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# BULLETIN OF THE MARYLAND HERPETOLOGICAL SOCIETY

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*The Maryland Herpetological Society*  
*Department of Herpetology*  
*Natural History Society of Maryland, Inc.*  
*2643 North Charles Street*  
*Baltimore, Maryland 21218*

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The Maryland Herpetological Society  
Department of Herpetology, Natural History Society of Maryland, Inc.

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## Meetings

The third Wednesday of each month, 8:15 p.m. at the Natural History Society of Maryland (except May-August, third Saturday of each month, 8:00 a.m.). The Department of Herpetology meets informally on all other Wednesday evenings at the NHSM at 8:00 p.m.



DISTRIBUTIONAL NOTES ON SOME DELAWARE SNAKES,  
WITH TWO FIRST RECORDS FOR THE STATE

Rudolf G. Arndt

Abstract

Locality data are given for seven species of little-known or secretive Delaware snakes. Although all species considered herein have been recorded for Delaware in range maps by Conant (1975), specific localities for two of the species have not been published. Data for five other species herein augment those in the literature and help to more accurately define their Delaware distributions.

Published information on the distribution of the herpetofauna of Delaware has been summarized and augmented primarily by Conant (1945, 1947, 1958). Additional data have been presented by Arndt (1972, 1975, 1976, 1977, 1978). As part of a continuing study of the herpetofauna of Delaware and adjacent areas by these two individuals, it seems desirable to now update information on the distribution of seven species of little-known or secretive Delaware snakes.

Many of the specimens or data reported on below have previously been made available to Roger Conant by me or by others and these data have been incorporated in Conant (1975). The Delaware range for each species considered herein and as known to me has thus already been published. The purpose of this paper is to present the first specific locality data for two of the species, and to augment locality data for five additional species. These data help to better describe the distribution of the snakes of Delaware. Further, with the recent advent of a nongame species program in the state, these data will help identify and hopefully safeguard known or possible populations of the less common species.

The data presented herein are based only on specimens or other documentation recently in my possession, and on literature records; museum and other records will be included in a later work. Data for Delaware will ultimately be related to that for adjacent states (e.g., summaries for Maryland by Harris, 1975, and for Pennsylvania by McCoy, 1982).

Many individuals contributed to this paper. In particular, Michael J. Geiger and Raymond M. Pusey provided many specimens and data; the former also provided numerous photographs. Specimens have also been contributed by Charles E. Mohr, Delaware State College, Dover; Thalia C. Putney, Wilmington Friends School, Wilmington; and Roland R. Roth, University of Delaware, Newark. Data have been provided by E. Paul Catts, Washington State

University, Pullman; David J. Cretty, Trap Pond State Park; Max. M. Harrell, Wilmington Friends School; and James F. White, Delaware Nature Education Society, Hockessin. Contributions of the above persons are credited below. Roger Conant kindly checked his records for certain species, and made valuable editorial comments. I thank the Department of Natural Resources and Environmental Control, State of Delaware, for permission for my continuing scientific investigations of the herpetofauna of Delaware. Specimens have been deposited in the Carnegie Museum of Natural History (CM). The numbers in brackets for a given species enumerate localities.

*Regina septemvittata* (Queen snake) - Conant (1945, and pers. comm., 1973) recorded it from Newark, from 3.2 km S Newark, and from Wilmington, all New Castle County. One adult (CM 108981) was found sunning on grasses in a small, open and well-lighted marsh, E side Rt. 13, 1.7 km S Chesapeake and Delaware Canal, New Castle County, 6 May 1972, by Grace M. Tilger and myself. It has been reported on by Arndt (1976). This specimen is notable as it is apparently still the southernmost record for the state. Another snake with it but which escaped was probably also of this species.

*Storeria o. occipitamaculata* (Northern red-bellied snake) - One adult male (CM 108982) was taken in a trash pile in an open, brushy area surrounded by mature mixed forest, 11.2 km E Laurel, Sussex County, 4 August 1984, by Joan A. Pienta, M. J. Geiger, R. M. Pusey, and myself. It is a male with a brick-red dorsum, of 148 mm snout-vent length and 195 mm total length. A dead-on-road (DOR) adult with a gray dorsum was found in Trap Pond State Park, Sussex County, on 15 August 1981 by J. F. White; it was not saved or photographed. Conant (1975) recorded it from Delaware on the basis of Delmarva Peninsula specimens taken just west and south of this state (R. Conant, pers. comm., 1985).

*Virginia v. valeriae* (Eastern earth snake) - Conant (1958) recorded one specimen from (1) Ellendale, Sussex County, taken 29 April 1946, and four specimens from (2) about 3.2 km SE Glasgow, New Castle County, taken 17 April 1953. To these can be added four specimens from three additional localities. (3) One adult (CM 108983) was found DOR in an area of deciduous forest, 3.2 km S Townsend, New Castle County, 28 September 1973, by R. Lynn Johnson and myself. (4) One adult (CM 108984) was found alive during excavations in a house basement in Guyencourt, NW Brandywine Creek State Park, New Castle County, 15 January 1974, by John D. Kern. (5) Two adults (CM 108985, 108986) were found under roofing shingles in a trash pile in a clearing surrounded by mature mixed forest, 8 km NE Seaford, Sussex County, 11 August 1984, by Damon M. Smith and myself.

*Elaphe g. guttata* (Corn snake) - It has to date been reported only from Sussex County, from (1) an open, cultivated area near Seaford by Conant (1945) and (2) from near Cape Henlopen State Park by Hillis (1974) and from Lewes by Arndt (1976). The last record is now CM 108987.

Further work has yielded additional specimens, all from Sussex County. As many as seven adults were observed in one day at locality (2) in eastern Lewes, and at the nearby (and habitat-continuous) Cape Henlopen State Park.

All were found under concrete, railroad ties and tin sheets on at least 13 dates from 20 May 1976 to 10 May 1984 by M. J. Geiger, Jim Merli, or myself; many are documented in photographs. (3) One adult (CM 108988) was found next to a farm building, 6.1 km E Laurel, 17 August 1962, and was killed by being doused with gasoline. According to R. M. Pusey, who obtained the specimen, the capture spot was then a homestead surrounded by cultivated fields; the site is unchanged to date (1984). (4) One hatchling or one adult was found on, or under shelter adjacent to, a highway at several points from 2.9 to 3.2 km SW Blades (S of Seaford) on each of six dates from 9 October 1979 to 26 July 1984 by M. J. Geiger; they are documented in photographs. (5) One hatchling was found DOR 0.5 km SW Blades on or about 15 October 1983 by M. J. Geiger; it is not documented. Another DOR hatchling (CM 108989) was found 0.6 km SW Blades, 9 October 1984, by M. J. Geiger. (6) One DOR adult was found 4.8 km SW Seaford, 4 June 1984, by M. J. Geiger; it is documented in photographs. Although close to localities 4 and 5, locality 6 is separated from them by the Nanticoke River. These data suggest that there are at least three populations of the corn snake in the area southwest of Seaford.

