giant most likely to cause confusion among zoo visitors.

Largest in-stock selection in the United States.

- CROCODILES • VENOMOUS REPTILES • GIANT PYTHON
- RARITIES—DIAMOND PYTHON, WOMAS, BLACKHEADS
- 25 YEARS IN BUSINESS • VETERINARIAN ON STAFF

We will pay highest prices for your captive bred herptiles.
Send for our free catalog.

Phone (904) 568-1830

Fax (904) 568-1832



Tom Crutchfield's
REPTILE ENTERPRISES, INC.

P.O. Box 1145 • Bushnell, Florida 33513



THE GOURMET RODENT™

RATS AND MICE

Bill & Marcia Brant
6115 SW 137th Avenue
Archer, FL 32618
(904) 495-9024
FAX (904) 495-9781
© All Rights Reserved

AMAZON Herp Expedition

with
Philippe de Vosjoli and Bill Lamar

Experience the Amazon river of Peru, the largest rainforest in the world, and home to 290 herp species.

April 8 - 15, 1995, with optional 1-week extension to April 22

Learn about our mightiest river, her fantastic herps, great wildlife, mystical pink dolphins, and exotic culture. We'll travel on our own chartered "floating hotel," hiking (day and night), swimming, fishing, and relaxing as we cruise some of the upper Amazon's more interesting tributaries. Such trips have averaged 75 to over 100 herp species.

Philippe de Vosjoli and Bill Lamar, two vastly experienced and internationally known herpetologists will guide you on this 8 day trip.

Contact GREENTRACKS, INC., at 1-800-9-MONKEY or fax at 903-597-5131 for cost and application forms. Trip will be filled on a first-come-first-served basis.

New Caledonia - Continued from page 38

Adrien who lives close to our gite, has a large boat that can handle the sizeable waves without difficulty. The only glitch is that because the boat is large, and considering the wind and high waves, he can't get close to shore, so we once again have to

carry our equipment from boat to shore. By the time we get to Island A, the sky looks ominous and dark and the wind has really picked up. Setting up the tent is a task and it takes every effort to keep the thing from flying out of our grasp and into the ocean. The stakes barely hold in the soft ground. We decide to tie as much of the tent as possible to trees and carry rocks to place over the stakes. The weather is miserable and before long it starts to rain. We nonetheless hack open some coconuts to spread them along the western shore in the hope of catching a coconut crab. By the time we get back we have no choice but to stay in the tent, partially so that our bodies can keep the thing down.

Inside the tent, the wind is howling and before long the rain strikes like small stones against a window pane. One whole side of the tent is bowed in because of the wind's force. Frank has sardines again but I have only chocolate-covered cookies. We decide to go to sleep, as there is nothing else to do. We wake up at 8:45 p.m. but the weather outside is even worse, so we decide to go back to sleep and possibly call it a night. At 11:45 p.m. the storm has passed over and we wake up, get our lights and gear together, and decide to explore Island A by night once again. We decide to stick to the north and west sides as much as possible. Around 12:30 a.m. we find a coconut crab and several hermit crabs around our coconut husks and, deciding to bring the coconut crab back with us, we put him in a canvas bag that Charles has given us. We then start to explore trees and I stay close to shore. Frank, being more daring, decides to go

more inland because he believes his compass is alright again.

At 1:30 a.m. I am back at camp. At 1:45 a.m. Frank is back and he has caught a female axanthic *R. leachianus*, which surprisingly has a full tail. This is the only *R. leachianus* with a full tail we find on this trip. We speculate that this is because *R. leachianus* is uncommon here and more spread out so that intraspecific competition is minimal. We know that there are owls and rats on Island A as well as introduced goats. The goats may be responsible for the poor ground layer of herbaceous plants and the lack of ferns. We know rats are death on insular lizards. The high density of leafless twigs up to head level are also probably the work of the introduced goats. In any case we are thrilled to have found a *R. leachianus* on this island.

November 27: *R. ciliatus* heaven

We get up early to try to catch some skinks. Frank scores and manages to catch another *Phoboscincus*. What a great way to end this visit. We will have caught two specimens of this very rare lizard. At one point while we dismantle the tent, it takes off because of the high winds, but fortunately it gets lodged between two trees or it would have ended up in the ocean. The boat arrives at 10 p.m., as scheduled.

We must walk a short distance in the water to get our gear into the boat. The ocean is unusually rough. Once we get back to shore, Adrien's family is kind enough to offer us coffee, tea, and biscuits, which we gladly accept. Once again the generous hospitality of the people here impresses us. We get back to shore and to our car, where a group of people are gathered to see the lizards. Some even come over to touch the skins of both the *R. leachianus* and the *Phoboscincus*. They are fascinated and we are pleased to be contributing somewhat to these people overcoming a fear of these lizards. This form of "Show and Tell" will continue on a daily basis until the end of our trip. The word has gotten around that a couple of crazy lizard hunters are on the island. We head back to Charles' and then proceed on to the gite where we have been able to get another bungalow. We haven't showered or shaved and have been wearing the same clothes for two days. We look it, and we suspect that we smell it. A hot shower is a blessing. We both fall asleep until 4 o'clock that afternoon. We have invited Charles and his family to have dinner at a restaurant near the gite at 7 p.m. We actually have the best meal we've had since our arrival in New Caledonia: squid salad, fish, and Isle of Pines land snails, which are famous throughout New Caledonia. That

evening we plan to search forest site 1 again. Charles' brother, Roc, who has an interest in animals, wants to join us and we gladly include him. Another pair of eyes can only help. The weather initially is stormy and rainy but eventually turns into intermittent rain.

It is close to 9 p.m. by the time we arrive at the forest trail. At 9:45 I spot a *R. leachianus* way up a tree. Frank puts on his spikes and rappelling equipment to try to catch it, but by the time he is 25 feet into the tree, the gecko takes off into the canopy. Frank ties himself in place and uses rope that he attaches to one of his spikes, which he takes off. He then swings the spike and after two or three tries manages to snag the branch the *R. leachianus* is on. He shakes the branch until the *R. leachianus* finally drops and I catch it. Determination and the ability to climb trees are two necessary qualities for catching *R. leachianus*. Without at least one person who is expert at tree climbing with gear, the chances of collecting these lizards, as well as several other kinds of *Rhacodactylus*, is very slim. For the inexperienced, tree climbing at night can also be very hazardous. We have been told that one renowned Australian herpetologist lost his life trying to collect these geckos.

We walk the trail until 11:05 and then decide to turn back because it will take us two hours of examining trees and shrubs on the way back. At 11:15 p.m. Roc spots a *R. ciliatus* in the foliage of a sapling around 9 feet (2.7 m) off the ground. Frank bends the sapling over and catches it. It is a male. We're slowly getting a sense of the type of habitat preferred by this species, and as I alluded to earlier, it requires a completely different search image from *R. leachianus*. The latter are found on smooth-barked trees with large-diameter trunks, that make up the canopy of primary tropical forest, usually on branches forking off the main trunk. The *R. ciliatus*, when active, typically are found at between 6 and 12 feet (1.8–3.7 m) in the foliage portion of small-diameter saplings and shrubs. We all adjust our search image as we work our way back toward the car. By 12:30 a.m. Frank has caught three more *R. ciliatus*, including a beautiful spotted female. Roc has found another male. I find a *R. chahoua* on a fallen tree at about 9 feet (2.7 m) and catch it before it hops into the surrounding dense vines and foliage. It turns out to be a female and I am thrilled. It will be a nice mate for the male caught earlier. I find another *R. ciliatus*, but we leave it alone because it is another male. For the same reason, we do not collect several *R. ciliatus* that we spot on the way. Their hemipenile bulges can be quite easily de-

THE VIVARIUM Volume 6 Issue 5

INCUBATORS
CAGES
HEATING
THERMOSTATS

DON'T MISS THIS!

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



Guaranteed Lowest Prices!

◆ FREE 48 Page Catalog ◆

Big Apple Herpetological
(Formerly Big Apple Snakes)

For Catalogs & Orders (800) 666-6672

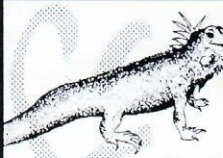
Big Apple Herpetological • 33 Main St. • Port Washington, NY 11050

WE WELCOME RETAILERS!
ASK FOR OUR WHOLESALE PRICE LIST!

HUSBANDRY
FEEDING/DOSING
MEDICATIONS
VITAMINS

CAPTIVE BRED SNAKES
BOOKS
HERP SHIRTS

LIGHTING
THERMOMETERS
FOODS
ACCESSORIES



Florida
Iguana & Tortoise
Breeders



Captive Bred Galapagos and Spur Thigh Tortoises
Rhino, Cuban, Cayman and Lewisi Iguanas
Bearded Dragons

A select line of imported reptiles, amphibians and
arachnids at wholesale prices

Personalized Care • Door to Door Service • Special Orders

OUR PRIVATE FARM

Kurt Leckie Sam Pascucci

Tel: (305) 680-8492 • Fax: (305) 434-4959

IMPORT / EXPORT DIVISION

Rudy Pascucci

Tel: (305) 846-1370 • Fax: (305) 846-1368

P.O. Box 291413 Davie, Florida 33329-1413

Complete Line of Quality Herptile and Small Animal Supplies



We specialize in providing our customers
with professional, personally researched products.
Learn from our experience!

Call for Catalog!

