

Emmett Reid Dunn and the Early History of Herpetology in Virginia

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ABSTRACT

The historical development of herpetology into a modern science in Virginia occurred in the early 20th century. Only brief observations on the use of reptiles by Indians for ornamentation and food and short notes on geographic occurrence and behavior occur in the state's historical literature. A small number of scientists published their observations on the amphibians and reptiles of the state from the mid-1800s to the early 1900s. It was not until Emmett Reid Dunn, a native of Alexandria, published the results of his research in herpetology beginning in 1915 that this discipline began to mature. By 1936, he alone had confirmed 72% of the amphibians and 77% of the reptiles now known to occur in the state. In this article, I review some of the observations in the historical literature, describe the life and influential contributions of E. R. Dunn, and include a brief overview of some of the publications by others that followed him up to the creation of the Virginia Herpetological Society in 1958. Although substantial contributions were written by others, the foundation of the modern study of herpetology in Virginia was laid down solely by the efforts of one person, the native Virginian E. R. Dunn.

Key words: amphibians, Emmett Reid Dunn, history, reptiles, Virginia.

INTRODUCTION

Scientific disciplines seem to have lives of their own. In some cases one dedicated person provides the seminal foundation and in others a group of people working around the same time do so. For example, William Barton Rogers (1804-1882) conducted a state-supported geological survey of Virginia from 1835 to 1842 and produced the first accurate geological map of the state (Roberts, 1950). Mount Rogers is named in his honor, and he is considered the pioneer of geology in the state (Roberts, 1942). No one single person, however, can be recognized as the sole pioneer of botany (Hugo & Ware, 2012), ichthyology (Jenkins & Burkhead, 1994), mammalogy (Bailey, 1946; Rose, 2013), or ornithology (Johnston, 2003) in Virginia. Several individuals helped to establish these disciplines early on but no one person stood out. Although several scientists contributed papers to Virginia herpetology that can be considered relatively modern from a scientific point-of-view, only one person, Emmett R. Dunn, provided the foundation for all of what followed. Here I review some of the contributions to herpetology in the historical literature, describe the life of and scientific foundation established by Emmett Reid Dunn,

and include a brief overview of some of the contributions by others that followed him. This review covers the period from 1612 to 1958 when the Virginia Herpetological Society (VHS) was created.

HISTORICAL OBSERVATIONS

The earliest published observations on the amphibians and reptiles of Virginia that appear in accounts found in the historical literature were printed in England. Captain John Smith published the earliest observations on reptiles, mostly as sources of food or how they were used by Indians for body ornamentation (Smith, 1612). During his first expedition in 1669, John Lederer discovered a squirrel in the stomach of a Timber Rattlesnake (*Crotalus horridus*) near what is now New Kent County (Lederer, 1672; Fig.1) but noted no other observations on reptiles. Herpetological observations made in the Colonial period were published in Robert Beverley's *The History and Present State of Virginia* in 1705. He noted six species of snakes, described aspects of snakebite, and said that frogs "do no hurt except by their noise of the croaking notes." Mark Catesby in his *Natural History of Carolina, Florida, and the Bahama Islands* (Catesby,

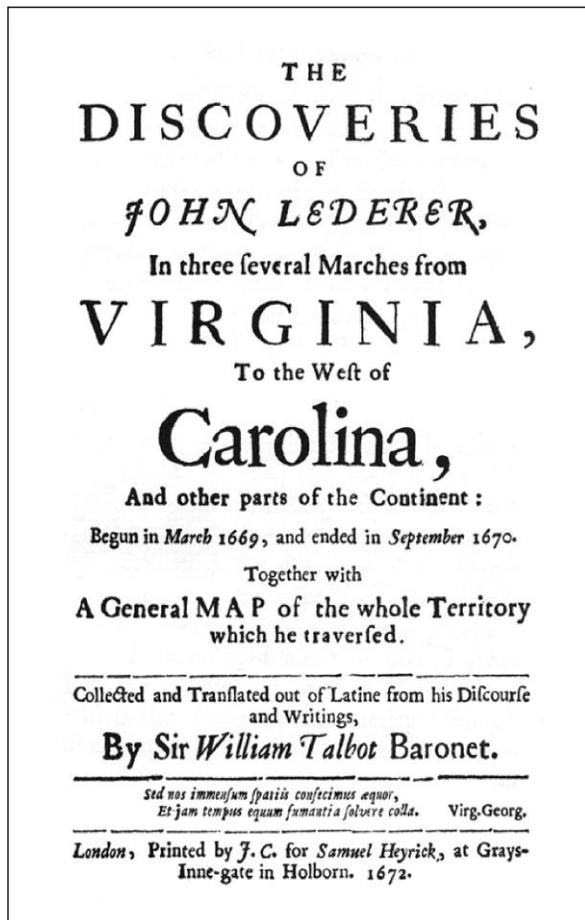


Fig. 1. First page of the publication written by John Lederer in 1672 in which he provides the first observation of a rattlesnake prey item in Virginia and possibly North America.