Most of the above specimens are from dry, sandy pine barren-like areas, although two (from localities 3 and 6) are from the cultivated field and house yard habitats now common in the region. Additional work will probably reveal the corn snake to be even more widespread throughout at least southern Sussex County.

Ashton (1976) listed the corn snake in Delaware as rare and suffering from commercial exploitation. The above records show that it is more widespread and common than previously known. The degree of commercial exploitation, if any, is not known. In Delaware it probably suffers most from destruction of its preferred habitat of woods and brush in dry and sandy areas.

*Lampropeltis g. getulus* (Eastern kingsnake) - Conant (1945) recorded it from numerous counties on the Delmarva Peninsula, but not from Kent and New Castle counties, Delaware, while Conant (1975) records it from all but northern-most Delmarva. Arndt (1976) recorded it from throughout Delaware, north to the Chesapeake and Delaware Canal, New Castle County, on the basis of an adult (CM 108990) found DOR 1.6 km SE Chesapeake City, Cecil County, Maryland, and 1.6 km W Delaware state line, 19 June 1974, by William H. Bason. Harris (1975) also recorded it from Cecil County, Maryland, and from northeastern Kent County, Delaware.

This species is here recorded from New Castle County, with an additional record from Kent County, Delaware. (1) One adult (CM 108991) was found alive on a highway (AOR) bordered on one side by a large field prepared for planting and by a large uncultivated meadow on the other, 2.4 km SE Odessa, New Castle County, 10 May 1973, by Fred C. Rohde. (2) One DOR adult (CM 108992) was found near a stream in an area of mature deciduous forest, 1.6 km S Townsend, New Castle County, 26 August 1973, by F. C. Rohde and myself. (3) One adult was taken DOR in an area of open, cultivated fields at the entrance to Killen Pond State Park, some 19 km S Dover, Kent County, 11 June 1973, by F. C. Rohde, Johnson C. S. Wang, and myself; it was not saved.

*Cemophora coccinea copei* (Northern scarlet snake) - A specimen taken at Buzzard's Point, southern shore of Trap Pond, Trap Pond State Park, Sussex County, is the first recorded specimen for the state and only the second documented specimen for the Delmarva Peninsula. The latter was taken April 1923 near Salisbury, Wicomico County, Maryland (Conant, 1958).

The Delaware specimen (CM 108993) was found at dusk while active above ground, 21 June 1963, by a Boy Scout, and subsequently obtained by R. M. Pusey who preserved it in formalin on 8 July 1963 (R. M. Pusey records and pers. comm., 1985). He later gave it to M. J. Geiger, who then presented it to me. R. Conant, through the courtesy of R. M. Pusey, has long had this specimen noted in his records, but not published specifically on it. The adult specimen is 46.7 cm snout-vent length and 53.5 cm total length, and has 20 dorsal red blotches; its sex has not been determined. The capture spot is on a small sandy peninsula free (in 1984) of undergrowth and used as a picnic area. Vegetation is mature mixed forest of loblolly pine, *Pinus taeda*; Virginia pine, *P. virginiana*; sassafras, *Sassafras albidum*; sweet gum, *Liquidambar styraciflua*; swamp maple, *Acer rubrum*; American holly, *Ilex opaca*; dogwood, *Cornus florida*; black oak, *Quercus velutina*; white oak, *Q. alba*; green ash, *Fraxinus pennsylvanica*; black tupelo, *Nyssa sylvatica*; cypress, *Taxodium distichum*; and American beech, *Fagus grandifolia*. Blueberry, *Vaccinium* sp., and cat-brier, *Smilax* sp., are common on the peninsula edge.

*Agkistrodon contortrix mokasen* (Northern copperhead) - Several additional specimens and new localities can be added to the two reported localities from Sussex County, from (1) 8.0 km W Millsboro (Conant, 1945) and (2) NW edge of Trap Pond State Park (Arndt, 1976), and to the only reported locality for it from New Castle County, from (3) Alapocas Woods, N edge of Wilmington (Conant, 1945).

Sussex County: There are additional specimens from locality (2). One adult (CM 108994) was killed near the northwest corner of Trap Pond State Park, summer 1972, after a child stepped on the snake by a woodpile behind a small grocery store and about 250 m from the two adults (now CM 108995, 108996) reported on by Arndt (1976). The child was not bitten. Specimen and data from C. E. Mohr. (Seven young born to CM 108996 on the night of 10-11 September 1972 are now CM 108997-109003). Another adult (CM 109004) was taken in Trap Pond State Park on 19 or 20 July 1973 after reportedly biting a dog and then the dog's owner. Both survived and evidently with little adverse effect to the human (pers. comm., R. R. Roth and E. P. Catts, 1984). This snake was recently obtained from R. R. Roth. One juvenile was seen AOR at night, S edge Trap Pond State Park, 7 August 1978, by M. J. Geiger; it was not preserved or photographed. A number of specimens were seen in this Park in the summer of 1983 (pers. comm., D. J. Cretty, 1984). (4) One adult (CM 109005) recently obtained from R. R. Roth was found DOR at Laurel by J. O'Day on 11 September 1959. (5) One adult (CM 109006) was killed when discovered next to a chicken coop, Whaley's Crossroad, 11.3 km E Laurel, early 1960's. The specimen and data are from R. M. Pusey (pers. comm., 1984), who also provided the data on the following two specimens. (6) One adult (CM 109007) was shot in a house kitchen, Lowes Crossroads,