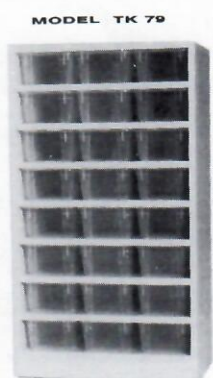
VISA and Mastercard Accepted

32514 Ne 77th St.
Carnation, WA. 98014-6701

Phone (206) 861-7964
Fax (206) 333-4205



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



MODEL TK 79
24 COUNT
SHOE BOX RACK
23 1/2" w x 41 3/4" h x 13 3/4" d
\$225



MODEL ST 56
6 COUNT
SWEATER BOX RACK
17 3/4" w x 41 3/4" h x 23 1/4" d
\$225



MODEL RM 27
4 COUNT
BLANKET BOX RACK
21 1/4" w x 41 3/4" h x 31" d
\$225

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

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

New Caledonia - Continued from page 41
tected by flashlight. We get back to the car by 1:10 a.m. We're at the gite by 1:45 but don't go to sleep until 2:30 a.m. We are beat. I volunteer to get up so I can be at Air Caledonie at 7:15 to change our tickets. We have decided to stay an extra day.

November 28: The confrontation

I am up by 6:30 and back by 8 a.m. I crash until 10:30 a.m., and we have to hustle once again to be out by the 11 a.m. checkout time and go back to another gite. We of course miss breakfast. We have lunch, crash until 4 o'clock, and start doing some packing so that we will be ready to

leave the next morning to catch a plane back to Nouméa.

That evening we have dinner at Charles' home, where Frank and I get into our only tense argument since this trip has started. I get carried away talking French with Charles and his family, and Frank feels completely left out because he can't understand the language. But we figure that if this is the only bicker we have on this trip, we're doing pretty good. Charles and his family give us hand-carved sandalwood huts as gifts, and we are both touched by their gesture of friendship.

That evening we go back to the northern forest in the hope of getting one or two ad-

ditional female *R. ciliatus*. Things are not to turn out as we planned. Once we get to the forest, we notice flashlights quite a distance from us, and soon the lights appear to be getting closer. We start off into the forest, but Frank gets a nagging feeling that he should check the car. He heads back, and before long he is surrounded by three men with flashlights and is calling for me to come over. The men have pushed a small car next to ours, and it appears that they intend to steal our battery. They are speaking a Kanak (Melanesian) dialect that neither of us can understand. I try talking to them in French, and they respond with a mixture of French and Kanak dialect.

The leader of this group is a tall, strong man with dreadlocks and a gash running across the top of his head exposing his skull. Blood is dripping from his head. He says something about having to go to the infirmary and is insisting on taking our battery. He is smoking a joint and is possibly drunk as well. In any case he is royally messed up. His mood alternates wildly: one moment he is violently aggressive, but when I talk to him about his head, he shifts to a more passive mood.

Things here look as if they could get ugly. Frank and I are not about to give up our battery and be stuck all night in the forest, especially when we have to catch a flight in the morning. At one point the leader of the group kicks in the left fender of our car. I talk to him about his head to calm him down, and he starts talking nonsense about the moon and sun and, laughing out loud, says it was a shark that bit him on the head. To me the wound looks more like a machete blow that this madman obtained during a fight. He's mumbling to the other men about getting something. He starts pushing me in the chest with his hand and then shoulder-butting me. I aim to avoid a fight so I don't resist and talk to him again about his head, which causes him to shift his focus. After a few more rantings he starts shoulder-butting Frank. I see that this is going to turn bad if we don't get out of this quickly. Frank says to tell him we're going to get help. By then his friends are off to get who knows what weapons—or more recruits. I tell the bleeding man we're going to get help and that we can stop at the infirmary or the police station. He panics and says "No, don't bring anyone, go to the infirmary and just tell them we're on our way." I insist on the police, seeing that this elicits a definite panic reaction. He says "No, don't bring anyone." Frank and I hop in the car and take off. Any prospects of collecting in the forest tonight are down the tubes. We head for a trail leading to a location where Frank has previously seen two

R. leachianus. It rains very lightly and intermittently that night. We spot no *R. leachianus*, but Frank collects two immature, probably yearling, *R. ciliatus* and, surprisingly, one of them has a full tail. This is the first full-tail specimen of *R. ciliatus* we have come across. The tail is as long as the body, bears a sizable pad at its tip and is prehensile. We keep the two small *R. ciliatus* because they may be a pair but leave a male we find later on. We head back to our room, remembering that we need to get up early to catch our plane.

November 29 – December 4th

After we return, we head back to the youth hostel to get a room. During the rest of the week we go to *Parks et Reserves* to get our updated permits, and visit the director of zoological research at ORSTOM twice, leaving specimens of skinks and geckos. These include a *Phoboscincus* as well as a *Bavayia*, which we think could be undescribed. We also show the animals we have captured and provide information on distribution, type of habitat, and apparent population densities. We go back to the Yaté dam for some photography. We also go back to Goro and get permission from the chief of the tribe to collect in the forest there. We find three more *R. auriculatus*, and Frank finds a male *R. trachyrhynchus*. One night, when Frank goes to the Goro area alone, he falls out of a tree about 20 feet (6 m), seriously scraping the inside of both his arms and injuring his knee. There is a sizeable chip, probably of bone, which moves around and once appeared to get lodged in the joint.

The trip back is uneventful except at New Zealand customs. Suffice it to say that we recommend avoiding any transfers through Auckland that require going through their customs. There are no United Airlines agents available when we land, and Air Caledonie can't forward our bags to San Diego. Two big thumbs down for the way New Zealand customs treat Americans in transit. United States customs and the U.S. Fish and Wildlife Service seem like models of civility after that experience. In fact, both are courteous, and U.S. Fish and Wildlife Service is expedient in processing our paperwork. We finalize measurements, exchange notes, and take additional photographs on the day after our return.

Acknowledgments

We'd like to thank the people of New Caledonia and their offshore islands, including the Isle of Pines, for their warm welcome and support. We are especially grateful to Mr. Marcel Boulet, Mr. Jean Chazeau, Mr. Charles Holué and his family, and Mrs. Christine Pollabauer. We

THE VIVARIUM Volume 6 Issue 5



WEST COAST CHAMELEON FARMS

LARGE SELECTION
OF CAPTIVE BRED AND
PARASITE FREE
IMPORTED ANIMALS.

SPECIAL ORDERS
WHOLESALE / RETAIL

(408) 685-8136
(408) 685-3166 FAX

P.O. Box 585 • APTOS, CA 95001

would also like to thank U.S. Fish and Wildlife Service at the Los Angeles International Airport for their expedient processing of our paperwork and live cargo.

Note: We have omitted the names of specific localities, including small islands, with the intention of protecting the respective lizard populations from illegal collecting. We request that we not be contacted with regards to obtaining New Caledonian geckos or skinks. As per the terms of our collecting permits, all animals collected are part of a number of research projects. Captive-bred specimens of *Rhacodactylus* are occasionally available in the herpetocultural trade.

AFH Membership. Membership includes

- A subscription to *The Vivarium* magazine.
- Access to AFH Legislative Representatives when in need.
- An association with a national non-profit organization dedicated solely to herpetoculture; to protect the rights of herpetoculturists to practice their avocation; and to promote responsible captive care.

Use the attached membership card to become a member today!



The American Federation of Herpetoculturists Statement of Income for 1994

SALES		
Membership Dues	\$132,170	
Advertisement	98,175	
Magazine	74,835	
Merchandise	40,329	
Contributions	659	
Interest Income	285	
Total Income		\$346,453
COST OF SALES		
Printing Cost	\$131,959	
Merchandise Cost	32,929	
Mailing Expenses	24,822	
Contractual Employees & Expenses	22,399	
Total Cost of Sales		\$212,109
SELLING EXPENSES	\$6,642	
Total Selling Expenses		\$6,642
GENERAL & ADMINISTRATIVE		
Employees	\$80,375	
Employer Taxes	14,650	
Office Expenses	14,553	
Rent & Utilities	8,933	
Legislative Action	4,704	
AFH Meeting Expenses	2,603	
Insurance Liability	2,155	
Education	1,500	
Legal & Accounting	470	
Dues & Subscriptions	450	
Refunds	264	
Sales Tax	219	
Fines, Penalties, & Interest Expense	83	
Total General & Administrative		\$130,959
TOTAL NET LOSS		(\$3,257)

Special Edition

This *Vivarium* issue has been published as a special edition issue. As you read through this issue you will notice that the regular departments AFH Profile, Product Review and Book Review are not present. This was due to the extra space needed to produce the thrilling adventure and informative field trip to New Caledonia by Philippe de Vosjoli and Frank Fast. We hope you enjoy this special edition and look for the regular department features return in the next issue.