1731-1743) added “The Noise they [Bullfrogs; Fig. 2] make has caused their Name; for at a few Yards Distance their Bellowing sounds very much like that of a Bull a quarter mile off.” In his description of the survey that delineated the line between North Carolina and Virginia, William Byrd II (1728) noted several occurrences of rattlesnakes but little else. I can find only three publications on Virginia’s herpetofauna in the period between Catesby’s works and John E. Holbrook’s volumes on herpetology in the middle 1800s. Castiglioni (1790) found a kingsnake (*Lampropeltis getula*) on the bank of the James River and Barton (1808, 1812) mentions the Hellbender (*Cryptobranchus alleghaniensis*).

Scientific papers, rather than historical or travel documents that include miscellaneous observations on selected species, did not appear until after John E. Holbrook published his series of seminal volumes on the amphibians and reptiles of North America between

1836 and 1842 (Adler, 1989). He included observations from Virginia in his accounts on four frogs, two lizards, two snakes, and seven turtles. Subsequently, a small number of authors published the first papers on the natural history of amphibians and reptiles in Virginia from a scientific perspective. Spencer F. Baird and Charles Girard (1853) described what they thought was a new species of snake (*Ophibolus clericus*) from Clarke County that is now known to be the Eastern Milksnake (*Lampropeltis triangulum*). Edward D. Cope (1895) noted a Rainbow Snake (*Farancia erytrogramma*) found on the bank of the Pamunkey River. A new species of treefrog (*Hyla evitatta*, now a synonym of *Hyla cinerea*) from the Washington, D.C. and northern Virginia area was described by Gerrit S. Miller, Jr. (1899). He also noted a Mole Kingsnake (*Ophibolus rhombomaculatus* [= *Lampropeltis calligaster*]) from Alexandria (Miller, 1902). Hugh M. Smith (1899) reported the Amphiuma (*Amphiuma means*) from Virginia for the first time. William P. Hay (1902) published the first checklist of amphibians and reptiles that included northern Virginia in its geographic scope.

EMMETT REID DUNN

It was not until Emmett Reid Dunn (1894-1956; Fig. 3) began exploring his passion for reptiles that modern herpetology in Virginia grew its first serious roots. He was born on 21 November 1894 and grew up in Alexandria. Little is known about his early years or the schools he attended. However, it is known from his publications that he spent considerable time on a



Fig. 2. The American Bullfrog (*Lithobates catesbeianus*) by Mark Catesby in his *Natural History of Carolina, Florida, and the Bahama Islands* (Catesby, 1731-1743). Image from a photograph taken of the painting online and reproduced in gray scale by Joe Mitchell.



Fig. 3. Emmett Reid Dunn, pioneer of the scientific study of herpetology in Virginia. This photo was taken at Midway, Nelson County, Virginia (date unknown). Photo courtesy of Mary Reid (Dunn) Barrow.

family farm adjacent to the James River at or near Midway Mills, or simply Midway (approximately 2 km N Wingina) in Nelson County. Dunn, like many who were to become professional herpetologists, was primarily interested in snakes when he was young. Living in Arlington allowed him to visit the Smithsonian Institution in nearby Washington, D.C. where he met Dr. Leonhard Stejneger (1851-1943), Curator of Reptiles and Amphibians. They established a life-long correspondence. Stejneger's letter to him in January 1913 so inspired Dunn that it set him on the path to become one of the most influential herpetologists in the first half of the 20th century. In that letter, Stejneger pointed out that the study of salamanders was far more in need of investigation than snakes (see the Foreword in Dunn, 1926). Salamander taxonomy and relationships were in a state of chaos in 1913 and had been since Cope's pioneering work on this group before the Civil War (Cope, 1859). At that time, Dunn was an 18 year old sophomore at Haverford

College, a Quaker school, in Philadelphia. He was a good writer and when he became aware of the first scientific journal available on amphibians and reptiles, *Copeia*, which started in 1913, he found an outlet for his observations. The new journal was first published at the end of the same year that Dunn received his pivotal letter from Stejneger.

