

AN OBSERVATION OF A
 PREDATOR-ESCAPE TECHNIQUE
 PRACTICED BY A
 ROUGH EARTH SNAKE

Many accounts have been recorded of one snake eating another, and in nearly every instance the prey, after violent opposition, has been summarily devoured. However, there is evidence that occasionally the prey is able to save itself. Such was the case with two snakes collected near Florence, South Carolina.

An 11-inch rough earth snake (*Virginia striatula*) and a 19-inch unidentified burrowing snake (possibly a mole snake?) were taken from beneath old logs in the woods and caged for observation. About 3 months later, the earth snake was found being swallowed tail first by the larger snake. This in itself was most unusual, as predator snakes customarily eat their prey head first.

The victim was making no effort to escape, but rather seemed to have accepted its fate. However, just as the earth snake's head was going backwards through the mouth of the predator, the smaller snake rolled its head sideways 90 degrees and quickly clamped its jaws over the larger snake's glottis. With the air supply thus cut off, the predator became increasingly restless, and after about 3 minutes was frantically trying to

dislodge the smaller snake's hold, opening its mouth wide and rubbing the offensive creature's head against the bottom of the cage. When it could not succeed in this, the predator regurgitated the smaller snake. The earth snake retained its hold for another 30 seconds, then let go and crawled off to a far corner of the cage, while the predator rapidly took large gulps of air.

Half an hour later, the predator again had the smaller snake by the tail and was swallowing it, and again the earth snake did not thrash about or attempt to bite the predator. The actions of both snakes were the same as were observed before, with the same last-second grab of the glottis and the subsequent efforts to dislodge. The observations were concluded at 5 p.m., after three complete enactments of the drama. At no time did the earth snake appear to be concerned about its fate, but gave the impression that there was no point in offering resistance until the last moment, at which time it would be able to escape unharmed.

It is possible that through the ages, earth snakes have been overtaken in their burrows by predator species, and have developed this unusual but highly effective escape technique to such high perfection.

Vernon M. Kirk
 Northern Grain Insects
 Research Laboratory
 Brookings, S.Dak. 57006

This article appeared in the January 1969 issue of TURTOX NEWS (Vol. 47, No. 1, p. 44) now a quarterly publication of the science companies of Crowell Collier and Macmillan, Inc. The article is reproduced here with the permission of the editor of TURTOX NEWS and the author. Standard common name and binomen have been changed in accordance with changes made since the original article appeared. (VaHS)

The rough earth snake (*Virginia striatula*) occurs in southeastern Va., with records from Henrico, New Kent, Charles City, James City, Chesterfield, and Brunswick counties as well as the Newport News area. Records for other SE Va. counties welcomed.

- 1 -

VaHS BULLETIN is a newsletter appearing at least six times a year. The pages are open for articles, or comment, on matters relating to Virginia herpetology. The principal activity is the state survey of native reptiles and amphibians. (Revised list soon.)

VaHS is a non-profit science-information effort sponsored by the Virginia Herpetological Society. "Special" VaHS BULLETINS are sent, free, to Virginia's college biology departments. It is sent to Va. biology teachers (secondary schools) upon written request addressed to VaHS.

EASTERN STATES SOCIETIES
TO MEET 29 OCTOBER 1972,
AT COLUMBIA UNION COLLEGE
TAKOMA PARK, MARYLAND..

In the leading feature, p.1
the VaHS BULLETIN editor
has suggested that the
predator may have been a
mole snake (Lampropeltis
c. rhombomaculata) since
this is a likely candi-
date for the "unidenti-
fied burrowing snake." It
is the variety frequent-
ly offering identifica-
tion problems to those
who are familiar with
the herpetofauna of the
northern tier of states.

VaHS CERTIFICATE AWARDED
AT NORTH VA. SCIENCE FAIR

Under a program launched
a decade ago, a special
certificate and VaHS mem-
bership for 1972-1973 was
awarded to:

William A. Warner
1307 So. Highland St.
Arlington, Va. 22204

The award, made by Dr. P.
H. Knipling, Arlington
County Science Supervisor
and VaHS Treasurer, was
made for an effective ex-
hibit on the habits and
care of a snake in cap-
tivity. The Northern Va.
Science Fair was held in
the Washington-Lee High
School, Arlington, Va.

You have not received a
new VaHS membership card
they are being printed!

Paid 1971 membership sup-
port has been credited to
1972. All additional
contributions will be
credited to future years.