Wanted: Calendar Photos

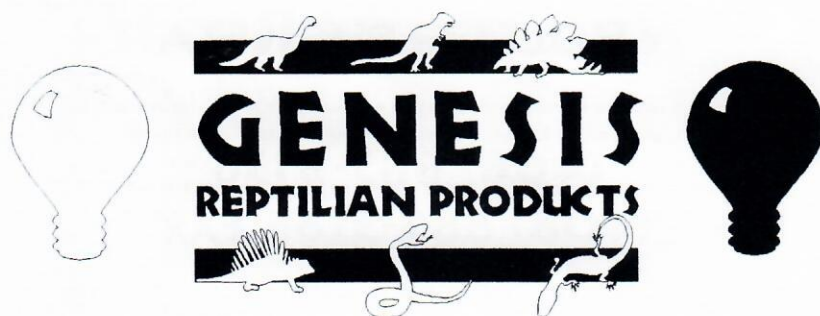
Once again we are preparing for our yearly calendar. We are now accepting color slides and photographs for the 1996 AFH Creatures of Enchantment calendar. All submissions must include the following to be considered for publishing:

- Color negatives or slides only. Slides are preferred. Colored prints accompanying photo negatives is recommended, but will not be returned.
- A descriptive caption that includes scientific and common names of all species photographed and to include photographer's name.
- All submissions will be returned after final photos have been chosen. Approximately 30 days after the submission deadline date.
- All finalists will be contacted for publishing rights and compensation agreements.
- Any societies or exhibition managers should submit 1996 event names and dates by the deadline for publishing in the 1996 calendar.

Submit all items to:

AFH
96 Calendar
PO Box 300067
Escondido, CA 92030-0067

**Accepting Submissions Until
May of 1995
Enter Now!**



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

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

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

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

Coming Events

March 24-26, 1995: Chicagoland Family Pet Show will be held in Chicago, Illinois. For info, call (708) 469-4611.

March 31-April 2, 1995: 7th Annual Pet Industry Spring Trade Show will be held in Atlantic City, New Jersey. For info, contact: H. H. Backer Associates Inc., ph. (312) 663-4040 or fax (312) 663-5676.

April 8, 1995: Eastern Herpetological Expo will be held in Pottstown, Pennsylvania. For info, contact: G. Leonard Knapp, 215 Lawn Ave., Sellersville, PA 18960, ph. (215) 257-6008.

April 8-9, 1995: South Jersey Exotics & Family Pet Showcase will be held in Cherry Hill, New Jersey. For info, contact: Vicki Clark, Expo USA, 503 E. Penn Blvd., Woodbury, NJ 08096, ph. (609) 848-3312 or fax (609) 384-6704.

April 21-23, 1995: America's Family Pet Show will be held in Pomona, California. For info, contact: GES, 16220 Carmanita Rd., Cerritos, CA 90701, ph. (310) 921-4648 or fax (310) 802-0542.

April 22, 1995: 18th Annual All Florida Herpetological Conference, University of Florida, Reitz Union, Florida. For info, contact: Dr. David Auth, ph. (904) 392-1721.

April 22-23, 1995: New York Pet Show will be held in Suffern, New York. For info, contact: Osborne/Jenks Productions, Inc., ph. (203) 563-2111.

April 28-30, 1995: 3rd Annual North Texas Herpetological Society (NTHS) Spring Symposium will be held in Arlington, Texas. For info, contact: K. C. Rudy, Euless, TX 76039, ph. (214) 933-HERP.

April 30, 1995: Northern Ohio Association of Herpetologists (NOAH) Reptile and Amphibian Showcase will be held in Cleveland, Ohio. For info, contact: Matt, ph. (419) 433-3639.

April 30, 1995: New York Metro Reptile Expo will be held in White Plains, New York. For info, contact: Bruce Lowder, NY Metro Reptile Expo, 256 Second St., Palisades Park, NJ 07650, ph. (201) 461-0770.

May 19-21, 1995: Herpetology Weekend co-sponsored by the US Forest Service and Kentucky State Parks will be held at Natural Bridge State Resort Park, Slade, Kentucky. For info, contact Natural Bridge Park, ph. (606) 663-2214 or Stanton Ranger District, ph. (606) 663-2852.

May 27-28, 1995*: Chicago Herpetological Society's 2nd Annual Live Reptile & Amphibian Exhibition will be held in River Grove, Illinois. For more info, contact: Ron Humbert c/o CHS, 2001 N. Clark St., Chicago, IL 60614, or call (708) 620-7377. *date changed

June 10, 1995: Northwestern Berks Reptile Show will be held at Hamburg Field House, Hamburg, Pennsylvania. Venomous reptiles allowed. For info, contact Troy Reppert, 848 Columbia Ave., Sinking Spring, PA 19608, ph. (215) 678-2616.

June 14-18, 1995: 19th Annual International Herpetological Symposium will be held in Denver, Colorado. For info, contact: David Hulmes, 261 Van Winkle Ave., Hawthorne, NJ 07506.

June 23-25, 1995: International Gecko Society Symposium will be held in Palm Springs, California. For info, see page 49 in this issue of *The Vivarium*.

July 6-9, 1995: International Congress of Chelonian Conservation will be held in Gonfaron, France. For info, write to Secretariat, SOPTOM, B.p. 24, 83590 Gonfaron, France.

July 7-9, 1995: Herpetoculture in the Classroom, 2 graduate credit hours from University of Wyoming, will be held in Rock Springs, WY. For more info, contact: Dan McCarron, Science

Dept., White Mountain Junior High School, P.O. Box 1089, Rock Springs, WY 82902, ph. (307) 382-4160, fax (307) 382-7351.

July 15-16, 1995: International Reptile Breeders Convention will be 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.

August 5-6, 1995: New Jersey Exotics & Family Pet Showcase will be held in Edison, New Jersey. For info, contact: Vicki Clark, Expo USA, 503 E Penn Blvd., Woodbury, NJ 08096, ph. (609) 848-3312, fax (609) 384-6704.

August 8-13, 1995: Society for the Study of Amphibians and Reptiles (SSAR) Annual Meeting will be held in Boone, North Carolina. For info, contact: Dr. Wayne Van Devender, Dept. of Biology, Appalachian State University, Boone, NC 28608, ph. (704) 262-2665.

August 19-20, 1995: National Reptile Breeders Expo will be held in Orlando, Florida. For info, contact: Wayne Hill, ph. (813) 294-2235.

August 25-30, 1995: Second International Asian Herpetological Meeting will be held in Ashgabat, Turkmenistan. For info, contact: Theodore J. Papenfuss, Museum of Vertebrate Zoology, University of California-Berkeley, CA 94720.

August 26, 1995: New York Herp Expo will be held in Syracuse, New York. For info, contact: Robert Cunningham, ph. (315) 446-9292.

August 27, 1995: St. Louis Reptile Breeders Expo will be held in St. Louis, Missouri. For info, contact: James Brumley, ph. (314) 892-6605 or (314) 845-2038.

August 27, 1995: New York Reptile Expo will be held in White Plains, New York. For info, contact: Bruce Lowder, NY Metro Reptile Expo, 256 Second St., Palisades Park, NJ 07650, ph. (201) 461-0770.

September 2, 1995: Eastern Herpetological Expo will be held in Pottstown, Pennsylvania. For info, contact: Leonard Knapp, 215 Lawn Ave., Sellersville, PA 18960, ph. (215) 257-6088.

September 16-17, 1995: Mid-Atlantic Reptile Show will be held in Baltimore, Maryland. For info, contact: Tim Hoen, The Maryland Herpetological Society, 2643 N. Charles St., Baltimore, MD 21218-4590, ph. (410) 557-6879 or 235-6116.

September 30-October 1, 1995: International Reptile Breeders Convention will be held in San Diego, California. For info, contact: Ray Busby, IRBA PO Box 85152-279, San Diego, CA 92186, ph. (800) 497-3550 or fax (619) 263-6898.

September 30-October 1, 1995: Annual Florida International Reptile Show will be held in Tampa, Florida. For info, contact: Doug Wagner, Suncoast Herp. Society, P.O. Box 2725, Dunedin, FL 34697, ph. (813) 736-1368.

October 8, 1995: Northern Ohio Association of Herpetologists (NOAH) Reptile and Amphibian Showcase will be held in Cleveland, Ohio. For info, contact: Matt, ph. (418) 433-3639.

October 28-29, 1995: Illinois Exotic Pet Showcase will be held in Springfield, Illinois. For info, contact: Vicki Clark, Expo USA, 503 E Penn Blvd., Woodbury, NJ, ph. (609) 848-3312 or fax (609) 384-6704.

November 19, 1995: New York Metro Reptile Expo will be held in White Plains, New York. For info, contact: Bruce Lowder, NY Metro Reptile Expo, 256 Second St., Palisades Park, NJ 07650, ph. (201) 461-0770.

Editor's Note: Herpetological societies and organizations are encouraged to notify AFH of events of interest so they may be included in our Coming Events section.

AMAZON



HERPETOLOGISTS, ENTOMOLOGISTS EXPEDITION

06/13 AUGUST 1995

EXPLORE & PHOTOGRAPH THE GREAT BIODIVERSITY OF THE FLOODED AMAZON RAIN FOREST

Led by research biologist in Herpetology and assisted by native, naturalist experts. Daily briefings, lectures, and day/night collection forays. Departs Port of Iquitos, Peru aboard riverboat "Amazon Discoverer" with American captain. *Thirteen years experience in the Peruvian Amazon.* Group size limited call for brochure.

**8 DAYS ALL INCLUSIVE FROM MIAMI
\$1598⁰⁰**

For details and reservations contact:

MARGARITA TOURS, INC.

Licensed • Bonded • Insured

P.O. Box 2513 • Ft. Lauderdale, FL 33303-2513

Phone/Fax: 305-764-8274

"We Are Professional Amazon Jungle Outfitters"

LORIO REPTILE SUPPLIES, INC.

Professional Herpetological Products

Also specializing in
rare Captive-Bred snakes.