The year in which Dunn graduated with a BA, 1915, was the same year in which he published his first papers, mostly on observations from Virginia. Five of the eight papers he published that year were derived from his field work at Midway. His first scientific paper was on phenotypic variation in a litter of Northern Watersnakes (*Nerodia sipedon*) (Dunn, 1915a). His second Virginia paper was on the herpetofauna of Midway based on observations he made in the summers of 1912-1914 when he was 17-19 years old (Dunn, 1915b). He listed two species of salamanders, six frogs, five turtles, three lizards, and 17 snakes. Subsequent papers were on diet and reproduction in *Sceloporus undulatus* (Eastern Fence Lizard) (Dunn, 1915c) and reproduction in four species of snakes (Dunn, 1915d). He published a list of 25 species he observed in Clarke County in August 1915 (Dunn, 1915e). He reported late seasonal activity dates for nine species observed in late November at Midway (Dunn, 1916a). He also showed that the male vocalizations of the American Toad (*Bufo* [= *Anaxyrus*] *americanus*) and Fowler's Toad (*Bufo* [= *Anaxyrus*] *fowleri*) could be used reliably to tell them apart (Dunn, 1916c). He recorded the first Northern Pine Snake (*Pituophis melanoleucus*) and Southeastern Crowned Snake (*Tantilla coronata*) in Virginia (Dunn, 1917c, 1919). In 1920, he added *Clemmys* [= *Glyptemys*] *insculpta* (Wood Turtle) and *Stereochilus marginatus* (Many-lined Salamander) to the Virginia checklist (Dunn, 1920a). He wrote the first checklist and key on Virginia's amphibians and reptiles based on records from 60 counties (Dunn, 1918a).

Dunn described *Desmognathus monticola* (Seal Salamander; Fig. 4) in 1916 based on specimens in the Smithsonian Institution, some of which were from six localities in the northern Blue Ridge Mountains (Dunn, 1916b). This was his first description of a formerly unrecognized species. Other papers, such as those on herpetofaunal records in Virginia and surrounding states (Dunn, 1920b) and the habitats of plethodontid salamanders (Dunn, 1928), were broad in scope but included specimens and observations from Virginia. He showed that the ranges of *Desmognathus fuscus* (Northern Dusky Salamander) and *D. monticola* overlapped extensively in the Virginia mountains (Dunn, 1917a). He pointed out that the treefrog described by Miller (1899) was a geographic variant of the Green Treefrog (*Hyla cinerea*) (Dunn, 1937). He

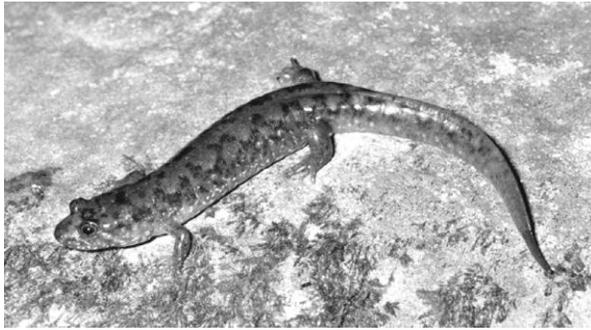


Fig. 4. *Desmognathus monticola* from near Sky Meadows State Park, Fauquier County, Virginia, a species described originally by E. R. Dunn in 1916. © John White - Virginia Herpetological Society.

was the first to consider the importance of sympatric species and salamander community structure (Wake, 1972). This body of work illustrates his developing wide breadth of interests.

Dunn graduated with a MA from Haverford College in 1916 and accepted a teaching job at Smith College in Northampton, MA. During that summer, however, he set out on his first major field trip, the one that started him on the path to become the world's expert on plethodontid salamanders. Mary Dickerson (1866-1923), Curator of Herpetology at the American Museum of Natural History (AMNH) in New York, had offered to sponsor him on a collecting trip to the mountains of North Carolina primarily to collect and study salamanders (Schmidt, 1957; Adler, 1989). The approximately seven week-long trip resulted in a major collection of amphibians and reptiles from that region. In the document that followed (Dunn, 1917b), he described the new salamander he found as *Plethodon yonahlossee* (Yonahlossee Salamander; Fig. 5) and what he thought was a new species of small turtle (*Clemmys nuchalis*). This name was later placed in synonymy with the Bog Turtle (*Clemmys* [= *Glyptemys*] *muhlenbergii*) (Schmidt, 1953). The trip culminated with a week at Midway for additional collecting. This trip solidified his primary scientific interest – to describe new species. This was the era when finding and describing new species was the measure of a professional herpetologist (Conant, 1997). Dunn wanted to be a member of this group and from the perspective of time he accomplished that even before he finished graduate school.