Columbia Union College
will be host for the
Eastern Seaboard Herpeto-
logical League (ESHL) '72
Fall Meeting. The
invitation was extended
to eastern herpetological
societies, associations,
and similar groups, by
Dr. Lester E. Harris, Jr.,
Head of the Biology Dep't
Columbia Union College.

Dr. Lester E. Harris, Jr.,
is a member of VaHS of
long standing. He has
attended joint VaHS-MdHS
meetings at the National
Zoological Park in past
years. He is the director
of the Columbia Union
College's Biological
Station at Headwaters,
Highland County, Virginia.

PLEASE MARK YOUR CALENDAR
SUNDAY, 29 OCTOBER 1972

Coordinator for the ESHL
is Mr. Robert G. Tuck, Jr.
5431 56th Avenue (#3)
Riverdale, Md. 20840...
President of the MdHS.
The VaHS representative
is Mr. Robert Jennings of
Richmond, Va.

DIRECTIONS FOR REACHING
THE MEETING OCTOBER 29
ARE GIVEN BELOW:

PLEASE DO NOT BRING ANY
POISONOUS ANIMALS - - -

I N V I T A T I O N:

"...This is to extend an
official invitation to
the Eastern Seaboard Her-
petological League to
meet on the Columbia
Union College campus for
their October 1972 session.
The college administration
has authorized me to ex-
tend this invitation to
you. ..."

(Dr.) Lester E. Harris, Jr.
Head of Biology Dep't.

PROGRAM: (in brief)

12:30 - 1:15 pm: set up
exhibits, register, final
line-up of speakers, etc.

1:30-3:15 pm: meetings
Amphitheatre in SCIENCE
BLDG. Introductions.

4:15-5:45 pm: regional
group representatives to
speak (10-min. maximum.)

6:00 pm: Dinner (\$1.50)
CAMPUS CENTER BLDG. Cafe-
teria (all vegetarian).

EXHIBITS: All should be
clearly labeled and iden-
tified; include your name
and address and society-
affiliation. No sales or
purchases; make friends,
exchange addresses. Let's
make it non-commercial....
College will provide 16 mm
motion picture, and 2"X 2"
slide CARROUSEL projectors.

Hope to see you October 29!

(detach)

DIRECTIONS TO COLUMBIA UNION COLLEGE -- TAKOMA PARK, MD./WASHINGTON, D.C. AREA

A D.C. roadmap (service station) will help. From the Capital Beltway (I-495)
take EXIT 25 SOUTH (New Hampshire Avenue Md. Rt. #650) to EAST-WEST HIGHWAY
(Md. Rt. #410) RIGHT TURN onto EAST-WEST HIGHWAY to CARROLL AVENUE. RIGHT
TURN on CARROLL AVE. TO FLOWER AVENUE. CONTINUE on FLOWER AVE. to the
CAMPUS CENTER BUILDING (on right) and VISITOR'S PARKING AREA (on left).

VA. 4-H REPTILE PROJECT

Four-H Club members throughout Virginia will soon have an opportunity to work on a reptile and amphibian project. The project manual, "The 4-H Reptiles and Amphibians Record Book," includes basic information about reptiles and amphibians, descriptions and habits of our more prominent species, sections on collecting and care in captivity, range maps and descriptions of Virginian poisonous snakes, and discussion of superstitions. There also are questions to answer and activities to complete and record.

The project book has been tested in AMELIA and NOTTOWAY counties and at the West Central 4-H Camp. To date, almost 1,000 4-H members have carried the project since early 1971.

The 4-H project record book will probably be scheduled for statewide publication and distribution sometime later

this year. County Extension Agents and volunteer 4-H leaders will then have an opportunity to use this publication in their work with 81,000 4-H'ers in Virginia. But, they will need your help!

We are now developing sets of slides of amphibians and reptiles that will be used in conjunction with this project. However, slides of many important species and even representatives of families are lacking. If you have good 2" X 2" slides of any of the following that you could send us with your permission to duplicate, we'd appreciate having them.

Cottonmouth, copperhead, eastern kingsnake, six-lined racerunner, a male skink, leopard frog, upland chorus frog, red-spotted newt, amphiuma, N. red salamander, mudpuppy, canebrake rattlesnake, black racer, worm snake, slender glass lizard, bullfrog, any Va.

treefrogs, N. cricket frog, hellbender, any mole salamanders, N. two-lined salamander, and an American alligator.