14.5 km E Laurel, early 1960's. (7) One adult (CM 109008) was killed next to a farm building, Puseys Crossroad, 12.9 km E Laurel, early 1960's. (8) One AOR adult was found at night near the downstream end of Trussum Pond, 6.4 km SE Laurel, 16 September 1978, by M. J. Geiger; it was photographed and released. (9) One DOR juvenile was found at Hitchens Crossroad, 9.7 km ENE Laurel, on or about 20 September 1978. This undocumented sight record by David Jackson was made available through M. J. Geiger. (10) One adult was found DOR, 11.7 km E Laurel, and a second adult was found alive on a road, about 15.3 km E Laurel, both late in September 1983, by Grady E. Griggs, Jr. (J. F. White, pers. comm., 1985, and see photograph of snakes in Anonymous, 1983). The specimens were found during daylight, one or two days apart, and were evidently not preserved (Frederick T. Mott, Kent County, Delaware, District Conservationist, pers. comm., 1985). (11) One specimen was found in a sandy area of loblolly pine, American holly and chestnut oak, *Quercus prinus*, crossing a sand road near Camp Barnes, Assawoman Wildlife Area, on a sunny afternoon in 1956, probably in July (E. Paul Catts, pers. comm., 1984, 1985). Catts informed me that the snake was deposited at the Academy of Natural Sciences in Philadelphia, but neither the specimen nor an entry for it in the Academy herpetology catalog could be located.

Visits with R. M. Pusey and M. J. Geiger in 1984 to the capture/observation spots for most of the above specimens indicate that they were taken/observed in or adjacent to mature mixed forest dominated by loblolly pine, sweet gum, wild cherry, *Prunus* sp.; red oak, *Quercus rubrum*; white oak, swamp maple and American holly.

New Castle County: (3) One adult (CM 109009) was found DOR in a hilly, rocky area with brush and mature deciduous forest on Wilmington Friends School property, edge of Alapocas Woods, 15 June 1982 (specimen and data from T. C. Putney, pers. comm., 1984). A live copperhead was seen there in October 1983, and there were three additional sightings in spring 1984 (pers. comm., M. M. Harrell, 1984). The copperhead thus still persists in this wild enclave in an otherwise heavily suburban/urban area. (12) One adult was found in or near Brandywine Creek State Park, about 6.4 km N Wilmington, on or about 20 September 1977. It reportedly bit a human, who was treated in a hospital emergency room. The snake apparently was not saved. Data from R. R. Roth, pers. comm., 1984. This park is in a rural area now rapidly becoming suburban.

The copperhead in Delaware is listed by Ashton (1976) as rare and suffering from habitat destruction. This evaluation of its status appears to be accurate.

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NEW DISTRIBUTION RECORDS FOR MARYLAND  
REPTILES AND AMPHIBIANS

The following records of Maryland amphibians and reptiles provide some new localities not available and hence not listed by Harris (1975) including several new county records. Thanks are due to Robert Miller and Michael Geiger for providing information on several specimens.

*Notophthalmus viridescens*. Harris (1975) stated that "Present records indicated its absence from the lower Eastern Shore of Maryland", although acknowledging a record by Conant (1945) from Northhampton County, Virginia. Recently, Miller (1984) noted a specimen from near Lakesville, Dorchester County. During late April 1979 my son Charles Grogan collected two efts from a small woodland pond N of Levin Dashiell Rd. approximately 2 km W of Salisbury, Wicomico County. Both specimens were released since I failed to realize at the time that this species was unknown from the county.

*Cnemidophorus sexlineatus*. Harris (1975) notes that this species is a Coastal Plain form in Maryland but cites records for Frederick and Allegheny Counties as examples of this species expanding its distribution via the Potomac River. On 18 June 1976 I observed a large adult of this species foraging in the floodplain of the Potomac River 1 km SW of Cabin John, Montgomery County. This locality is situated approximately midway between Lock 12 on the C&O Canal and the southern tip of Plummer's Island and is on the Eastern Piedmont. This specimen was observed for several minutes as it searched for insects but could not be captured, and represents the first record of this species for Montgomery County.

*Eumeces laticeps*. Harris (1975) notes a single record of this species for each of the four counties of the lower Eastern Shore. A large adult male of this species was taken during August 1984 from Shad Landing State Park, Worcester County by a visitor to the park. It had a snout-vent length of 115 mm and total length of 281 mm and was kept by the park rangers for a few weeks in captivity and later released.

*Lampropeltis triangulum*. A specimen was taken by Carlton Windsor, Jr. on 12 September 1983 as it was crawling on a pile of maple logs within a sawmill site on Peggy Neck Rd. 2.5 km E of Loretto (7 km NNE Princess Anne), Somerset County. This specimen is catalogued TSU 6335 in the Towson State University herpetological collection and represents a new county record for this species for Somerset County. It is a juvenile female with a snout-vent length of 284 mm and total length of 331 mm and is a typical example of the coastal plain milksnake, or intergrade *L. t. triangulum* X *elapsoides* as described by Williams (1978) and Conant (1975).

*Cemophora coccinea*. A large specimen of this species (ca. 530 mm) was taken during June 1975 by Mark Mengele, a park ranger at Shad Landing State Park, Worcester County as it was crossing a road in the park. This

specimen was examined by Michael Geiger who retains a photograph of it, however the snake was apparently later released. This is the first record of this species for Worcester County.

*Nerodia erythrogaster*. On 6 June 1983 I discovered a DOR specimen on New Bridge Road at the Chicamacomico River 5 km W of Vienna, Dorchester County. This specimen is catalogued TSU 6334 in the Towson State University herpetological collection. This large female with a snout-vent length of 984 mm and total length of 1225 mm is apparently the largest individual from Maryland. Harris (1975) lists four records of this snake from Dorchester County including one from near Bucktown. Another specimen catalogued NHSM/HSB 1126 in the Natural History Society of Maryland was taken approximately 1 km N of Bucktown, 23 September 1975 by R. Czarnowsky, B. Biggs and R. Miller. Robert S. Simmons in July 1975 saw two specimens and collected one from under a piece of tin next to a ditch along side Md. Rt. 331, 9 miles SW Vienna, Dorchester County (Harris, 1975). These records indicate that this species is rather commonly distributed in the southern half of Dorchester County although it is rarely seen or collected.

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BODY LENGTH OF MALE *CRYPTOBRANCHUS ALLEGANIENSIS*  
AT SEXUAL MATURITY

The size of male *Cryptobranchus alleganiensis* at sexual maturity has not been accurately documented. Nickerson and Mays (1972) indicated it to be approximately 340 mm (probably total) length but expressed a degree of uncertainty.