Dunn's teaching position at Smith College began in the fall of 1916 but he had to serve in the military briefly during 1917-1918 due to the need for men in World War I. He never saw combat or left the United States. He returned to his teaching position in late 1918 and for the next three years worked there and on his

Ph.D. degree at Harvard University, which he completed in 1921. Additional papers on salamanders and other topics were published annually during this period. His first big project after completing his terminal degree was to write the book *The Salamanders of the Family Plethodontidae* (Dunn, 1926). Many of the salamander specimens he examined for this pivotal publication were from Virginia. This book contains the most detailed systematic analysis of any group of amphibians ever attempted previously (Wake, 1972). The impacts to herpetology of these early systematic works that he completed before he started in his Ph.D. program (Dunn, 1917a, 1918b; Fowler & Dunn, 1917) and his book on salamander systematics, evolution, and ecology cannot be overemphasized (Wake, 1972).

Although Dunn's herpetological interests expanded greatly after graduating from Haverford, he remained interested in the amphibians and reptiles of Virginia until at least the late 1930s. He maintained an active checklist of Virginia species until that time and added county records to it as they became available. This unpublished, but well-researched checklist (Dunn, 1936) was printed on mimeographed paper; copies were made available to colleagues and institutions. The one I describe here is in the reprint library in the Division of Amphibians and Reptiles, Smithsonian Institution.

The checklist that Dunn published on Virginia herpetology in 1918 (Dunn, 1918a) listed 36 (15 frogs, 21 salamanders) species of amphibians and 44 reptiles (12 turtles, 6 lizards, 26 snakes). His unpublished and expanded checklist that he maintained until 1936 increased the numbers to 53 amphibians (20 frogs, 33 salamanders) and 47 reptiles (12 turtles [exclusive of the unconfirmed sea turtles], 7 lizards, 28 snakes). He added 20 species in the intervening 18 years (17 amphibians, 3 reptiles). The largest gain was the addition of 12 salamanders. For comparison, the checklist by Mitchell & Reay (1999) includes 74

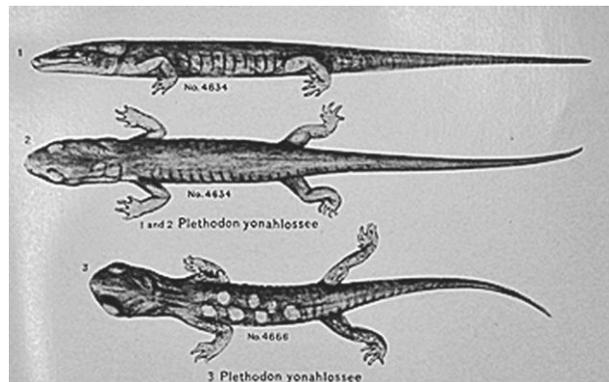


Fig. 5. First illustration of the Yonahlossee Salamander (*Plethodon yonahlossee*) by E. R. Dunn in 1917.

amphibians (25 frogs, 49 salamanders) and 61 reptiles (22 turtles, 9 lizards, 30 snakes). The addition of the Southern Chorus Frog (*Pseudacris nigrita*) by Moriarty & Hobson (2003) illustrates the continued refinement of our understanding of the herpetofauna of Virginia and increased the total to 137. Dunn had confirmed 72% of the known amphibians and 77% of the known reptiles 69 years earlier and much of it was due to his own efforts.

The 1936 checklist almost coincides with E.R. Dunn's change of focus away from Virginia. His paper two years later on the characters that distinguish *Acris crepitans* (Northern Cricket Frog) from *Acris gryllus* (Southern Cricket Frog) and their geographic distributions (Dunn, 1938) included many observations he had made in Virginia. It was his last contribution to herpetology in the state. Of the 217 publications Dunn would author in his lifetime, 21 were on Virginia's herpetofauna. These contributions, combined with the 1936 unpublished checklist, provided the all-important knowledge of what and where these species occur in the state, as well as basic knowledge of their ecology.