Your assistance will help many 4-H'ers throughout Virginia to develop an understanding of, and an appreciation for, amphibians and reptiles that should assist in the advancement of herpetology in Virginia.

Send slides to:

(Mr.) Michael J. Clifford
Extension Agent,
P.O.Box 235, Amelia,
Virginia 23002

We will, of course, return the original slide to you.

If you are interested in working with young people on this, or any other, 4-H project, contact your city or county Extension Agent. They'll be glad to hear from you. (MJC)

WHAT OTHER PUBLICATIONS HAVE BEEN SAYING -- OF INTEREST:

NATIONAL GEOGRAPHIC

July 1972 pages 104-117 "Shadowy World of Salamanders" by Dr. Paul Zahl with photographs by the author and Dr. Robert S. Simmons (DDS) of Balto. Md.

Among the familiar names mentioned in the article is that of Dr. Richard Highton, zoology professor at University of Maryland, College Park, whose monumental study of the Plethodon salamanders is world-renowned.

SMITHSONIAN magazine

July 1972 carried an article on the Dismal Swamp.

Among the people mentioned is Roger H. deRageot, VaHS past president, who is shown taking a water snake from the marshland.

The article quotes legend - not Roger - to the effect that pigmy rattlers, and diamondback rattlers, are abundant in Dismal Swamp. This is simply not true, as Roger may have advised the author.

There have never been any Diamondback Rattlesnakes (Crotalus adamanteus) recorded for Dismal Swamp. Only one Carolina Pigmy Rattler was captured in Va. (1958) at Northwest. The best estimate now, is that it was an "escapee" from the car of a north-bound snake collector.

SUPPORT THE VaHS PROGRAM.

ATLANTIC NATURALIST

Vol. 27, Nos. 1 & 2, Spring and Summer issues, 1972.

The Spring issue contains an article on "Reptiles of Mason Neck" by VaHS-member (Ms.) M. Kathleen Klimkiewicz, pages 20-25.

The Summer issue carried the sequel on the "Amphibians of Mason Neck" with photographs in both by Robert G. Tuck, Jr., the president of MdHS and a member of Dr. James A. Peters' staff at the U.S. National Museum, Div. of Reptiles and Amphibians.

Kathleen Klimkiewicz, who joined VaHS while she was at Hollins College, Va., is to be congratulated on the patient collecting and recording of local herpetofauna. Hers was a thorough survey of a most interesting and historic area. Mason Neck is the site of Gunston Hall, home of George Mason (1755). It is a point of land jutting into the Potomac River below Washington's home at Mount Vernon, Va. and upriver from the U.S. Marine Corps base at Quantico. Mason Neck is a 30-minute drive from Washington, D.C. Included in its confines are a National Wildlife Refuge, a tract under the No. Va. Regional Park Authority,

SEND IN NOTES ON READINGS OF INTEREST TO VaHS. ...

and another under the Va. Division of Parks. It embraces several wetland areas --- freshwater and tidal (brackish) marshes.

For those who may wish to affiliate, write:

AUDUBON NATURALIST SOC.,
8940 Jones Mill Road NW
Washington, D.C. 20015

The Audubon Naturalist Society recently celebrated its 75th anniversary. Its publication, ATLANTIC NATURALIST, is highly regarded and is under the editorship of Mr. Ben O. Osborn of Alexandria, Va.

"LIZARDS OF VIRGINIA"

The collecting sites for Va. lizards, noted as "o" on the maps (VaHS-B#68, pp. 5-9) may be made considerably more visible by taking a felt pen in your favorite loud color and carefully filling in the center of each "o". This will liven up the otherwise straight black and white presentation. VaHS

Yes, Virginia, there is a VERMONT HERPETOLOGICAL SOCIETY (VtHS) so the VHS has gone to VaHS to prevent possible confusion!

YOU HAVE NOT RECEIVED:
A NEW membership card
-- they are being printed and will be sent with #70.

LETTERS, IDEAS, COMMENTS

To VHS: 4/4/72

"I am quite interested in herpetology and am an active collector and make careful observations both at home and in the field. . . . If a collector is interested in learning about the bones of a reptile, such as a dead snake, dissect it and place the carcass in strong bleach for about 1 hour and he will have a fine skeleton for study.

I did this with a 51-inch Black Racer using a nylon string through the vertebrae. I hope to accomplish the task of gluing the ribs to the backbone. The skull is glued intact.