Dedicated to Excellence in Herpetology
and Customer Satisfaction

For a free price list call:

(215) 757-8315

P. O. Box 892 • Langhorne, PA 19047



Join Danté Fenolio, Michael Ready, and experienced herpetologist Bill Lamer in search of amphibians, reptiles, and other wonderful wild life of the ECUADOR RAINFOREST. Rare photographic opportunities. Group now forming for SUMMER '95. Call now, limited space available.

CONTACT: OUT BACK
HERPETOLOGICAL
COMPANY
408.741.4911

Classifieds

HOW TO PLACE A CLASSIFIED AD IN

THE VIVARIUM: Type or clearly hand write your ad in 30 words or less for a total of \$15.00. Any ad over 30 words costs \$0.50 per additional word. Payments must be made in advance and must include the correct amount in order to be placed in the next issue. Classifieds that run for one year (6 times) paid in advance, qualify for a 5% discount. For additional info, call (619) 747-4948 or fax (619) 747-5224.

Issue	Deadline
(6.6) May-June	Feb. 28
(7.1) July-August	May 1
(7.2) September-October	July 3
(7.3) November-December	Aug. 31

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

ANIMALS

REDDING REPTILE BREEDERS: A wide selection of captive-bred snakes. Write for our free 1994 price list. RRB, Box 71142, Project City, CA 96079, (916) 275-8782.

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

Tarantulas: mescalero spiderlings, juv., adults, price list, many species, goliath bird eaters, king ba-

boons, tiger rump doppelganger, red Martinique tree spider, more. 1187 Montecito Drive, Los Angeles, CA 90031, (213) 227-6566.

AUSTRALIAN BEARDED DRAGONS (*Pogona vitticeps*) one month old \$75.00 each, 2 months \$100.00 each. Veiled chameleons: hatchlings \$75. Blue-tongued skinks: Northern \$200, Irian jayan banded adults \$200 ea., Australian water dragons (*Physignathus lesueurii*), 10-12" juveniles \$200 ea. Send SASE for pricelist and care sheets. Weis Reptiles, Rt. 4, Box 468, Tallahassee, FL 32304. (904) 574-1037.

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

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

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

Quality captive-bred pythons. Available in May, albino labyrinths, labyrinths, het-labyrinths, albino green patternless, green patternless, albinos, double and single heterozygous for all of the above. Competitive pricing. Special discounts on quantity purchases. FREE price list send SASE to: Clarence and Paula Hues d.b.a. H & H Reptiles, P.O. Box 6574, Bryan, TX 77805-6574. (409) 778-0742.

QUALITY REPTILES at affordable prices. Snakes, lizards, turtles, tarantulas, frogs and a complete line of dry goods and frozen feed. For free

monthly price list call or send SASE to special care 5, W. Prospect Ave. Pittsburgh, PA 15205. (412) 928-9433. Fax (412) 279-2913.

SNAKES ALIVE! Captive-bred exotic, pythons, red-tailed boas, tri-colors, kings, gophers, corns and many albino snakes. Free 1994 price list available. Snakes Alive!, Star Route, Davis Creek, CA 96108. (916) 233-LIVE (5483).

Captive reptiles from exceptional stock. If we don't have it, we'll find it, for you. Over 25 yrs. in the herp business. Hogg Is. boas, Turks Is. boas, emerald tree boas, gray band kings, Trans-Pecos rat (reg. & blond), lizards, turtles, frogs, insects, etc. Call or write for current stock. Black Canyon Reptiles, 3241 Calle Delabajada, Tucson, AZ 85746. (602) 883-1854.

Bearded dragon hatchlings-\$65.00; Blue-tongued skinks-\$200; CB Chinese water dragon,-\$40; Leopard geckos-\$20.00 and up. Call Bill or Lisa Applegate (704) 882-3486.+

SRI LANKA PYTHONs, These are one of the most beautiful large pythons, rarely offered for sale, and we have the best bloodline anywhere! \$300 ea. Jim Gregg (206) 776-3755.

Adult and sub-adult specimens of African spur-thighed tortoises, *Geochelone sulcata*. (909) 780-0715.

QUALITY HERPS: Hogg Isle boas, all redtail forms, green & yellow anaconda, emerald tree, yellow phase Amazon tree, Kenyan sand, Dumeril's boas, yellow head retics, carpets, red phase carpets, green tree, diamond, ringed, D'Albert's, Macklot's, spotted, yellow phase scrub, Papuan, blood pythons, assorted colubrids, western hognose, red-eyed tree frogs, poison arrow, green basilisks, assorted monitors, blue-tongue skinks, skinks, *Uromastyx* species, star, yellow & redfoot, Kleinmann's, African spur, Hermann's, leopard & assorted tortoises & turtles. Too much to list. Honestly represented animals & no junk!! **NEW ENGLAND REPTILE DISTRIBUTORS** (serious inquires only) call Kevin or Josh (603) 382-6361.

Baby Sonora black kingsnakes, \$25 & \$40; Cape kingsnakes, \$40; Indian python, \$300. Pick-up only at THE BONE ROOM (a natural history store) 1569 Solano Ave., Berkeley, CA. 94707. (510) 526-5252

Burmese mountain tortoise, (*Manouria emys*, ssp.) direct from breeder 93 yearlings \$350; 94 hatchlings \$225; captive born. Jacksonville, Florida. Vil Morgan. (904) 268-9671.

WHOLESALE, PET STORES: We have reptiles, rodents & hard goods. We ship daily using UPS, postal & air. Call or fax for our weekly special. R&T Animals, 29005 Anderson Rd., Wickliffe, OH 44092.

Interested in selling, buying, breeding, exchanging information on *Liasis* and other pythons and boas. Specializing in *Liasis* boa, mackloti, and other Australo-Indonesian pythons. Price list available. Contact GARY AND ROBIN BRADDOCK, "Intelligent Propagations," (610) 856-1474.

Baby: wife expecting!! Must sell Burmese breeding stock: 1.1 double het. albino/green, \$800; .1 het. albino, \$300; 1.1 het. labyrinth, \$2,000; 1.1 labyrinth, '94 babies, \$1,500. Available summer of '95: albino & het. ball pythons; albino & het. boa constructors. ARNETT REPTILES: (913) 776-3349.

Australian frilled dragons with import documents. Also New Guinea frilled dragons. Regular or red phase bearded dragons. All are captive bred & born. Contact: Robert G. Sutton, phone/fax: (216) 467-8982.

Quality captive-bred young adult veiled chameleons (hatched 6/94-7/94) with complete care sheet including husbandry information, \$150.00 each. D&K CHAMELEONS, P.O. Box 542, South Pasadena, CA 91031. (818) 281-6592.

The Herpetocultural Library Series

The Cutting Edge of Herpetoculture. . .

Find out why these information-packed books have revolutionized herpetoculture by contributing to the successful propagation and husbandry of reptiles and amphibians. With over 25 books published to date, *The Herpetocultural Library* offers a series of bestselling books based on specific herps including green iguanas, ball pythons, red-tailed boas, box turtles, savannah monitors & much more!

*Rated by experts in their field as the most useful, no-nonsense books on the care and propagation of amphibians and reptiles.

*Recommended by herpetological societies and veterinarians nationwide.

*Written by expert herpetoculturists, not by professional writers.

Others have tried to imitate *The Herpetocultural Library Series*, but don't be fooled by the pretty pictures that don't address the essential needs of your pets. With a helpful, easy-to-read format, Advanced Vivarium Systems strives to publish literature that provides sensible guidelines and information to ensure the proper care and maintenance of reptiles and amphibians.

. . . Books That Save Lives

For additional information, please contact your local pet supplier or dealer for pricing and availability.

Published by: **Advanced Vivarium Systems, Inc.**
P.O. Box 408 Lakeside, California 92040 USA

PANCAKE TORTOISE HATCHLINGS, several bloodlines. Quality animals-honestly represented. Call Dan (406) 862-1673

QUALITY COLUBRIDS and rosy boas at reasonable prices. Video showing all animals, facility and breeding techniques \$9.00. For free list contact: Scott John, 313 Franklin St. Mt. Airy, NC 27030. (910) 789-7138.

Moving sale: ADULT BREEDERS 1.1 boa constrictors, 1.1 Honduran milk snakes, 3.3 gray banded kingsnakes, 1.1 prairie kingsnakes, 2.1 Texas alligator lizards, 1. W. banded gecko, 0.1 Texas banded gecko; Call Doug (214) 736-1569 evenings/Central Time.

Captive bred carpets; childrens; albino & norm Burmese pythons; corns; Mex milk snakes; hognose & leucistic rat snakes. All will be very early for the 95 season. Quantity discount available. Call Jay (818) 831-0408.

TARANTULAS! Exotics from the world over: bird eaters, ornamentals, pink toes, baboons and more! Write or call for price list: Arachnomania, P.O. Box 413, Aurora, IL 60507-0413, (708) 844-0352.

SUPERWORMS aka king mealworms - *Zophobus morio*. A great food item for insect-eating herps, fish and other insectivorous animals! Looks like a mealworm on steroids. Big! Retail prices: 1/2 pound \$11; 1-2 pounds \$19, 3-9 pounds \$18. Wholesale prices: 1/2 pound \$9; 1-2 pounds \$15; 3-9 pounds \$14; 10+ pounds \$12. The price given is per pound, except for 1/2 pounds. Sales tax may apply. Before shipping, there's about 700-1000 worms per pound. Shipping is approximately \$3 per 2 pounds. North County Exotics, P.O. Box 4856, Salinas, CA 93912-4856. Phone (408) 663-0566, leave message.