Dunn continued to teach at Smith College until he resigned in late 1928 to travel under a Guggenheim Fellowship to the tropics and the museums in Europe (Mitchell & Smith, 2013). After his return in the fall of 1929, he obtained a faculty position at his *alma mater* Haverford College where he would remain until his death from cancer on 13 February 1956 (Conant, 1956; Adler, 1989).

E. R. DUNN TO THE VIRGINIA HERPETOLOGICAL SOCIETY

E. R. Dunn's influential book on plethodontid salamanders (Dunn, 1926) opened a new world of research into the natural history, systematics, and ecology of this diverse group of vertebrates. Many herpetologists who worked on Virginia's herpetofauna after the 1920s focused largely on salamanders in the Blue Ridge and Appalachian mountains. Research on the other taxonomic groups began to grow in the 1930s as well and expanded thereafter over the next several decades. Little of this work could have been undertaken without Dunn's 1926 plethodontid salamander book and the groundwork he provided in the first taxonomic checklists for the state.

Several biologists focused on salamanders, as well as the other taxonomic groups in the 1920s through the 1940s. Henry W. Fowler (1878-1965) noted the first record of *Scaphiopus holbrookii* (Eastern Spadefoot) for Virginia (Fowler, 1918) and later published distribution records for Accomack, Augusta, and Loudoun counties (Fowler, 1925). Harry A. Allard

(1880-1963) published four papers on the natural history of the box turtle based on captive observations of individuals caught in northern Virginia (Allard, 1935, 1939, 1948, 1949). He also described the call of *Bufo* (= *Anaxyrus*) *fowleri* (Allard, 1916) and reported on an albino Eastern Wormsnake (*Carphophis amoenus*) from Arlington (Allard, 1945). Maurice K. Brady (1904-1958) described the eggs of *Desmognathus phoca* (= *D. fuscus*) in Loudoun County (Brady, 1924a), and reported *Pseudotriton ruber* (Red Salamander) and what he thought was a Bog Turtle from Fairfax County (Brady, 1924b, c). The turtle was actually a juvenile Wood Turtle (Mitchell, 1989). He provided lists of the amphibians and reptiles observed in the Dismal Swamp and on Hog Island in the James River (Brady, 1925, 1927). A checklist and natural history notes on 18 species from Stafford County and a description of morphological variation in *Terrapene carolina* (Eastern Box Turtle) from northern Virginia were published by W. Gardner Lynn (1905-1990) in the 1930s (Lynn, 1936, 1937).

Several authors followed Dunn's lead and worked on salamanders in Virginia in the 1940s and beyond. M. Graham Netting (1904-1996) added new distributional records (Netting, 1932; Netting et al., 1946; Netting & Wilson, 1940). The first studies on salamander ecology and reproduction were conducted by Clifford H. Pope (1899-1974) and his colleagues. They evaluated growth and reproduction of the Slimy Salamander (*Plethodon glutinosus*) (Pope & Pope, 1949; Pope, 1950) and were the first to study the elevational distributions of plethodontid salamanders from an ecological perspective (Pope & Hairston, 1947; Pope & Pope, 1949). Pope and James A. Fowler (1916-2008) described a cave-dwelling form of Wehrle's Salamander as *Plethodon dixi* (= *P. wehrlei*) and named it after the public cave in which the original specimens were collected (Pope & Fowler, 1949). Fowler was the first to publish a report on an introduced species in the state, the False Map Turtle (*Graptemys pseudogeographica*) in the Potomac River near Washington, D.C. (Fowler, 1943b). He also contributed locality records for several amphibians and one snake (Fowler, 1943a, 1944, 1945, 1947; Fowler & Hoffman, 1951), as well as notes on the behavior and reproduction of *P. dixi* (Fowler, 1951, 1952).

Various aspects of the natural history of some of Virginia's Coastal Plain amphibians and reptiles were first published by Neil D. Richmond (1912-1992; see photo in Mitchell [1994: 12]), who succeeded Netting as the curator of herpetology at the Carnegie Museum of Natural History in 1954 (Adler, 2012). His family farm near Lanexa in New Kent County was the source of many behavioral and life history observations, some

of which were not corroborated until decades later (e.g., Richmond, 1944, 1945a, b, c, 1947, 1956; Richmond & Goin, 1938). He was the first to document the Glossy Watersnake (*Regina rigida*) in Virginia well north of its known range (Richmond, 1940).