In VHS-B#62, page 2, Glen Engeling notes that the Northern Black Racer has not been recorded for Newport News. Near the Riverside Hospital there is a small pit that fills periodically with water. It attracts many frogs. I frequently collect from this area. One day last summer I ran across a 51 $\frac{1}{2}$ inch male northern black racer drinking water from the pond. It died after a few weeks in captivity. I skinned and dissected the specimen and saved the entire skeleton. No pictures were taken of it but the shedded skin was saved. . . . "

(Mr.) Kevin J. Mahaffy
131 Kerlin Road
Newport News, Va.
23601

To VHS: 6/1/71
" . . . I would like the VHS readers to know that the project I completed while I worked for the Peninsula Junior Nature Museum in Newport News, Va., helped me to get into graduate school at South West Texas State U. at San Marcos, Texas. The project also gave me excellent training in identification of amphibians and reptiles which was extremely beneficial when I took a course entitled Field Biology of Animals.

My work in Virginia has helped me in practically every course I've taken in graduate school. This should give VHS members, especially the younger ones, an insight into the usefulness and practicality of studying reptiles and amphibians or other animals."

(Mr.) Glen A. Engeling
South West Texas State
University, Biology
Dep't., San Marcos,
Texas 78666

VHS BULLETINS Nos. 67-68, a special double issue on "LIZARDS OF VIRGINIA" was put in the mail recently. IF YOU DIDN'T RECEIVE IT PLEASE LET VHS KNOW, NOW!

To VHS: 2/27/72

"It has come to my attention that the Great Dismal Swamp is in danger. Developers plan to drain the area for industrial or housing developments.

This seems foolish since Lake Drummond produces as much as 8 million gallons of water a day which has important uses, and these wetlands support a great variety of wildlife. . . .

Senator Spong and Representative Whitehurst both have bills before their respective chambers, but can't stir up sentiment, much less enthusiasm, for saving the area. . . .

Looking at this situation realistically the species that would suffer most by draining the GREAT DISMAL would be mankind. . . ."

(Mr.) R. Eugene Ramsey
Rt. #2, Box #378
Waynesboro, Va.
22980

Editor's Note: (See VHS-B #63 pages 1-2) Here are some places to write:

The Nature Conservancy
1800 North Kent Street
Arlington, Va. 22209

National Wildlife Federation
1412 16th St. NW,
Washington, D.C. 20036

NATIONAL AUDUBON SOCIETY
950 Third Avenue
New York City, N.Y. 10022

LETTERS ON 'SPRING RESEARCH'

To VHS: Re: VHSE#66, The Mole Salamanders:

"I had no idea that there were no reliable records of the spotted salamander (Ambystoma maculatum) from ROCKINGHAM County, Va., until I read the article.

On Sunday, April 6, 1968, I observed and positively identified a specimen believed to have been an adult, 70mm in length, at the foot of Church Mountain, approximately 1 mi. E. of Va. Hwy #259 that runs through a defile in the Allegheny Mountain chain between Broadway, Va. through Matthias, W.Va., and then turns N. through Wardensville, W.Va. before it intercepts US #55. The locality is 1 mi. from the W. Va. - Va. state line.

This creature was jet black in color with brilliant orange spots. It was found during a rain storm about 100 ft. from Rattlesnake Run and some 30 ft. from a steep grade covered with deciduous trees and bushes; but quite near a rill which shows wetness at the surface during all but the very driest season (which occurs only in the mid-summer in that area). I have no doubt that water flows year-round just under the surface through fractured veins in the sedimentary rock underlying the very thin topsoil

found there. The elevation of the site is some 1,450 ft. above sea-level and is, approximately, 1 1/4 miles NNW of the highest peak of Church Mountain which is 3,097 ft. in elevation.

I have no doubt that the salamander came out because of the temporary surface water conditions attending the heavy rains and was possibly seeking a breeding site which we have never found due to the swiftness of the current of the mountain stream nearby. There must be pockets of water still enough, probably hidden by rocks, where the eggs may develop. We have not seen other specimens although it is near our deer-hunting lodge and a number of our group sleep there while trout fishing in a tributary of the No. Fork, Shenandoah River in April - and, we have done so for the past 15 years."

(Mr.) Fred W. Price
4000 Lake Blvd.
Annandale, Va.
22003

(6 April 1971)

Editor's note: Mr. Price, a long-time VHS member, is a counselor in Reptile Study merit badge in the Fairfax District, National Capital Area Council.