PETER KAHL REPTILES: If you are interested in albino boa constrictors you should look no further. We are the first and largest producers of albino boas. We have more bloodlines of albino boas available for a more diverse breeding group, and all of our bloodlines are compatible with each other. Accepting deposits for the following 1995 season for: albino boas, striped genetic boas, double heterozygous (snow) boas, double heterozygous (striped albino) boas, heterozygous boas (albino), Surinam, Peruvian, Guyana redtail boas, Brazilian rainbow boas, green tree pythons, spotted pythons, blood pythons, and others. For free price list contact Peter Kahl Reptiles P.O. Box 150 Long Green, Maryland 21092; (410) 592-9675, fax (410) 592-6911.



SAN DIEGO REPTILE • BREEDERS •

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

SPECIALIZING IN BOAS • PYTHONS • COLUBRID SNAKES

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

PUBLICATIONS

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

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

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

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

Herp Books & Magazines. Huge selection at excellent prices with great service. Call or write for a current stocklist. Pet shops may request a wholesale

Advertiser's Index

Advanced Vivarium Systems	46
Amazon River Expeditions	45
American Reptile, Inc.	54
Arachnomania	36
Barker, Dave	33
Bean Farm, the	41
Bibliomania	37
Big Apple Herpetological	41
Burgundy Reptile Traders	22
Bush Herpetological Supply	36
Captive Bred Wildlife	21
Carolina Mouse Farms	21
Clark, Bob	37
Critter Corner	54
Crutchfields Reptile Enterprises, Inc. ..	40
Custom Cages	14
Florida Iguana and Tortoise Breeders ..	41
Genesis Reptile Products	44
Glades Herp	17
Gourmet Rodent	40
Greentracks, Inc.	40
Helix Controls	16
International Gecko Society	47
Jungla Adventures	34
Krieger Publishing Company	25
Lorio Reptile Supplies	45
Maryland Herpetology Society	12
Maryland Reptile Farm	11
Midwest Custom Products, Inc.	48
Nature's Treasure	33
Nekton USA, Inc.	38
Neodesha Plastics	13
Ocean Nutrition	53
Outback Herpetological Co.	45
Pretty Birds	23
RAM	9
Rep-Cal	2
Reptile Haven	16
Reptile Resource Inc.	21
Reptile Service, The	11
Reptile Specialties	53
Reptile World	48
San Diego Reptile Breeders	47
Sandmar Enterprises	42
Sandfire Dragan Ranch	25
Seven Generation Reptiles	49
Tetra Terrafauna	56
West Coast Chameleon	43
West Coast Zoological	49
Zupreem	55

International Gecko Society Symposium

June 23-25, 1995
Palm Springs, California



Sean McKeown
Arnold Kluge
Tim Tyle
Frank Fast
Aaron Bauer
L. Lee Grismer
Grant Macredie

Gecko fauna in the Hawaiian Islands
Pygopodidae
Captive husbandry of *Coleonyx*
Ecology of New Caledonian geckos
Geckos of southwest Africa
Systematics of *Eublepharis*
Ecology of New Zealand geckos

Other speakers to be announced

Each registrant receives a copy of the proceedings.

• Deadline for registration at \$100 is May 1, 1995. Postmarked after this date registration is \$125 •

Hotel room: \$55*, single or double occupancy

Palm Mountain Resort. In US dial (800) 622-9451.

Outside US fax (619) 323-8937 or call (619) 325-1301.

Send check or money order for \$100* payable to:

International Gecko Society Symposium

P. O. Box 370423

San Diego, CA 92137

Conference space is limited to the first 200 registrants.

REPTILE WORLD

IMPORTS OF TUCSON

Large Selection of the Finest Reptiles from Around the World

Captive Bred and Imports
2725 E. Grant Road
Tucson, AZ 85716

Retail Sales and Mail Order
602-325-2340
FAX 602-322-6164

QUALITY SELECTION PRICE

Send SASE for Price List

Midwest Custom Products, Inc.

8608 E. 32nd St., Kansas City, MO 64129
Tel: (816) 861-3351 • Fax: (816) 861-4126

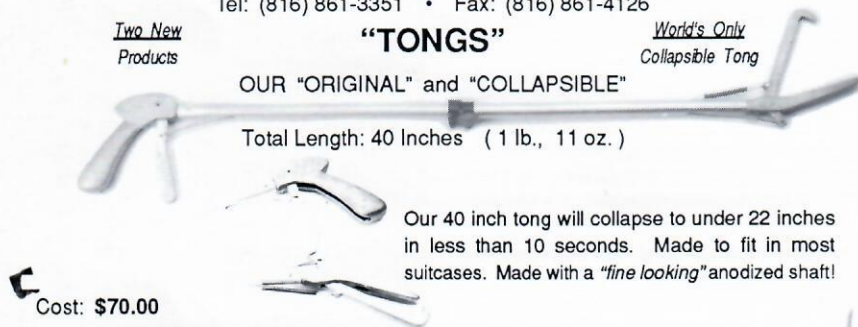
*Two New
Products*

"TONGS"

*World's Only
Collapsible Tong*

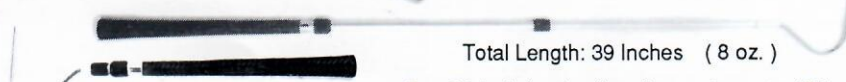
OUR "ORIGINAL" and "COLLAPSIBLE"

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



Cost: \$70.00

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



Cost: \$38.00

Total Length: 39 Inches (8 oz.)
Our 39 inch hook will collapse down to 17 1/2 inches long. Made with anodized aluminum shaft and stainless steel hook.

"MOST POPULAR"

- *Our original 40 in. tong (25 in. also available), 1.7 lbs. \$55.00
- *Std. 39 in. field hook (1/4 in. stainless steel hook), 8 oz. \$28.00
- **"New" animal grabber to 28 in. or 38 in., 1.8 lbs. \$80.00
- *Small hook (3/16 in. stainless steel hook, 16-24 in. lgth.), 4 oz. \$17.00
- *Probes: Set of 6 probes (sizes ranging from .020-.186),
carrying case, lubricant (included) \$48.00

DISTRIBUTORS WANTED

catalog. Serpent's Tale Books, 464 Second Street, Excelsior, MN 55331, phone (612) 470-5008, fax (612) 470-5013.

1994-95 HERPETOLOGICAL BOOK CATALOG now out. Over 4,000 titles listed. Send \$2.00 refundable with order. Herp. Search Service & Exchange, 117 E. Santa Barbara Road, Lindenhurst, NY 11757.

SUPPLIES

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

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

Mouse watering equipment for sale! Used Edstrom Vari-Flo valves w/ 3/16" barb. Thousands available .50 each. Serious inquiries only, please. Call (909) 780-0715.

HEATING ELEMENTS: Flexwatt "New" 4" 2.50/ft.; 11"-3.75/ft. Insulator clip sets 1.25. Non-light emitting Pearlco infrared heating—60 watt, 100 watt, 150 watt and 250 watt, 24.95 2/\$48. Proportional thermostats with night time drop LCD display, very expandable, starting as mentioned \$115 and up. Also available, books, hooks, probes, vitamins, frozen rodents, captive-bred and select cherry picked farm raised imported reptiles, amphibians etc. Wholesale and quantity pricing available! "Your satisfaction is our goal". Hours E.S.T. M-F 12:00 pm to 7:30pm; Sat. 12pm to 3pm. Serpent's Den, PO Box 952 Rt. 6 and 209, Milford, PA 18337-0952. Tel. (717) 296-5877. Fax (717) 296-4614.

QUALITY REPTILE PRODUCTS through the mail. We are a research based distributor of heating, lighting, health, hooks, probes and books. Wholesale/bulk prices available. Write or call for a complete catalog of dry goods. The Bean Farm, 32514 NE 77th, Carnation, WA 98014-6701, (206) 861-7964 voice, (206) 333-4205 fax.

GIFTS & CLOTHING

Beautiful TURTLE & TORTOISE ART—Fine art cards & prints. For free brochure, contact Lightroom Productions, 1441 Everview Road, San Diego, CA 92110-1528; (619) 276-3501

When in the Bay Area, come see THE BONE ROOM, the largest selection of natural history items in the West. We have bones, insects, fossils, jewelry and animal remnants. 1569 Solano Ave., Berkeley, CA 94707 (510) 526-5252. Ron Cauble, owner.

RODENTS, ETC.

THE MOUSE FACTORY: Quality feeder mice and rats for sale. All orders are properly processed to insure quality control. Price: Pinkies \$25/100, Fuzzies \$30/100, and weanlings \$35/100. Ray Queen, P.O. Box 85, Alpine, TX 79831, (915) 837-7100.

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

SUWANNEE MOUSE FARM: Quality frozen mice & rats at reasonable prices. Pinkies and fuzzies—.35, hoppers and weaners—.40, adults—.45. discount

600 and up. PO Box 14, Suwannee, FL 32692. (904) 542-2247. Next day air.

Pinkies, fuzzies, juveniles, and mature mice and rats. Also, live mice and rats. Will contract in quantities. SUPERIOR RODENTS, PO Box 284, Wetumka, OK 74883. Tel. (405) 452-3170.