As in other urodeles, the testes of *Cryptobranchus* undergo an annual maturational cycle (Burger, 1937; Humphrey, 1921). According to Humphrey (1921), primary spermatogonia are surrounded by epithelial cells comparable in function to mammalian Sertoli cells. Division of spermatogonia and epithelial cells initiates formation of lobular lumina, after which the full sequence of germinal cell maturation proceeds as a cephalocaudal wave. This progression is rapid and difficult to observe (Humphrey, 1921) but McGregor (1899) considered sperm maturation in *Cryptobranchus* to occur immediately prior to fertilization without prolonged storage in the testes. Maturation divisions occur between June and August (Humphrey, 1921) and spawning is in October (Ratcliff, 1965).

We have determined by light and scanning electron microscopy the body size at which male *Cryptobranchus alleganiensis* become gametogenic.

Thirty-one *Cryptobranchus alleganiensis* were hand-caught in the Allegheny River 3 km southwest of Tionesta, Pennsylvania, on May 29 (7 animals) and on 31 August, 1980 (24 animals). They were killed with ether and measured (standard snout-vent length) dead. Cranial, middle and caudal portions of both testes of each animal were fixed in Karnovsky's (1961) fixative or in alcohol-formol-acetic acid (AFA) for electron and light microscopy, respectively. The presence of sperm was also confirmed by microscopic examination of fresh testicular exudate of the larger salamanders. Fixed exudate of mature animals was filtered through Whatmans No. 1 paper which was then trimmed, folded, and stapled. The resulting packet was dehydrated through a series of ethyl alcohols and critical-point dried. A small piece of double-stick tape was used to transfer clumps of sperm to the specimen stub. Sperm were coated with gold approximately 45 nm thick and observed with a Coates and Welter (Cwikscan 106A) field emission scanning electron microscope. AFA-fixed samples were dehydrated through a series of ethanols and embedded in Paraplast. Sections 6 and 8  $\mu$  thick were stained with hematoxylin and fast green.

The smallest specimen with testicular sperm was 200 mm snout-vent length (S-V-L). All longer animals were also spermatogenic (Figure 1). The testes of a 187 mm S-V-L salamander in August contained spermatids and some secondary spermatocytes. The next four smaller animals with S-V-L of 184-, 178-, 166- and 154 mm were collected in May. Since *Cryptobranchus* testes being their recrudescence in June (Humphrey, 1921) no sperm were expected. However, spermatids were present in the 184- and 166 mm animals. Secondary

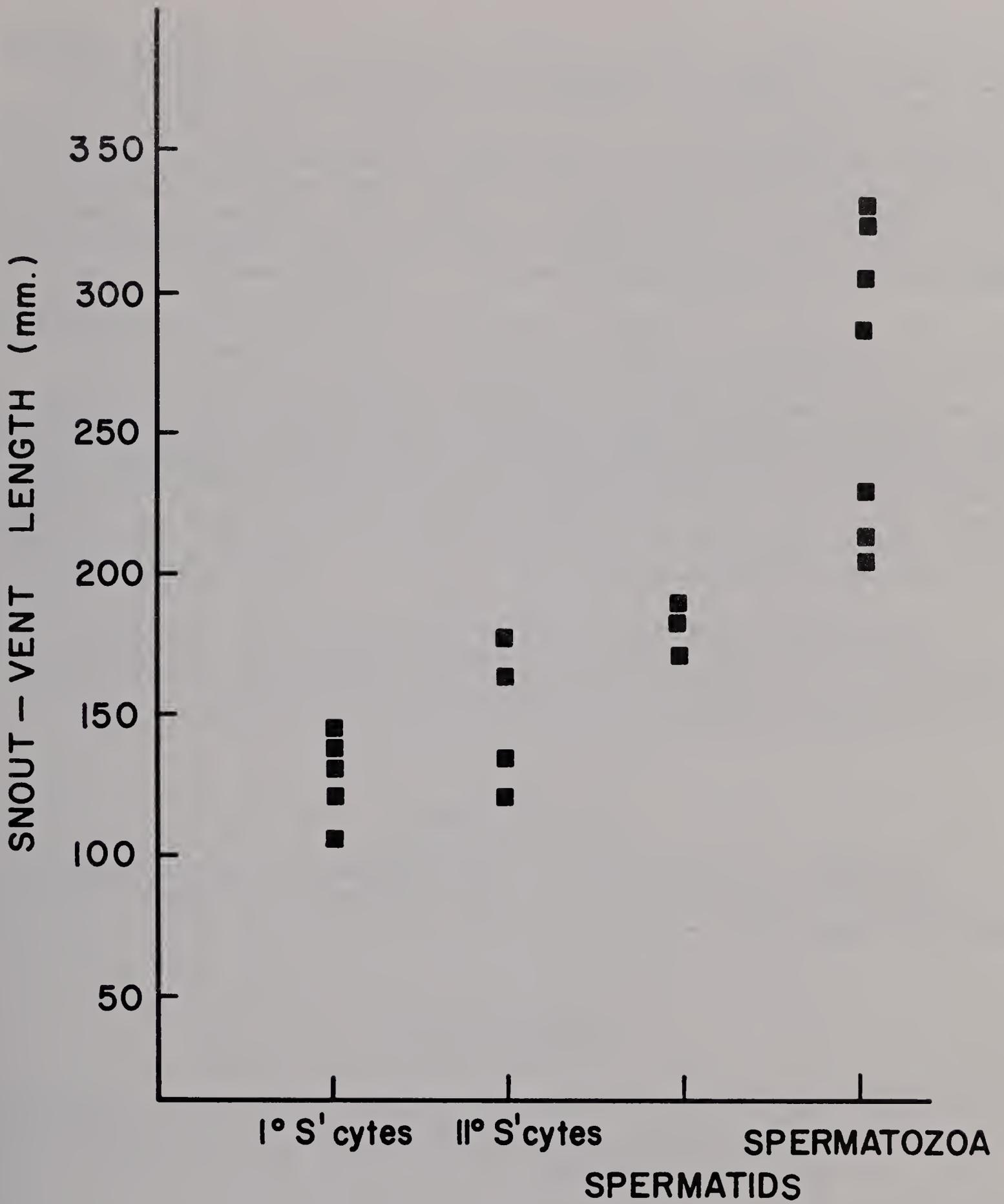


Figure 1. Correlation of most-differentiated germinal epithelium type with snout-vent length of 19 *Cryptobranchus*. All longer animals examined bore spermatozoa.

spermatocytes characterized the germinal epithelium of the smaller animals. Since gametes in immature *Plethodon* develop until the spermatocyte stage before degenerating (Burger, 1937) and during May immature *Necturus* testicular lobules consist of spermatogonia with no indication of spermatocytes (Humphrey, 1921) it is possible that the 178 mm animal would have shortly experienced gametogenesis. His testes were more distended than those of smaller, immature animals. Similarly, the presence of spermatids in the May animals measuring 184 mm and 166 mm S-V-L also suggest sexual maturity with the possibility of spermiogenesis during the current summer.