Bridgewater, Va.
14 February 1972

" I got the record early Ambystoma jeffersonianum (see VHS BULLETIN No. 66) last month, during a warm spell, at Rawley Springs, ROCKINGHAM County, (Va.). (Collected 24 January '72)

Specimen was photographed but not preserved; (other specimens are available.) A spotted salamander (Ambystoma maculatum) taken in the same pool March 16.

(Upland Chorus Frog taken 5 mi. SW of Bridgewater, 28 February 1972, was also photographed. AUGUSTA County collecting note.)

The "Ambystoma pools" have been producing both these species (jeffersonianum & maculatum) plus woodfrogs (R. sylvatica) in numbers, as they were this spring. Red-spotted newts (Notoptthalmus v. viridescens) and green frogs (R. c. melanota) are in the pond later in the season. This has been going on for 25+ years, to my knowledge. We do not "collect" these pools, but observe, and sometimes capture and release specimens. They're probably fairly small and isolated populations of the Ambystoma species. ."

(Dr.) Harry G.M. JOPSON
Bridgewater College

Collection data have been received from: Professor Shirley A. Whitt, Lynchburg College (coll.#25); Dr. James A. Fowler, Dearborn, Mich. (coll.#26); and from Dr. John S. Applegarth, University of New Mexico, Albuquerque, (coll.#27). Despite the diversity of sources, all of the specimens recorded were Virginia material and, as such, will be properly recorded on the Va. Herpetological Survey maps (see VaHS-B#61).

Additional collection numbers were opened for:

Columbia Union College Biol. Sta. Headwaters, Va. (coll.#28) and the Virginia Institute of Marine Sciences, Gloucester Point, Va. (coll.#29). The VaHS numbers are placed on each color-dot representing a known collecting locality for each species of reptile and amphibian. Bringing all of this fragmented data together in one place has greatly aided the view of reptile and amphibian distribution in the state of Virginia.

Correspondence to:

FRANKLIN J. TOBEY, Jr.
VaHS BULLETIN editor
4706 Tallahassee Ave.
Rockville, Md. 20853

From Lynchburg College:

A list of 130 amphibians and reptiles which are in the preserved collection at Lynchburg College, Lynchburg, Va., has been provided by Professor Shirley A. Whitt and Jack Marsh. The list is of Virginia specimens in the biology department as of January 1971. Additional data on some localities are needed. All will be posted on the VaHS maps.

U.S. NATIONAL MUSEUM, DRA

Specimens from the Va. counties indicated were deposited in the U.S. National Museum collection (Smithsonian Institution) as follows:

Six specimens of the Green Treefrog (Hyla c. cinerea) collected by Dr. Charles and Mrs. Dorelyn Handley on 19 Sept. 1971 in ACCOMAC Co., on Assateague Island, Va., 0.3 mile East of the lighthouse. USNM #192,955. The six specimens were collected inside the plastic "JIFFY-JOHNS" near beach-front parking area. They were possibly attracted by the mosquitoes trapped in the "johns". Specimens were photographed (live) by Ms. Kay C. Ferris of Arlington, Va.

(continued top next col.)

Five specimens of the two-lined salamander (Eurycea b. bislineata) collected by Perry C. Holt 26 June 1962 (1962) in GILES Co., Va., were deposited in the US National Museum, DRA, USNM# 192,956 (larvae).

One specimen of the No. Ringneck Snake (Diadophis punctatus edwardsi) collected by Lawrence R. Heaney, 1 mile East of Rileyville, in PAGE Co., in Spring, 1970 (no date) USNM #192,957.

A specimen of the Hellbender (Cryptobranchus a. alleganiensis) was collected by Dr. Frank J. Schwartz and B. Dutcher, on 29 May 1964 in FLOYD County, near Floyd, Va., 6.2 miles North of Little River; USNM #194,590.

(Data provided by R.G. Tuck, Div. of Reptiles and Amphibians, USNM.)

VaHS BULLETIN is a newsletter on Virginian herpetology. It should not be cited in the technical or scientific literature.

The VaHS-B does not pretend to be a "professional journal" -- it is not. Appearance of an item in the VaHS BULLETIN doesn't constitute FIRST PUBLICATION. The VaHS-B's too small in total circulation to be treated as more than a "personal communication".

HERPETOLOGY COURSE TO BE
GIVEN AT MOUNTAIN LAKE
BIOLOGICAL STATION

The Mountain Lake Biological Station, University of Virginia, will offer a course in herpetology during the coming summer to be taught by Dr. Harry G.M. JOPSON, professor of biology⁺ at Bridgewater College, Bridgewater, Va.