Best Price, highest quality surplus laboratory mice and rats. Mice: pinkies \$19/100, weaned \$29/100, adult \$34/100. Rats: pinkies \$36/100, weaned \$58/100, adult \$125/100. No packing charge, \$100 minimum order. Visa, Mastercard available. LAB PLUS, 16105-8h Victory Bl. Ste 354, Van Nuys CA, 91406. (818) 997-1970, fax (818) 997-6423. Contracts available.

MICE, 30 per 1000. Rats sm: .75, lg 1.35. The best prices on reptiles, birds, mammals. (904) 253-6165, fax (904) 441-1857. 24 hour answering service. 1-800-955-8102.

ESSEX PETS. Quality mice and rats all sizes available guaranteed frozen or live arrival best prices Alan Essex, Rt. 1 Box 171, Blum, TX 76627. (817) 582-2392

TOURS/EXPEDITIONS

Limited bookings available for guided tours of herpetological collection sites in Nevada. Call or fax: (702) 471-0240 for reservations. Send SASE to COLLECTIONS OF REPTILES COMPANY, P.O. Box 0731, Las Vegas, Nevada 89125-0731 for a brochure and list of species available to collectors.

WANTED

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

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

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

Quality captive bred non-venomous and venomous reptiles, amphibians and arachnids. Contact Serpent's Den, P.O. Box 952, Rt. 6 and 209, Milford, PA 18337-0952. Tel. (717) 296-5877. Fax (717) 296-4614.

PHOTOS OF BOA CONSTRICTOR WANTED FOR BOOK. Many photos of each subspecies and nationality are desired for publication in an upcoming book on this species. Shots of *B. constrictor* in its natural habitat are especially needed. No photos will be published without explicit permission. See address below.

SE SOLICITAN FOTOGRAFÍAS DE BOA CONSTRICTOR. Hacen falta varias fotos de cada subespecie y población para publicarse en un libro próximo sobre esta especie. En especial se buscan imágenes de *B. constrictor* en su ambiente natural. No se publicará nada sin permiso. William D. Joy, P.O. Box 300703, Arlington, TX 76007-0703, USA.

Information on all aspects of FROG FARMING; methods, studies, breeding programs, organization, economics and set-up. willing to compensate for quality information, experience or referral. Contact: Zane Smith, 4221 E. Ray Rd. #2105, Phoenix, AZ 85044.



A rare find.

Looking for the finest in selectively bred snakes? Our animals have been selectively bred over many years to represent the finest qualities of each variety we work with. Vibrant, well-started offspring are backed by our complete commitment to customer satisfaction and support.

*green tree pythons
albino sand boas
san felipe rosy boas
arizona rosy boas
desert rosy boas
hypomelanistic rosy boas
gray banded kingsnakes
desert california kingsnakes
tarabumara mountain kingsnakes
baja mountain kingsnakes
durango mountain kingsnakes
arizona mountain kingsnakes
orange pueblan milksnakes
andean milksnakes
albino queretaro kingsnakes
and more!*

What more could you ask for?
Send for our complete catalog.



Seven Generations Reptiles
PO Box 339, Joshua Tree, CA 92252
619.366.0071
Rare and Selectively Bred Snakes

WEST COAST ZOOLOGICAL

Specializing in Captive
bred Tarantulas & Reptiles



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

Call or Fax
for FREE Price List

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



Captive Care and Propagation of the CALIFORNIA KINGSNAKE

Lampropeltis getula californiae

by
**Thurgess Cranston and
Erik Loza**



A shoebox rack, manufactured by Sandmar® Enterprises, used to house neonate and small juvenile California kingsnakes. The heat tape is in a recessed groove toward the back of the rack and underneath the plastic cages. Photograph by Thurgess Cranston.



A drawer-type Sandmar® Enterprises enclosure with a male California kingsnake in the display area. The female resides in the Sterilite® drawer below and is separated from the male by a closed PVC connection (clearly visible in front) until the breeding season. Photograph by Thurgess Cranston.

The California kingsnake, *Lampropeltis getula californiae*, is one of the most popular colubrid snakes maintained in captivity. In part, this is due to its array of selectively produced and naturally occurring color variants. Please refer to *The Vivarium* 6(4) by Briggs and McKeown for information on the morphs of this highly variable subspecies. With refinement in husbandry techniques, thousands of this desirable snake have been produced by herpetoculturists over the years. This article will discuss tried-and-true husbandry methods that we have used to reproduce many captive generations of the beautiful, hardy, and docile California kingsnake.

California kingsnakes will thrive and reproduce in a variety of enclosure settings, provided their environmental requirements of diet and temperature are met. Enclosures used by the authors range from simple sweater boxes to 10- or 15-gallon (38 or 57 liter) aquaria. The successful California kingsnake enclosure allows the snake a sense of security while still providing the hobbyist with ample opportunity to view the animal. Cages that have a standardized dimension for ease of long-term maintenance of these animals are preferred by breeders. A newer design was developed by Sandmar® this past year. The cage is a drawer-type enclosure (Applegate, 1993; Mattison, 1991). The male kingsnake is confined in the top display area with ample hiding areas; the female is placed in the drawer (a Sterilite® sweater box) at the bottom. During the breeding season, the male is allowed access into the lower drawer via a 2-in (5 cm) PVC connection to copulate with the female. After several successful breedings, the drawer is replaced with another drawer containing a different female. This allows exchange of animals with minimal amounts of stress to either snake.

Substrates used in the authors' collections have included aspen bedding, hardwood chips, newspaper/paper towels, and CareFresh® animal bedding. Corn cob litter does **not** work very well with these animals. Corn cob readily allows mold formation with a minimal amount of moisture and seems to desiccate young animals. Of

the substrates mentioned, this is the **least** desirable. Coarse, dust-free, pine shavings have worked very well in both authors' collections. Although ingestion of the substrate during feeding is a concern, no problems have been experienced as long as sufficiently coarse-grade material is used. Thurgess has recently tried the new CareFresh® animal bedding with great success. Although not as attractive as pine shavings, this new bedding has several inherent advantages, including its benign nature. Several animals that continuously exhibited mucus build-up in the mouth when on other types of substrates improved remarkably within two weeks on



Copulation in a pair of California kingsnakes. Photograph by Erik Loza.



Male California kingsnake uses a copulatory grasp, or nuchal bite to a female during copulation. Photograph by Erik Loza.



Courtship in a pair of California kingsnakes. The male is an unusually patterned hypomelanistic specimen. Photograph by Erik Loza.



Gravid female California kingsnake. The abdominal distention produced by maturing eggs is clearly visible. Photograph by Erik Loza.



Gravid female California kingsnake inspecting a laying box. Photograph by Erik Loza.



Female California kingsnake in the process of laying eggs. Photograph by Erik Loza.



Typical juvenile snake set-up. The paper towel is kept dry and the water is kept at a minimal level in the water bowl to prevent too much humidity in the enclosure. This animal is approximately 2 months old. Photograph by Thurgess Cranston.



Clutch of California kingsnake eggs beginning to hatch. Photograph by Erik Loza.

CareFresh®. Its superb absorbing power makes CareFresh® an interesting alternative to other types of substrates. The only drawbacks of this product are the cost (up to \$18.00 for a 50-liter bag—ouch!!!) and its rather drab appearance. The best choice for a large snake collection is still coarse, dust-free, pine shavings.

Particular attention should be paid to the acclimation of wild-caught specimens. [Editor's note: These snakes may only be collected with a valid California Department of Fish & Game fishing license. Refer to their current booklet for bag limit.] While this snake is noted for its calm disposition, many wild individuals may initially be quite nervous. The elimination by the keeper of as much environmental stress as possible is of the utmost importance. Additionally, a number of intestinal parasites have been documented in wild California kingsnakes, including nematodes, pentastomides, and protozoans (Cranston, 1994; Klingenberg, 1993; Perlowin, 1992). The authors strongly recommend having a fresh fecal sample from any wild-caught specimen examined by a qualified reptile

veterinarian. Many kingsnakes that were perpetually thin or problematic feeders have made dramatic improvements once treated properly for internal parasites. A hiding area in the California kingsnake's cage is also an important consideration. Simple cardboard boxes, ceramic dishes, and the plastic hide boxes manufactured by companies like TerraFauna® are all functional. Additionally, such unconventional items such as abalone shells and recycled wooden salad bowls have been used successfully as hiding spots. The new ceramic hiding areas (e.g., Critter Caverns manufactured by ZooQuality®) are very attractive cage furniture, albeit a little expensive, up to \$27.99, retail. Notable changes have occurred with animals by simply providing them with a hiding area. For example, animals, especially some of the wild-caught desert forms, have started feeding once they were provided with a hiding area.

Feeding *L. getula californicae* typically presents few problems. Most adults, wild-caught or captive-bred, feed readily on appropriately sized mice. In the authors' collections, animals are offered pre-killed

or frozen and thoroughly thawed mice on a weekly basis. Gestating females are offered an increased amount of food (one to three mice per weekly feeding) in the hope that energy reserves will be boosted, thereby increasing fecundity. In addition, gestating females are offered smaller sized mice due to their decreased abdominal volume in the gastrointestinal tract. Because the snake experiences less stress, fewer problems are caused during the digestive process. Furthermore, by feeding smaller meals, a larger surface area-to-volume ratio is attained for increased digestibility (see de Vosjoli, 1994, for discussion of this important herpetological phenomenon). Some of the larger kingsnakes in Erik's collection are offered pre-killed or frozen-then-thawed four- to six-week-old rats. Interestingly, wild-caught inland bloodlines usually do not accept this type of food item; however, coastal California kingsnakes often will. Captive-bred stock

from either origin are the most likely to accept rats as a meal. Dietary supplementation may be important in the captive propagation of California kingsnakes. As with other snakes in our collections, we often place Rep-Cal® calcium supplement on the rumps of prey for the gestating females. We both strongly discourage the use of alternative food, such as lizards or snakes, for fear of parasite transmission.