The presence of spermatids in two animals collected in May advance the date of gametogenesis relative to that (June) cited by Humphrey (1921). Spermatozoa in the seven animals collected in August and spermatids in another smaller animal (Figure 1) indicate spermiogenesis and a breeding season beginning in mid to late August since the duration of testicular sperm storage is minimal (McGregor, 1899). Two immature salamanders taken in August contained primary and secondary spermatocytes. Testes of the other animals (137-, 136-, 132-, 122-, and 102 mm S-V-L) had no germ cells advanced beyond primary spermatocyte level. Their testicular lobules were fewer in number and the testis was thread-like.

These observations show that male *Cryptobranchus* are gametogenic at 166 mm S-V-L. From comparable observations of gametogenesis in other salamanders, it is assumed but not known that *Cryptobranchus* of this size could become active breeders in the streams from which they were taken.

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—Eric D. Wikramanayake and G. L. Dryden, *Department of Wildlife and Fisheries Biology, University of California, Davis, California 95616, and Biology Department, Slippery Rock University, Slippery Rock, Pennsylvania 16057.*

Received: 13 March 1985

Accepted: 20 April 1985

## NEWS AND NOTES:

BOOK REVIEW:

A FIELD GUIDE TO WESTERN REPTILES AND AMPHIBIANS. Second edition, revised. By Robert C. Stebbins. Houghton Mifflin Co., 2 Park St., Boston, MA 02108. xvi, 336 pp., 40 figs., 48 pls. (35 col.), 200 maps. 1985. \$12.95 paper, \$17.95 cloth.

The eagerly anticipated second edition of this classic, first appearing 20 years ago (1966), is at last at hand, and a noble successor it is, with thoroughly up-dated information, an expanded coverage that includes the herpetofauna not only of the states of New Mexico, Colorado, Wyoming, Montana, Saskatchewan and Northwest Territory and all adjacent lands to the west (as before), but also mainland (not insular) Baja California, with numerous new illustrations and maps.

Indeed, all maps have been redrawn, 188 taking the place of 190 in the first edition, but one being added to depict vegetational zones of Baja California, and eleven to account for species (called "endemics") limited, within the scope of this work, to Baja California. Most of the plates are the same as in the first edition (although the color plate of skinks is not reproduced as well), but 35 are in color (vs. 24 in the first edition), for a total of 48 (vs. 39). A total of 244 species is treated (vs. 207), only 17 of which are Baja California "endemics." Twenty "endemic" subspecies, however, of species occurring in the United States, had to be included because of the coverage of Baja California. With 260 subspecies accounted for, 504 species-group taxa are embraced. The figures are the same as before, except for the addition of one figure of *Tantilla* hemipenes.

The new plates include eleven in color: two of *Batrachoseps*; one of leopard frogs; two of *Holbrookia*, *Cophosaurus*, *Callisaurus* and *Uma* (replacing one black and white plate); one of *Gambelia*, *Crotaphytus* and *Dipsosaurus* (replacing a B-W plate); three of *Cnemidophorus* (replacing one B-W plate); and two of Baja California "endemics." In addition, four color figures of geckos are added to a former plate, one new B-W plate of Baja California "endemics" is included, and the original six B-W figures of *Tantilla* are replaced by five (one eliminated, two redrawn). Thus there is an astounding total of 601 separate illustrations, 245 of them in color. Only 12 species are not illustrated: *Dicamptodon copei*, *Scaphiopus multiplicatus*, *Bufo exsul*, *B. nelsoni*, *Rana clamitans*, *R. onca*, *Pseudemys concinna*, *Eretmochelys imbricata*, *Trionyx muticus*, *Coleonyx brevis*, *Crotaphytus insularis*, and *Gerrhonotus paucicarinatus*.

Only one typographical error was noted, *Coleonyx swaitaki* replacing *C. switaki*. However, the customary error of spelling of *Lampropeltis getulus nigrinus* (instead of the correct *L. g. nigrita*, required in the feminine gender to agree with the feminine generic name, since the subspecific name is clearly an adjective, hence must modify *Lampropeltis*; *getulus* appears to be a

barbarism, and was so considered by Barbour, pers. comm.) was perpetuated. On the other hand, the grammatically incorrect *Sceloporus graciosus arenicolous* was properly rendered as *S. g. arenicolus*.

A conservative stand was adopted in most instances of taxonomic controversy, as indeed is desirable in any work such as this that inevitably serves as a standard for many years. However, fuel was added to the recurrent rumors of a species of *Bipes* occurring in southern Arizona (p. 243), and a few common names were adopted that do not conform with the conventional standard. Conservatism is especially welcome in the case of (1) *Anniella*, for which the name *A. pulchra* is retained in its long-familiar sense, rather than being transferred to a different species as proposed recently (an appeal to the International Commission on Zoological Nomenclature to preserve the earlier status quo is in process); (2) *Gerrhonotus* s.l., since the application of that name in its broad sense (rather than in the narrow sense, limited to *G. liocephalus*, with allocation of other species to *Elgaria* and *Barisia*) is required by discovery that *G. parvus* is oviparous, hence like *G. liocephalus*, although its scutellation agrees with *Barisia*, all species of which are viviparous, leaving no single criterion for separation of *Gerrhonotus* s.s. and *Barisia* (*Elgaria* likewise falls on egalitarian grounds); (3) a monotypic *Phrynosoma douglassii*, in which subspecific distinctions have long been tacitly (occasionally explicitly) recognized as objectively indefensible even if subjectively accepted; (4) a monotypic *Hyla regilla*, in admission that techniques do not yet exist satisfactorily to delimit the several proposed subspecies of it; and (5) preservation of the legally correct (however exasperating) -ii genitive ending for species-group names thus originally proposed.

Conservatism is less overwhelmingly justified in (1) rejection of specific distinction of some populations commonly allocated as subspecies of *Sceloporus magister* despite karyological evidence (admittedly not fully documented) to the contrary; (2) rejection of specific status for *Salvadora deserticola* (again not fully documented); (3) rejection of polytypy in *Hypsiglena torquata*; and (4) rejection of *Spea* as a valid genus, strictly in conformance with almost universal custom, despite abundant evidence (admittedly not vigorously presented) of distinction from *Scaphiopus*.