The course is being given in the first term June 14 through July 18, only.

The following course description was excerpted from the U.of Va. program:

ZOOLOGY 204: HERPETOLOGY

Biology of amphibians and reptiles: The herpetofauna of the southern Appalachians is rich, particularly in respect to the salamanders. Fieldwork is done in GILES Co. (the MLBS area) and other significant localities. A considerable number of species can be expected to be encountered in the field or the laboratory.

A research project is to be conducted by students as a part of the course. Dissecting microscope is required. Texts: Introduction to Herpetology by Goin and Goin; Blair's Vertebrates of the U.S.

⁺ Dr. Harry G. M. JOPSON, vertebrate zoologist, VHS charter member, was President of VHS 1966-1969.

During the second term, July 19 through August 22 a course will be offered in mammalogy. It will be taught by Dr. Charles O. HANDLEY, Jr., Curator in Charge, Division of Mammals, U.S. National Museum, Smithsonian Institution, Washington, D.C. 20560

ZOOLOGY 207: MAMMALOGY

Course combines field and laboratory work, lectures and student seminars. The distribution, ecology and population variation of the small mammal fauna of the Mountain Lake area are studied in the field.

Seminars consider natural history, systematics, classification and morphology of mammals of the world. Dissecting microscope required. Texts: Readings in Mammalogy, by J. Knox Jones and S. Anderson; and Introduction to Mammalogy, (Cockrum).

REGISTRATION: - - - - -

While the courses are designed for graduate students, primarily, it will be possible for anyone with a background of general biology to register for them. Other courses offered; one per term.

Admission to the courses is open to men and women of good academic standing who have a minimum of ten semester hours of college credit in biology. These courses at Mountain Lake, Pembroke, Va., are a part of the summer session of the University of Virginia.

Courses may be taken for graduate or undergraduate credit. Students wishing to apply these credits to U.of Va. graduate degrees must be admitted to graduate program of U.of Va. before enrollment. WRITE: Dean, Graduate School of Arts and Sciences, U.of Va., Charlottesville, Va.

Students from other universities planning transfer of credits for Mountain Lake courses should secure advance approval from their own college or university.

REQUEST ADDED INFORMATION
from:

Director, Mountain Lake Biological Station, U. of Va., Charlottesville, Va. 22903

Dr. J.J. Murray, Jr., VHS, and Dr. J.L. Riopel, are co-directors of the MLBS.

DELAYED APPEARANCE: THIS PAGE WAS RUN OFF BY OFFSET AND WENT OUT WITH "LIZARDS of VIRGINIA"

EYE MARKS IN VERTEBRATES:
AIDS TO VISION

Source: SCIENCE (AAAS)

3 Sept. '71 Vol. 173,

No. 4000; pp.936-939

Abstract: Lines leading forward from the eye may function as aiming sights in many small vertebrates. The chief evidence is the correlation of distribution and positions of eye lines in various vertebrate groups with predatory feeding habits. Dark patches around the eye may serve to reduce glare in species in bright environments. Facial patterns often have multiple functions.

The authors note that a number of functions have been suggested for colors and markings of species, including camouflage, mimicry, and temperature regulation. They suggest that, in addition, the patterns of circles and lines about the eyes of vertebrates may enhance their vision and enable predaceous species to locate and capture prey much more effectively.

Eye lines are well defined marks, usually very dark and narrower than the eye. They extend from the margin of the eye or through the eye to the snout. Often a line from the center of a pupil bisects the dark eye line. The authors suggest that if the eye lines serve as lines of

sight in tracking and capturing swiftly moving prey, their presence, position, and type should be related to feeding habits. These lines should occur more frequently in species that feed on rapidly moving prey. The authors note:

"If eye lines serve as sighting devices, it would be expected that smaller members of a group would be more likely to have such lines than larger members, because the prey-capturing apparatus of the former is relatively smaller and the prey moves more swiftly in relation to their size. Among the North American frogs depicted in Conant (A Field Guide to Reptiles and Amphibians) and Stebbins (A Field Guide to Western Reptiles and Amphibians), almost all ranids and hylids longer than $2\frac{1}{2}$ in. lack eye lines, whereas almost all below this size have them. Among eastern North American salamanders there is a similar trend; smaller species more frequently having eyelines. However, eye lines are relatively uncommon in salamanders. Do predaceous young have eye lines more often than the much larger adults?