Two other authors who began their studies in the 1940s would impact herpetology in Virginia for decades. Richard L. Hoffman (1927-2012; Fig. 6) wrote a number of papers while he was a teenager (Mitchell, 2009; Roble & Mitchell, 2012) on salamander and lizard distribution and systematics in the Virginia mountains (Hoffman, 1944a, b, 1945b, 1947, 1949, 1951; Hoffman & Kleinpeter, 1948a, b). He published the first checklist of the herpetofauna of Alleghany County (Hoffman, 1945a) and described the Virginia distribution patterns of the two species of Gray Treefrogs (*Hyla chrysoscelis* and *H. versicolor*) based on call differences 20 years before they were determined to be two separate species (Hoffman, 1946; Mitchell & Pague, 2011[2013]). Hoffman continued to make contributions to Virginia herpetology until the end of his life. Most of the papers that Roger Conant (1909-2003; Fig. 7) wrote on Virginia herpetology covered the herpetofauna of the Delmarva Peninsula (Conant, 1943a, b, 1945, 1946, 1958a; Conant et al., 1990). The first edition of Conant's field guide to eastern amphibians and reptiles (Conant, 1958b), like Dunn's 1926 book on salamanders, had a profound impact on herpetology in the eastern United States, and stimulated a new era of discovery and research in Virginia. This book was available to non-professionals, and that alone stimulated a surge in reports of



Fig. 6. Two pillars in the history of herpetology in Virginia. Franklin J. Tobey (left), founder of the Virginia Herpetological Society, and Richard L. Hoffman (right), who contributed many papers starting in his teen years and after whom the salamander *Plethodon hoffmani* (Valley and Ridge Salamander) was named. The photo was taken at the VHS meeting in 1996 by J. C. Mitchell.



Fig. 7. Roger Conant at the 1982 Society for the Study of Amphibians and Reptiles meeting in Raleigh, NC. Photo © David B. Grim.

distribution records backed by specimens donated to the Smithsonian Institution. The first set of distribution maps (Tobey, 1985) and faunal reviews (e.g., Mitchell, 1994; Mitchell & Anderson, 1994) on the Virginia herpetofauna are based in part on the foundation provided in this book.

At the national level, several important books appeared in the 1940s and 1950s that were based in part on museum specimens from Virginia, as well as results of field work in the state. The handbook series published by Cornell University Press was the first to provide comprehensive descriptions of the natural history of all the salamanders (Bishop, 1943), lizards (Smith, 1946), frogs (Wright & Wright, 1949), turtles (Carr, 1952), and snakes (Wright & Wright, 1957) in the United States. These books established the context for many subsequent natural history studies that expanded our knowledge of herpetology in the state. All are still considered essential references.

The number of papers published on the distribution, ecology, and systematics of Virginia's herpetofauna continued to increase through the 1950s. Walter B. Newman (1925/26-1959) described a salamander

(*Plethodon jacksoni*) from Montgomery County, VA that he thought was new (Newman, 1954), but Highton (1962) placed it in synonymy with *P. wehrlei* (Wehrle's Salamander). He also described a new dusky salamander from the Blue Ridge Escarpment in Patrick County as *Desmognathus planiceps* (Newman, 1955). Martof & Rose (1962) placed it in synonymy with *D. fuscus* (Northern Dusky Salamander) because both forms were in the museum jar containing the type series and because they could not tell them apart. Tilley et al. (2008) resurrected Newman's *D. planiceps* (Flat-headed Salamander) based on morphology and molecular data and expanded its known range in southwestern Virginia and North Carolina. Newman, who had aspired to write a book on Virginia herpetology (R. L. Hoffman, pers. comm.), died at age 33 from a heart attack (note in the Newman reprint file in the Division of Amphibians and Reptiles, Smithsonian Institution).

Mountain Lake Biological Station, a field station in Giles County owned and managed by the University of Virginia (UVA), has played an important role in Virginia herpetology since the 1930s with courses in herpetology, animal ecology, and others that included field trips throughout the southern Appalachians (J. J. Murray, pers. comm.). Several projects resulted in publications. For example, Victor H. Hutchison (1931-present), who took classes there in the 1950s while a student at Duke University, contributed a paper on the herpetofauna of Giles County (Hutchison, 1956a) and two on the ecology of salamanders in the genus *Eurycea* (Hutchison, 1956b, 1958). E. R. Dunn taught a unit of herpetology in a course on vertebrates at the station in 1935 (J. J. Murray, pers. comm.).