Other taxa more clearly justified in their elimination in the interest of conservatism are *Hyla eximia wrightorum* and *Tropidoclonion lineatum mertensi*, the validity of each of which will undoubtedly be reestablished with fully synoptic study.

On the other hand, the recent careful studies of the difficult genera *Batrachoseps* and *Rana* were accepted in full, even to inclusion of as yet unnamed taxa. It is heartening to observe retention of the well-established subspecies *Sceloporus graciosus vandenburgianus* despite its neglect in a recent review.

Indeed, the one omission most regretted is a more frequent notice of uncertain or debatable matters (although occasionally briefly inserted, e.g., in the accounts for *Sceloporus magister* and *Salvadora hexalepis*).

Suggestions for future study are always stimulating, although of course ephemeral in pertinence, as knowledge expands without revision of its summary. An excellent new cautionary word is inserted in the introduction of (p. 8), about the potentially excessive weight of the printed word, but consistent attention to likely fallibilities and gaps in knowledge would be useful. It might also be too space-consuming.

Only in the context of some of the Baja California endemics were lapses in consistency of treatment detected. *Crotalus enyo* and *Nerodia valida*, for example, are implied by mistake to be monotypic, whereas their subspecies are well established, and the range of the latter outside of Baja California is not shown although its map includes at least part of its territory. Likewise, the map for *Ctenosaura hemilopha* shows the range for the whole species in the shading indicative of the nominate subspecies, whose range is correctly shown on mainland Baja California.

For the benefit of those unfamiliar with the first edition, it should be noted that an excellent introduction of 23 pages covers a broad range of general information; that well-illustrated keys are provided for identification of species on the basis of post-embryonic (or post-larval) material (to which the main body of the text pertains), as well as for amphibian eggs and larvae (in an appendix of 26 pp., with brief descriptions as well as the illustrated keys); that the maps are collected at the end of the book; that there is a 5-p. glossary and four pages of references; that all plates are collected near the middle of the book; that the 40 figures are scattered through the text; and that there is an excellent, 14-p. index.

The introduction is much the same as in the first edition, judiciously augmented here and there, although the discussion of field study techniques, including marking, is greatly curtailed in the second edition, and the supportive figure omitted, substituting the recommendation that professional guidance be sought for such studies. No attempt is made, wisely, to summarize knowledge of herpetological natural history; instead the introduction limits itself to a very personal field vade mecum, and to use and rationale of the book. Topics covered are, seriatim, Area Covered, How to use this Book, Illustrations (briefly stating the author's bias as a highly talented and experienced artist), Size, Color, Young, Sex Differences (reviewed in some detail for salamanders, anurans, turtles, lizards and snakes), Voice, Time of Activity and Breeding, Habits, Food, Subspecies, Biochemical Taxonomy, Distribution Maps, Use of Names (he rejects eponyms), Metric System (used throughout, with conversion to the English system given parenthetically), Making Captures (including use of a snake stick, noosing, night driving, triangulation, eyeshines, tracking and containers for specimens), Caring for Captives (including temporary quarters, cages, substrate, temperature, feeding, rearing amphibian larvae, rearing reptile eggs, choice of captives), and Field Study and Protection.

This field guide is unique in many ways; it has no competitor in coverage of amphibians and reptiles of western North America or Baja California; and it is the only herpetological guide illustrated by the author, who is not only a superbly skilled artist but a lifetime authority on

the herpetofauna of the area covered. The second edition is a monumental achievement in both artistry and scientific acumen in the context of use by both novice and expert. Its serviceability will surely at least equal the time-span of the first edition: a sure, long-term investment for every buyer.

—Hobart M. Smith, *Department of Environmental, Population and Organismic Biology, University of Colorado 334, Boulder, Colorado 80309.*

## NEWS AND NOTES:

# EARTHWATCH

## BULLETIN

Contact: Blue Magruder  
617-489-3030

### IONIAN SEA TURTLES FIGHTING FOR A BEACH-HEAD

By Mark Cherrington

EARTHWATCH News Service

When a female loggerhead sea turtle crawls ashore to lay eggs on midnight beaches, she cries continuously. The tears are in fact a means of removing the salt that accumulates in her ocean environment, but they might as well be shed for the fate of her kind. Sea turtles of all species live in a precarious balance with mankind. From the enormous leatherback to the relatively tiny Ridley's, these antediluvian reptiles face habitat loss, competition, and persecution around the world.

Unlike most of its cousins, which are endangered, the loggerhead is listed only as threatened. That comparative security may be due partly to the loggerhead's more flexible feeding habits. Loggerheads sometimes lunch on lobsters, crabs, and other crustaceans near shore, but are also perfectly happy ingesting jellyfish far out at sea.

During the 170 million years they've been swimming the world's seas, loggerheads have outlived most of their prehistoric predators and have seen oceans come and go. Their thick shells can deflect even shark bites. In fact, turtles that have been bitten sometimes attack sharks, killing them by ripping out their gills. They even manage to survive colonies of barnacles that sometimes grow in their throats. But nothing in the loggerhead's long history could have prepared it for pound cake and tourists.

The pound cake threat came about because loggerhead egg whites don't coagulate. Pound cake made with them taste better and last longer than those made with chicken eggs. In the southern U.S., an entire industry grew around loggerheads' eggs; egg trucks from various bakeries decimated the turtles' nesting beaches until the animals came under the protection of the Endangered Species Act in 1972. Today poachers still take eggs for food both in the U.S.

-more-

10 Juniper Road • Box 127 • Belmont, Massachusetts 02178 (617) 489-3030

## NEWS AND NOTES:

## Loggerheads 2/2/2

and in the Mediterranean, but the problem has lessened considerably. The tourists, however, may prove a thornier problem.

Like all sea turtles, loggerheads nest on secluded beaches, a preference that increasingly puts them in conflict with seclusion-hungry vacationers. The tourists are not a direct threat to the turtles, but their presence makes nesting much more difficult. Nesting females are skittish emerging from the sea at night; lovers strolling the beach and the lights and commotion of resorts often drive the turtles back into the water where they abort their eggs. The problems don't end, though, even for those eggs that are laid. When newborn turtles hatch, they find their way to the sea by cuing off lighter sky over the water. Unfortunately, resort lights and street lights often lure hatchlings in the wrong direction where they become vulnerable to predators and the deadly heat of daylight.