This seems to be the case among some ambystomid salamanders (see VHSB 66). The lines are present in the young of some species and absent in the adults. The same trend occurs in certain lizards (skinks).

In some species of lower vertebrates, there is a teardrop-like mark down which they may sight to catch prey. The pigmented eye grooves which converge toward the snout may enhance binocular vision and function as an aiming sight. These sighting grooves occur in the Green Anole (Anolis c. carolinensis). The authors suggest that the vine snakes (Oxybelis aeneus) possess sighting grooves which may represent the ultimate of refinement in accurate striking faculty. It has a very precise eye line in a very narrow groove which tapers to a point. The narrow head in this, and other arboreal forms increases binocularity in aiming along such a path; as far as we know, such features are never this precise in terrestrial snakes. Vine snakes probably have the opportunity for comparatively fewer strikes at prey than terrestrial snakes since they are

(continued on next page)

continued from last page:
VERTEBRATE EYE MARKS

partially anchored to limbs and, more important living where prey can easily drop away through space. Some species, such as the soft-shelled turtles, which are mainly carnivorous, may employ the eye line in obtaining live prey, according to the authors. These observations may suggest additional studies on Va. species which possess eye lines or sighting grooves.

Robert W. Ficken
Dep't of Zoology
Univ. of Wisconsin
Milwaukee, Wis. 53201

Paul E. Matthias
Field Station, Univ. of
Wisconsin, Rt#1, Box 216,
Saukville, Wis. 53080

Robert Horwich
Chicago Zoological Soc.
Brookfield, Ill. 60513

SALT GLANDS IN REPTILES

(Excerpts from SCIENCE,
30 July 1971, Vol. 173,
No. 3995, pp.437-441)

The authors introduce the article with the observation that the sea is a highly concentrated salt solution and that most marine vertebrates, including reptiles, encounter problems in conserving water and excreting excess salts. They note: "The reptilian kidney, unlike kidneys of mammals and birds, cannot produce urine more concentrated than the plasma, so accessory organs known as salt glands have developed in marine forms to handle excretion of excess salts. In sea turtles and in the estuarine diamond-back terrapin, (see VHS-B #57) the salt gland is behind the eye and secretes tear like fluid into the orbit. In the marine iguana (sub-tropical), the salt gland is nasal and the secretions are sneezed out the nares.

Authors:

William A. Dunson
Randall K. Packer
Margaret K. Dunson
Dep't of Biology
Pennsylvania State Univ.
University Park, Pa.
16802

CHEMICAL-CUE IN SNAKES

Abstract: Newborn garter snakes (Thamnophis sirtalis) responded very similarly to worm and fish surface-extracts regardless of whether the mothers were fed, exclusively, on fish or worms during the gestation period. The initial stimulus control of the attack response in newborn snakes thus seems relatively unmodifiable.

SCIENCE (AAAS) 5 March '71
Vol. 171, No. 3974, pages
921-923; G. M. Burghardt,
Dep't of Psychology,
Univ. of Tennessee,
Knoxville, Tenn. 37916

SNAKE EGGS -A REJOINDER:

Re: Burghardt's report on "Chemical-Cue Preferences of Newborn Snakes..." All snakes are either oviparous or ovoviviparous. In neither case is there any connection between the mother and the young which is developing within the egg. Consequently, any experience by the mother regarding food or environment would have nothing to do with the young. (Letter to SCIENCE magazine, 21 May 1971) by

(Major) Chapman Grant
1114 Idaho Street
Escondido, Calif.
92025

HERPETOLOGY COURSE TO BE
GIVEN AT MOUNTAIN LAKE
BIOLOGICAL STATION

The Mountain Lake Biological Station, University of Virginia, will offer a course in herpetology during the coming summer to be taught by Dr. Harry G.M. JOPSON, professor of biology[†] at Bridgewater College, Bridgewater, Va.

The course is being given in the first term June 14 through July 18, only.

The following course description was excerpted from the U.of Va. program:

ZOOLOGY 204: HERPETOLOGY

Biology of amphibians and reptiles: The herpetofauna of the southern Appalachians is rich, particularly in respect to the salamanders. Fieldwork is done in GILES Co. (the MLBS area) and other significant localities. A considerable number of species can be expected to be encountered in the field or the laboratory.