John Thornton Wood (1919-1990; see photo in Mitchell [1994: 13]) moved to the College of William and Mary (W&M) from Columbia University in New York City in 1948. He completed his Master's degree on the nesting ecology of the Four-toed Salamander (*Hemidactylium scutatum*) at W&M in 1951 (Wood, 1951a). Between 1948 and 1956, the year after he completed his medical degree from UVA, he published 15 papers on amphibians and nine papers on reptiles (e.g., Wood, 1951b, 1953a, b, 1954a, b, 1955; Wood & Wilkinson, 1952a, b; Martin & Wood, 1955; Wood & Goodwin, 1955; Wood & Rageot, 1955; Goodwin & Wood, 1956). Wood also helped to establish the VHS in 1958, became its first president, and then moved to Canada in the early 1960s to continue his medical practice (Mitchell, 1994).

Another person who studied herpetology in Virginia and played an early role in the development of the VHS was W. Leslie Burger (1925-1988; see photo in Mitchell [1994: 13]). He was an undergraduate student

at UVA in 1945, worked at the Virginia Fisheries Laboratory (which later became the Virginia Institute of Marine Science) in 1956, and taught at W&M from 1957 to 1959 (Mitchell, 1994; Adler, 2012). He made a number of valuable collections and documented several species new to the state but was unable to publish his observations. The checklist of amphibians and reptiles of Virginia that he developed (Burger, 1958) was used as the springboard for field work by the VHS.

Roger Conant's 1958 field guide was published in the same year that Franklin J. Tobey (1919-2010; Fig. 6) and others, including Burger and Wood, created the VHS (Tobey, 1988). This third oldest regional society in the United States stimulated the interest of many amateurs and several young people who later became professors at leading universities in the United States. Conant's book and the initiation of the VHS signaled the start of a new era in Virginia herpetology.

CLOSING THOUGHTS

Emmett Reid Dunn brought Virginia into the modern era of scientific discovery with his checklists, papers on salamander systematics, and the 1926 treatise on plethodontid salamanders. Others who followed used his foundation to expand the exploration of Virginia herpetology into the middle of the 20th century and beyond. The vision of an expanding mushroom cloud captures the pace and productivity of the efforts of these scientists. Scientific productivity in the second half of the 20th century and into the 21st century continued the expansion and indeed quickened the pace. The strides that have been and are still being made by the VHS on distribution patterns and natural history has brought numerous amateurs to the effort. Their contributions, along with those of professional herpetologists, will continue to elevate and expand the knowledge base on the amphibians and reptiles in the Commonwealth even further. We give due credit to the one person who started the modern era of herpetology in Virginia, Emmett Reid Dunn.

ACKNOWLEDGMENTS

Too many people than I can thank adequately here contributed in many ways to my understanding of the history of Virginia herpetology and the players that made it happen. I single out Richard L. Hoffman because he lived in and contributed to the period of expansion of knowledge of Virginia's herpetofauna, and because he showed me how valuable and rewarding it is to stand on the shoulders of those that came before. J. J. Murray, professor emeritus at UVA, provided information on herpetologists who worked or studied at