In the Mediterranean, loggerheads' problems are compounded by an enormous increase in the number of tourists and by ever-growing pollution. There may be hope, however. Marine biologist James Sutherland of Sussex University in England has found a relatively large and hitherto unknown nesting colony on the island of Zakynthos, Greece. In 1983, his preliminary census recorded some 2,500 nests laid by 820 turtles, making it the largest colony in the Mediterranean. This summer, he plans to return to the Ionian Islands to thoroughly document the turtles' behavior and to help assess their needs so that protective measures can be taken by the Greek government.

His current work is being underwritten by EARTHWATCH, the non-profit organization that recruits paying volunteers to help share the cost and the work of field research. Dr. Sutherland still needs volunteers for a series of two-week teams that run from June 2 through October 6. Team members will assist in every phase of the work, from patrolling the beaches to measuring the turtles, to counting and measuring the turtles, to counting and measuring the eggs, to recording weather conditions. For more information, call Nancy Gunnlaugsson at 617-489-3030, or write Loggerhead Turtles, EARTHWATCH, 10 Juniper Road, Box 127N, Belmont, Massachusetts 02178.

5/10/85

# # #

NEWS AND NOTES:

**ANNOUNCEMENT  
FOR IMMEDIATE RELEASE  
YOU ARE INVITED ON A ZOO RESEARCH EXPEDITION**

The Zoo and Aquarium Travel Association (ZATA) has invited its member zoos and aquariums to offer a unique travel program to its members. The program will be to San Esteban Island in the Sea of Cortez off the western coast of Mexico. There, members of the Arizona-Sonora Desert Museum along with the research team made up of zoo society travelers from ZATA zoos and aquariums will observe and capture the endangered, giant chuckwalla that live on the island. This study is being conducted to study behavior, and other aspects of the lizard's biology so that captive colonies of these animals can be maintained properly. This impressive lizard is found nowhere else in the world.

Come and join one of the 11 day expeditions if you would like to do more than just visit a place and would like to get involved with a real zoo research program. The tax deductible price for this expedition is \$1595, all inclusive, from Tucson. The expedition departure dates are April 17, 1985 May 31, 1985 October (date to be determined), January 10, 1986. From Tucson where there will be a training program and tour of the famous Arizona-Sonora Desert Museum, we travel by van to Kino Bay, Mexico. There we board the comfortable 120' Baja Explorador, which will provide our accommodations during our stay. A member of the ZATA staff will accompany the expedition and care for the needs of the staff and organize the program.

Side trips are planned for surrounding islands and there will be plenty of time for snorkeling, fishing and wildlife observation. Contact ZATA, 1776 Independence Court, Birmingham, AL 35216 for more information, 1-800-633-4734.

NEWS AND NOTES:

RESEARCH EXPEDITION APPLICATION  
PAGE TWO

ARIZONA-SONORA DESERT MUSEUM  
RESEARCH EXPEDITION APPLICATION

Please complete this application and return it along with your reservation certificate. Please note that ZATA or the Arizona Sonora Desert Museum retain the right to reject prospective participants in the Desert Watch Research Expedition. Applications will be evaluated to see that the applicant's health, background and interests are compatible to the research programs and goals, the environment, and living conditions at the research site. If you have questions, please do not hesitate to call (1-800-633-4734).

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NEWS AND NOTES:

SSAR REGIONAL HERPETOLOGICAL SOCIETY  
LIAISON COMMITTEE

The SSAR created a Liaison Committee in 1977 to establish a closer relationship with Regional Herpetological Societies. Communication has been established, but obtaining responses from some societies has been difficult.

In order to keep herpetologists informed about the activities and upcoming events of your society, we are asking each Regional Society to send current information to the Liaison Committee and to put the Liaison Committee on your mailing list.

We will also be updating our directory and would like to include your group. Please send the following information to the Liaison Committee as soon as possible.

Group Name  
Contact Person  
Mailing Address  
Publications

Any information to be published in Herpetological Review has to be received at least 2 months before publication date. For example, anything to be published in the June 1985 issue has to be received by March 31, September 1985 by June 30, and December by September 30.

Any suggestions concerning the work of the Committee and topics of future conferences would be greatly appreciated.

Terry Hibbitts, Chair  
SSAR Regional Herpetological Society Liaison  
309 South 4th Street  
Wylie, Texas 75098

## NEWS AND NOTES:

SSAR REGIONAL HERPETOLOGICAL SOCIETY  
9TH ANNUAL CONFERENCE, TAMPA, FLORIDA

The Ninth Annual Regional Herpetological Conference sponsored by the SSAR will be held August 7 during the 1985 joint meeting of the SSAR and HL at the University of South Florida in Tampa. The title of the conference is "Methods to Enhance the Regional Herpetological Society". Tentative topics are: Improving Newsletters and Journals, Personal Relations, Preparing Slide Programs, Auctions, Mall Shows, Field Trips, Membership Involvement, and Annual Conferences.

There will also be tables available for Regional Herpetological Societies to distribute information about their society. Each society should provide approximately 100 brochures about their society to be distributed at the conference. The brochure should include purpose, history, activities, membership categories, dues, and contact person for additional information. If you can not attend the conference, please forward brochures to me and I will be sure they are displayed.

Please encourage the members of your society to attend the afternoon conference as well as the entire SSAR/HL meeting August 4-9. Help us make the conference a success.

Additional information about this meeting will be published in the next issue of HR. Inquiries may be directed to: Terry Hibbitts, Chair  
SSAR Regional Society Liaison  
309 South 4th Street  
Wylie, Texas 75098

NEWS AND NOTES:

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DISTRIBUTION: In the subgenus *Hylaran*  
COMMENT: In the subgenus *Rana* in  
which it differs in mating call  
placement name for *Rana*, 8  
Zool. Ser., 8

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*Rana debussji* van Kampen, 1910.  
TYPE(S): Holotype: ZMA; now  
TYPE LOCALITY: Deli, Sumatra,  
Sumatra, Indonesia, by  
DISTRIBUTION: Batak Mountain  
COMMENT: In the subgenus *Hylaran*

*Rana delarourii* Angel, 1928. B  
TYPE(S): Holotype: MNHN  
TYPE LOCALITY: Bac-Kan (T  
DISTRIBUTION: Known only  
SUBGENUS: Subgenus *Pan*

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Dinosaurs. The word conjures up, for most of us, visions of enormous prehistoric monsters, jaws gnashing with razor sharp teeth, claws poised to rip their helpless prey to bloodied shreds. We imagine massive, awkward, stupid, vicious beasts -- as we view their fantastic skeletons in the museum, we sigh with relief that only their bones remain.