A research project is to be conducted by students as a part of the course. Dissecting microscope is required. Texts: Introduction to Herpetology by Goin and Goin; Blair's Vertebrates of the U.S.

[†] Dr. Harry G. M. JOPSON, vertebrate zoologist, VHS charter member, was President of VHS 1966-1969.

During the second term, July 19 through August 22 a course will be offered in mammalogy. It will be taught by Dr. Charles O. HANDLEY, Jr., Curator in Charge, Division of Mammals, U.S. National Museum, Smithsonian Institution, Washington, D.C. 20560

ZOOLOGY 207: MAMMALOGY

Course combines field and laboratory work, lectures and student seminars. The distribution, ecology and population variation of the small mammal fauna of the Mountain Lake area are studied in the field.

Seminars consider natural history, systematics, classification and morphology of mammals of the world. Dissecting microscope required. Texts: Readings in Mammalogy, by J. Knox Jones and S. Anderson; and Introduction to Mammalogy, (Cockrum).

REGISTRATION: - - - - -

While the courses are designed for graduate students, primarily, it will be possible for anyone with a background of general biology to register for them. Other courses offered; one per term.

Admission to the courses is open to men and women of good academic standing who have a minimum of ten semester hours of college credit in biology. These courses at Mountain Lake, Pembroke, Va., are a part of the summer session of the University of Virginia.

Courses may be taken for graduate or undergraduate credit. Students wishing to apply these credits to U.of Va. graduate degrees must be admitted to graduate program of U.of Va. before enrollment. WRITE: Dean, Graduate School of Arts and Sciences, U.of Va., Charlottesville, Va.

Students from other universities planning transfer of credits for Mountain Lake courses should secure advance approval from their own college or university.

REQUEST ADDED INFORMATION

From:
Director, Mountain Lake Biological Station, U. of Va., Charlottesville, Va. 22903

Dr. J.J. Murray, Jr., VHS, and Dr. J.L. Riopel, are co-directors of the MLBS.

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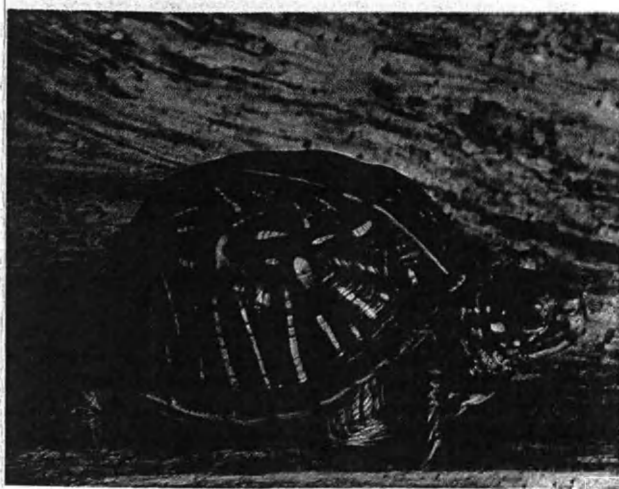
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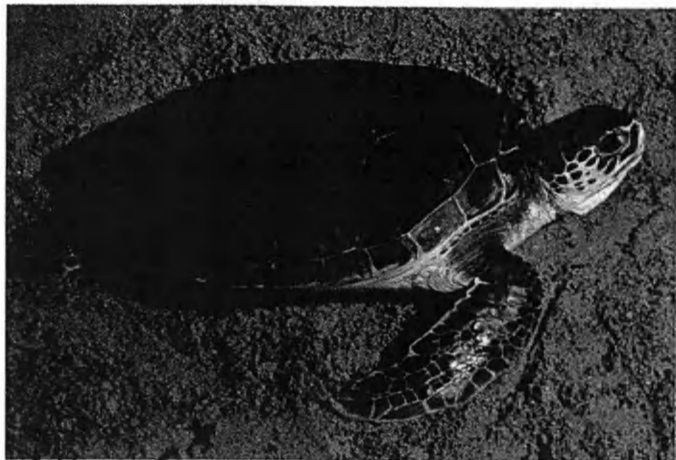
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Carl H. Ernst is associate professor of biology at George Mason University, and Roger W. Barbour is professor of zoology at the University of Kentucky.

"There is so much new information in the book, and such a fine review of the literature. . . . the bibliography alone would be well worth the price of the book. In summary, I would say that the manuscript represents a fine contribution to herpetological literature, and that the illustrations are certainly better than anything in print."—C. J. McCoy, Carnegie Museum

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