Water is provided regularly to captive adult kingsnakes. Occasionally adults go without water for a few days with no detrimental consequences. It is important that neonates and gestating females are provided with water on a continual basis. The only time water is removed from their cages is when the enclosure becomes too humid; then water is removed until the cage dries out.

Special lighting is not used in either of the authors' collections in the maintenance of California kingsnakes. Ambient lighting from overhead fluorescent lights is present during varied hours. Contrary to what was once thought, photoperiod manipulation is not necessary to captively propagate this species.

Thermal gradients are maintained using under-enclosure heat tapes. Flex-Watt® heat tapes appear to provide the most constant heat gradient. When using this form of reptile heater, it is important to place electrical tape over the metal elements of the cut end of the tape in order to reduce the likelihood of electrical shock. The amount of heat given off by the heat tape is regulated using a rheostat or, more recently, the thermostat developed by either Microclimate® or Helix Magnetics®. With either thermostat, precise temperatures ($\pm 1^\circ\text{F}$) can be maintained. With the Helix Magnetics® thermostat, adding other components, such as light regulation, is easily accomplished because of the handy "phone cord" plug-in design. Perlowin (1994) describes the use of heat tape with the Microclimate® thermostat. In our collections animals are allowed access to thermal gradients ranging from $70\text{--}85^\circ\text{F}$ ($21\text{--}28^\circ\text{C}$) during the spring, summer, and fall. These gradients are achieved by placement of heat tapes under the backs of the cages; therefore, snakes have access to cool (cage front) or warm (cage back) regions of the cage.

California kingsnakes *do need SOME* winter cooling, although the low range is not as important as it is with higher elevation kingsnakes (e.g., Sonoran mountain kingsnakes, *L. pyromelana*, Cranston, 1994). Thurgess has induced captive propagation of this species with minimal temperature drops, down to only 65°F

(18°C). However, for simplicity, the phenomenon of physiological cycling is achieved by allowing the California kingsnake to cool to the mid $50\text{s}^\circ\text{F}$ ($12\text{--}13^\circ\text{C}$), along with the rest of our snakes. Starting in mid-November, or two weeks prior to the actual cool down, the kingsnakes are taken off feed. Temperatures remain at the late summer levels for this two-week period to allow time for the animals to eliminate the contents of their intestine. After the two-week gut-clearing stage, enclosure heaters and room heaters are turned off. Within a few days, temperatures in the enclosures have stabilized to the brumation temperatures. During this winter cooling, drinking water is available to the animals at all times. Unless we are working in the room, lights are kept off. Animals are inspected at least twice weekly to make sure they are not experiencing any dramatic weight loss or developing colds or other health problems. Temperatures in the low-to-mid $50\text{s}^\circ\text{F}$ ($10\text{--}13^\circ\text{C}$) are considered optimal. In extreme cases, temperatures as low as 38°F (3°C) have been tolerated for short periods of time with no apparent ill effects; this is not recommended, however. It has been our experience that during the brumation period healthy California kingsnakes lose less than 5% of their body mass.

The spring "warm-up" is achieved simply by turning on room heaters and/or enclosure heaters during mid-February. Within two days after the spring warm-up, most of the kingsnakes are accepting food eagerly. In fact, as with many snakes, this may be the time of greatest feeding intensity.

Captive propagation of the California kingsnake is accomplished easily. On our cooling cycle, most breeding activity occurs from late March through early May, although copulation has been observed as late as the end of June. The breeding process is usually instigated when the female kingsnake is introduced into the male's enclosure. The reproductive state of the female may be assessed by manually palpating the abdominal area of ovarian follicles. Generally, females are thought to be most receptive immediately following their first shed of the season, which typically occurs about a month after emerging from brumation. The breeding sequence begins shortly after the female is placed in the cage with the male. At all other times, we house the snakes separately. Courtship in the California kingsnake is highly ritualized and tends to follow patterns seen in many other colubrid species (Secor, 1987). The male inspects the female within 3 minutes of her placement in the cage. Soon af-

ter, the male will spasmodically rub the back of the female along her entire length. This courtship period has been observed to last between 15 minutes and several hours. However, one encounter required a mere 45 seconds of dorsal stimulation by the male before copulation was observed. If the female is ready to breed, she will lift up her tail and the male will place one of his hemipenes into her vent. Actual intromission often lasts approximately 30 minutes although on many occasions we have noted copulations lasting between 2 and 3 hours. Sometimes, copulation is accompanied by what is known as a copulatory grasp: The male bites the female on her neck, face, or trunk, and remains in this position until copulation is over. We have also observed this behavior in Taylor's milk snakes, *L. triangulum taylori*, and in Mexican milk snakes, *L. triangulum annulata*. In our collections, we usually have the females breed at least three times. California kingsnakes have copulated a total of up to seven times over a 30-day period in our collections.

The female will always have a pre-egg-laying shed from 7 to 14 days prior to the actual egg laying. After her shed, a plastic container with an access hole at least twice the diameter of the snake is placed in her cage. Damp sphagnum moss lines the container. The approximate date of oviposition may be predicted by closely observing the female's behavior. Females tend to reside within the nest box, which is typically kept on the cooler side of the cage. In contrast, she places her body, especially the part that contains the developing eggs, on the heated side of the cage. Females may begin to pace the cage restlessly, entering and leaving the nest box many times, within the 36 hours prior to oviposition. This restless behavior lasts about 24 hours. At this point, the females may suddenly "settle down" in the nest box. Actual egg laying occurs within 12 hours. The female lays her eggs in this "nest box" with one exception: Sometimes females lay infertile eggs outside the "nest box."

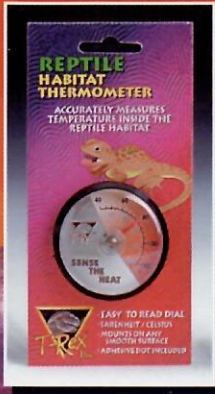
In our collections, we have had as few as 3 and as many as 13 eggs from a single female (average: 6 to 10 eggs). This is fewer than what Perlowin (1992) reports; he lists the range as 6 to 23 eggs. However, most of our adult breeder stock are young adults. In subsequent years our clutch size could increase with an increase in adult female size. Like Perlowin, we have found larger clutch sizes in the coastal forms of this snake in comparison to the desert forms. Female kingsnakes are physically exhausted following oviposition and are allowed to rest undisturbed in the nest box for at least another day before they are of-

ferred food. Eggs are removed from the nest box as soon as the entire clutch is laid and are placed inside the incubator. If possible, we remove eggs as they are laid to prevent them from sticking together. The medium of choice (due to availability and low cost) is vermiculite. Other media such as damp paper towels, sand, and potting soil have also been used successfully. Usually we mix vermiculite and water at a ratio of 1.5:1 by weight. At approximately four weeks into the incubation, the medium is replaced by fresh medium, again moistened at a 1.5:1 ratio. Our kingsnake eggs are incubated at 82°F (28°C) for approximately 60—70 days, at which time they start to pip. It is not uncommon to experience up to a two-day spread between the first neonate slicing the egg open to the last one hatching out.

California kingsnakes are one of the easier snakes to induce to double clutch. We have had females do this on numerous occasions. It is imperative that the female is in top condition. An individual female's ability to produce a second clutch of eggs is more a function of genetics than husbandry. Coastal populations seem to double clutch more readily than inland populations, although we have had both bloodlines double clutch. Immediately after the female's first clutch, we will feed the animal as much as she can eat. Within two weeks, and before the female has another shed, a second breeding will take place if it is going to occur. In our collection we rarely have a female double clutch if she undergoes a post-egg shed before she breeds a second time. Eggs in the second clutch are often fewer in number and smaller.