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ALAN CHARIG is curator of Fossil Amphibians, Reptiles and Birds at the British Museum (Natural History).

A NEW LOOK AT DINOSAURS  
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An entertaining, informative, and visually stunning exploration of the amazing range of vision among our fellow creatures, the book depicts, through breathtaking color photos, how the world may appear to animals on every step of the evolutionary ladder, from the chambered nautilus and the rattlesnake to hawks, monkeys and even dragonflies.

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- \* *special powers of perception, such as the ultraviolet vision of the bee and the infrared "vision" of certain snakes.*

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NEW BOOK RELEASE:

- \* *The hawk's vision is sometimes estimated to be eight times as sharp as our own. Birds of prey can frequently see an object on the ground when we cannot even see the bird in the air.*
- \* *The douroucouli, a monkey of South America, is the only known nocturnal primate, and its eyes are so sensitive that if they are exposed to daylight for any length of time, the animal can go blind.*
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Visually astounding and factually compelling, **HOW ANIMALS SEE** may change forever the way you look at your world and your fellow creatures.

SANDRA SINCLAIR is a writer and film maker. She lives in New York with her daughter and animals.

**HOW ANIMALS SEE: Other Visions of Our World**

By Sandra Sinclair, Foreword by Dean Yeager, Ph.D.

Publication date: May 7, 1985

Price: \$24.95, hardbound

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*edited by H. H. Genoways and F. J. Brenner*

Now for the first time anywhere, all of the data for the rare and endangered flora and fauna of Pennsylvania can be found in one place. This book is meant to be the blueprint for action in saving the most endangered and threatened portions of the flora and fauna of the Commonwealth. This action is the responsibility of several state agencies, professional scientists, and the general public of the Commonwealth.

This book represents the best estimation of the Pennsylvania Biological Survey of the status of the species of special concern in Pennsylvania. Species considered to be of special concern are those that are classified as endangered, threatened, vulnerable, status undetermined, and extinct or extirpated. The data assembled for each species are grouped under the headings of common name, description, range, habitat, life history and ecology, basis of status classification, and recommendations for future action. The accounts for the individual species also include citations to more extensive information concerning the species. With the passage of time, the data in this book will become outdated; however, these data will always be the baseline against which future studies will be measured. This book will be a basic reference for anyone who is concerned about the environment and is interested in conserving our natural resources.

The book opens with chapters on Aquatic and Terrestrial Habitats, Physiographic Provinces, Drainage Patterns, and Definitions of Status Categories used. The remaining six chapters are devoted to plants and five major animal groups. The chapter on plants gives information on 21 endangered species of plants. The animal groups covered are invertebrates represented by accounts for 62 species, fishes by 62 species, amphibians and reptiles by 18 species, birds by 39 species, and mammals by 34 species. There are two distribution maps (Pennsylvania and

North America) for 175 of the species. There are six full-page color plates and black and white photographs of over 100 representative species.

Fishes covered in this book include:

**Endangered**—*Acipenser brevirostrum*; *A. fulvescens*; *Notropis buchananii*; *Ictiobus bubalus*.

**Threatened**—*Ichthyomyzon fossor*; *Hybopsis storeriana*; *Ammocrypta pellucida*.

**Vulnerable**—*Acipenser oxyrhynchus*; *Lepisosteus oculatus*; *Salvelinus namaycush*; *Hybopsis x-punctata*; *Notropis bifrenatus*; *N. heterolepis*; *Catostomus catostomus*; *Minytrema melanops*; *Noturus eleutherus*; *N. gyrinus*; *N. stigmosus*; *Enneacanthus obesus*; *Micropterus punctulatus*; *Etheostoma camurum*; *E. exile*; *E. maculatum*; *Percina copelandi*; *P. evides*; *Aplodinotus grunniens*.

Plus nine species of undetermined status and 27 extirpated species.

Amphibians and reptiles covered in this book include:

**Endangered**—*Pseudacris triseriata*; *Rana utricularia*; *Kinosternon subrubrum*; *Pseudemys rubriventris*; *Clemmys muhlenbergii*; *Sistrurus catenatus*.

**Vulnerable**—*Aneides aeneus*; *Eumeces laticeps*; *Lampropeltis getulus*; *Opheodrys aestivus*; *Crotalus horridus*.

**Status Undetermined**—*Eumeces anthracinus*; *Clonophis kirtlandii*; *Heterodon platyrhinos*.

**Extirpated**—*Ambystoma tigrinum*; *Pseudotriton montanus*; *Emydoidea blandingii*; *Trionyx muticus*.

This book, bound in hard cover, contains 430 pages produced in an 8½ inch by 11 inch double column format. You may order your copy now for only \$30.00 plus postage and handling by using the above order form. All sales are final.

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## Society Publications

Back issues of the Bulletin of the Maryland Herpetological Society, where available, may be obtained by writing the Executive Editor. A list of available issues will be sent upon request. Individual numbers in stock are \$2.00 each, unless otherwise noted.

The Society also publishes a Newsletter on a somewhat irregular basis. These are distributed to the membership free of charge. Also published are Maryland Herpetofauna Leaflets and these are available at \$.25/page.

## Information for Authors

All correspondence should be addressed to the Executive Editor. Manuscripts being submitted for publication should be typewritten (double spaced) on good quality 8½ x 11 inch paper, with adequate margins. Submit original and first carbon, retaining the second carbon. Indicate where illustrations or photographs are to appear in text. Cite all literature used at end in alphabetical order by author.

Major papers are those over 5 pages (double spaced, elite type) and must include an abstract. The authors name should be centered under the title, and the address is to follow the Literature Cited. Minor papers are those papers with fewer than 5 pages. Author's name is to be placed at end of paper (see recent issue). For additional information see *Style Manual for Biological Journals* (1964), American Institute of Biological Sciences, 3900 Wisconsin Avenue, N.W., Washington, D.C. 20016. Price is \$6.00.

Reprints are available at \$.03 a page and should be ordered when manuscripts are submitted or when proofs are returned. Minimum order is 100 reprints. Either edited manuscript or proof will be returned to author for approval or correction. The author will be responsible for all corrections to proof, and must return proof preferably within 7 days.

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