Neonate care is straightforward. In our collections, we house the babies in small shoeboxes placed in a rack with heaters toward the back, again setting up desirable thermal gradients. We supply newly hatched snakes with a moistened paper towel, loosely crumpled at the back of the cage. This provides moisture for the first shed and necessary warmth. Once the neonates shed, the damp paper towel is removed. Alternately, newly hatched kingsnakes may be left in the high humidity of the incubation container until their first shed. Then, the snakes remain on dry paper towels or pine shavings with access to a small water dish. It is advisable to maintain juveniles, as well as adults, singly. However, Erik routinely cages entire litters together with no incidence of conspecific predation. It should be pointed out that under this condition the young snakes are kept only with their own litter mates and are never fed together. Any individuals

SENSE THE HEAT

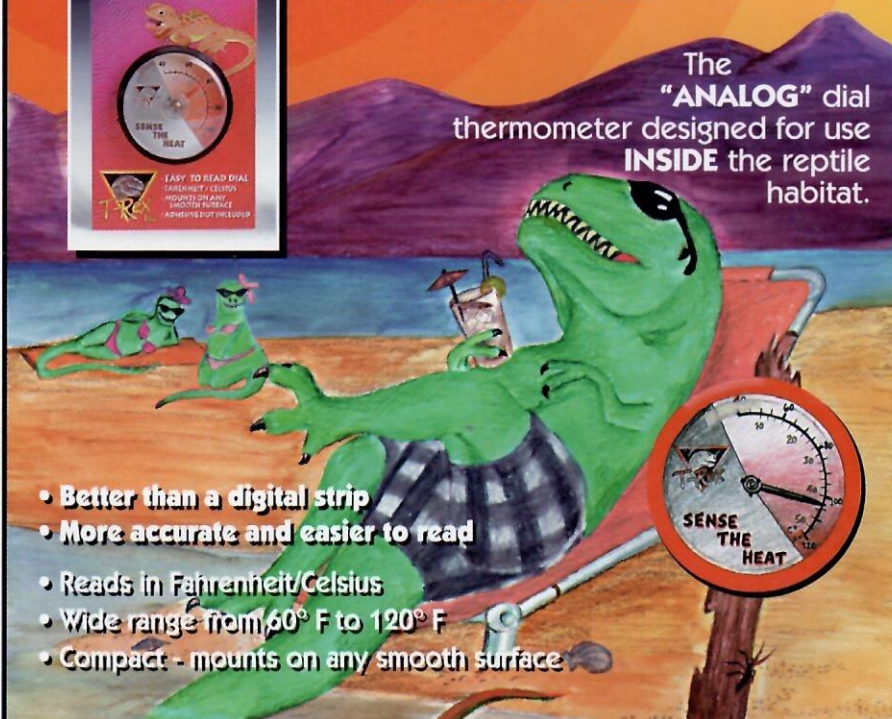


REPTILE HABITAT THERMOMETER
ACCURATELY MEASURES TEMPERATURE INSIDE THE REPTILE HABITAT

EASY TO READ DIAL
GREEN/WHITE/RED
MOUNTS ON ANY SMOOTH SURFACE
ADHESIVE PUT INCLUDED

...WITH THE T-REX REPTILE HABITAT THERMOMETER

The "ANALOG" dial thermometer designed for use **INSIDE** the reptile habitat.



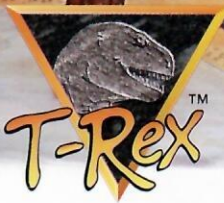
- Better than a digital strip
- More accurate and easier to read
- Reads in Fahrenheit/Celsius
- Wide range from 60° F to 120° F
- Compact - mounts on any smooth surface



REPTILE HABITAT HUMIDITY GAUGE
ACCURATELY MEASURES HUMIDITY INSIDE THE REPTILE HABITAT

SENSE THE HUMIDITY

For Optimum Reptile Care also use the T-Rex HUMIDITY GAUGE



T-Rex is a trade name of Ocean Nutrition Corporation
225 W. 15th St., National City, CA 91950
(619) 336-4728 • FAX(619) 474-0863

Frogs



Lizards

Reptile Specialties

John Uhern

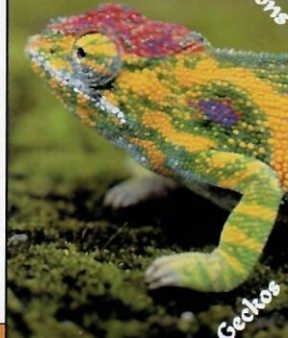
Largest Selection of Chameleons Anywhere
C.B. • Farm Raised • Imports



Currently shipping throughout the U.S. and abroad.

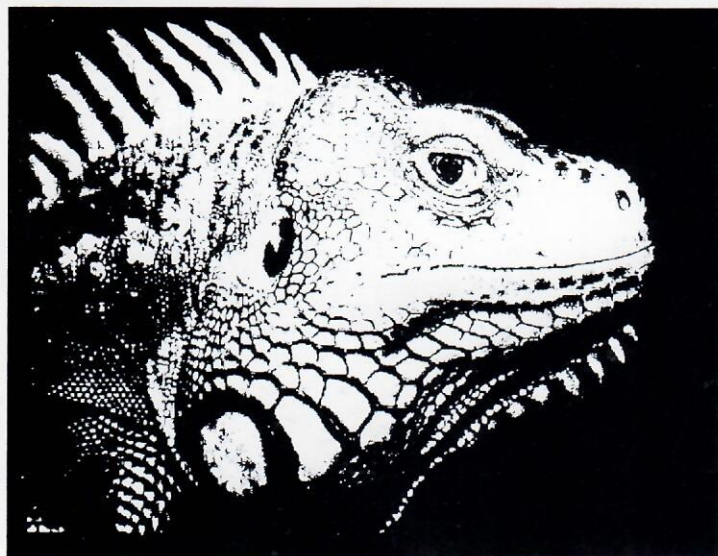
P.O. Box 91 • Torrance, CA 90503 • USA
(310) 553-4728 • Fax (310) 553-7331

Chameleons



Geckos

NUTRI GROW Iguana Diet™



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

AMERICAN REPTILE INC.

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

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

that become disproportionately larger than the others are removed from the group.

Baby kingsnakes are fairly large—up to 0.6 oz (17 g)—and are capable of accepting “unscented” pink mice as their first meal. Hatchlings with large amounts of yolk left in the gut after emergence from the egg will often shed a second time before accepting their first meal. Although domestic pink mice are readily accepted by most California kingsnakes, desert populations often prefer to start on food items scented with lizard or another species of snake. Usually, babies are fed through their first winter. At 6 months of age they are approximately 2.5 oz (70 g) in body mass. If

feeding schedules are frequent (twice weekly), babies will be large enough to breed at 18 months of age. In our collections, California kingsnakes weighing approximately 7 oz (200 g) for males, and 7.9 oz (225 g) for females are sexually mature.

The California kingsnake (*L. getula californiae*) is an ideal reptile to maintain in captivity. Ease of long-term maintenance and attractiveness makes it an interesting study animal for both the amateur and large-scale herpetoculturist.

Acknowledgments

We would like to thank the following individuals for their assistance from the collecting of the data, to the photographs, to

the actual writing of this paper: Eunice Cranston, Jean Allured, and Doug Brown.

Literature Cited

- Applegate, Robert. 1993. The General Care and Maintenance of Milk Snakes. Advanced Vivarium Systems, Lakeside, CA. 71 pp.
- Briggs, Patrick, and Sean McKeown. 1995. Natural and captive-selected color phases of California kingsnakes (*Lampropeltis getula californiae*). The Vivarium 6(4):26–29, 44–46.
- Cranston, Thurgess. 1994. Common kingsnakes, *Lampropeltis getula*. The Vivarium 5(6):30–33; 43–47; 54.
- De Vosjoli, Philippe. 1994. The Lizard Keeper's Handbook. Advanced Vivarium Systems, Lakeside, CA. 142 pp.
- Klingenberg, Roger J. 1993. Understanding Reptile Parasites. Advanced Vivarium Systems, Lakeside, CA. 81 pp.
- Mattison, Chris. 1991. A–Z of Snake Keeping. Sterling Publishing Co., Inc. New York. 143 pp.
- Perlowin, David. 1992. The General Care and Maintenance of Common Kingsnakes. Advanced Vivarium Systems, Lakeside, CA. 71 pp.
- Perlowin, David. 1994. A Product Review: A temperature control system. The Vivarium: 6(3): 5 and 11.
- Secor, Stephen M. 1987. Reproductive behavior of kingsnakes. SWHS Herpetology 17(1):1–19.

DAVID BLAIR'S CRITTER CORNER

Call: (800) HERP-NUT

(800) 437-7688

For Orders or to Request a Catalog



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

For Product Info. CALL:
CRITTER CORNER, INC.

316 W. Mission #117 Escondido, CA 92025

(619) 746-5422



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

SERVED IN FINER TERRARIUMS EVERYWHERE.



ZuPreem is proud to introduce an exciting new line of reptile diets. Nutritionally complete and made from the finest ingredients, ZuPreem is the best option for feeding your reptile. To serve ZuPreem yourself, just go to your favorite pet food retailer. Or call 1-800-345-4767 for more information.

ZuPreem



NEW!

Tetra Terrafauna SizzleStones™ **Look how they've improved!**



A successful terrarium starts with healthy reptiles. Most reptiles need "belly heat" for proper food digestion and comfort. For years, this warmth has been provided by Tetra Terrafauna's patented Sizzle Stones. And now there's great news ... Sizzle Stones just got better—a lot better. Here's how.

Regular and Super Sizzle Stones now feature a new heating system—THERM-O-FORM™—a temperature controlled heating conduit, formed into an oval shaped insulated coil embedded inside the Sizzle Stone. Heat is disseminated over the entire surface area of the stone at a pre-regulated temperature range to ensure safety, creature comfort, and increased body temperature for proper food digestion. And there's more ... **all** Sizzle Stones are now coated with REPTO-SEAL™ to protect the stone surface, reduce bacteria build up, and make cleaning easy and quick.

Sizzle Stones are now available in three natural colors ... **Eastern Bluestone, Western Redstone, and Desert Sandstone ... to create an authentic landscape, and duplicate a reptile's natural habitat!**

Tetra Terrafauna Sizzle Stones—pioneers in successful terrariums ... in the past, the present, and for the future.

Tetra


Terrafauna®

If reptiles could talk, they'd ask for Tetra Terrafauna.

**Tetra Sales (U.S.A.), 201 Tabor Road, Morris Plains, NJ 07950,
Canadian Rep: R.C. Hagen, Ltd., Montreal, Quebec**