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LITERATURE CITED

- Adler, K. 1989. Herpetologists of the Past. Pp. 5-141 *In* K. Adler (ed.), Contributions to the History of Herpetology. Society for the Study of Amphibians and Reptiles, Oxford, OH.
- Adler, K. 2012. Herpetologists of the Past, Part 3. Pp. 9-386 *In* K. Adler (ed.), Contributions to the History of Herpetology, Volume 3. Society for the Study of Amphibians and Reptiles, Salt Lake City, UT.
- Allard, H. A. 1916. The song of the Fowler's toad (*Bufo fowleri*). *Science* 44: 463-464.
- Allard, H. A. 1935. The natural history of the box turtle. *Scientific Monthly* 41: 325-328.
- Allard, H. A. 1939. Mating of the box turtle ending in the death of the male. *Copeia* 1939: 109.
- Allard, H. A. 1945. A color variant of the eastern worm snake. *Copeia* 1945: 42.
- Allard, H. A. 1948. The eastern box turtle and its behavior. *Journal of the Tennessee Academy of Science* 23: 307-321.
- Allard, H. A. 1949. The eastern box turtle and its behavior (concluded). *Journal of the Tennessee Academy of Science* 24: 146-152.
- Bailey, J.W. 1946. The Mammals of Virginia. Privately Published, Williams Printing Co., Richmond, VA. 413 pp.
- Baird, S. F., & C. Girard. 1853. Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part I, Serpents. *Smithsonian Miscellaneous Collections* 2: 1-172.
- Barton, B. S. 1808. Some accounts of *Siren lacertina* and other species of the same genus of amphibious animals. Privately Printed, Philadelphia, PA. 84 pp. + 1 plate.
- Barton, B. S. 1812. A memoir concerning an animal of the class of reptilia or amphibia, which is known in the United States, by the names of alligator or hell-bender. Private Printing, Griggs & Dickinson Printers, Philadelphia, PA. 26 pp. + 1 plate.
- Beverley, R. 1705. The History and Present State of Virginia. R. Parker, London. Reprinted in 1947 by the University of North Carolina Press, Chapel Hill, NC.
- Bishop, S. C. 1943. Handbook of Salamanders, the Salamanders of the United States, of Canada, and of Lower California. Cornell University Press, Ithaca, NY. 596 pp.
- Brady, M. K. 1924a. Eggs of *Desmognathus phoca* (Matthes). *Copeia* (127): 29.
- Brady, M. K. 1924b. *Pseudotriton montanus* near Washington. *Copeia* (130): 54-55.
- Brady, M. K. 1924c. Muhlenberg's turtle near Washington. *Copeia* (135): 92.
- Brady, M. K. 1925. Notes on the herpetology of Hog Island. *Copeia* (137): 110-111.
- Brady, M. K. 1927. Notes on the reptiles and amphibians of the Dismal Swamp. *Copeia* (162): 26-29.
- Burger, W. L. 1958. List of Virginian amphibians and reptiles. *Virginia Herpetological Society Bulletin*, Supplement to Bulletin No. 4. 5 pp.
- Byrd, W. 1728. History of the dividing line betwixt Virginia and North Carolina, run in the year of our Lord 1728. Reprinted in L. B. Wright (ed.), 1966. The Prose Works of William Byrd of Westover. Harvard University Press, Cambridge, MA.
- Carr, A. F. 1952. Handbook of Turtles in the United States, Canada, and Baja California. Cornell University Press, Ithaca, NY. 542 pp.
- Castiglioni, L. 1790. Viaggio negli Stati Uniti: dell' America Settentrionale fatto negli anni 1785, 1786, e 1787. Nella Stamperia di Giuseppe Marelli, Milano, Italy.
- Catesby, M. 1731-1743. Natural History of Carolina, Florida, and the Bahama Islands. 2 vols., London.
- Conant, R. 1943a. *Natrix erythrogaster* in the

- northeastern part of its range. *Herpetologica* 2: 83-92.
- Conant, R. 1943b. The milk snakes of the Atlantic Coastal Plain. *Proceedings of the New England Zoology Club* 22: 3-24.
- Conant, R. 1945. An annotated check list of the amphibians and reptiles of the Del-Mar-VA peninsula. *Society of Natural History, Delaware*. 8 pp.
- Conant, R. 1946. Intergradation among ring-necked snakes from southern New Jersey and the Del-Mar-VA peninsula. *Bulletin of the Chicago Herpetological Society* 7: 473-482.
- Conant, R. 1956. E.R. Dunn, herpetologist. *Science* 123: 975.
- Conant, R. 1958a. Notes on the herpetology of the Del-Mar-VA peninsula. *Copeia* 1958: 50-52.
- Conant, R. 1958b. *A Field Guide to Reptiles and Amphibians of the United States and Canada East of the 100th Meridian*. Houghton Mifflin Co., Boston, MA. 366 pp.
- Conant, R. 1997. *A Field Guide to the Life and Times of Roger Conant*. Selva, Provo, UT. 498 pp.
- Conant, R., J. C. Mitchell, & C. A. Pague. 1990. Herpetofauna of the Virginia barrier islands. *Virginia Journal of Science* 41: 364-380.
- Cope, E. D. 1859. On the primary divisions of the Salamandridae with descriptions of two new species. *Proceedings of the Academy of Natural Sciences of Philadelphia* 1859: 122-128.
- Cope, E. D. 1895. A new locality for *Abastor erythrogrammus*. *American Naturalist* 24: 588.
- Dunn, E.R. 1915a. The variations of a brood of watersnakes. *Proceedings of the Biological Society of Washington* 28: 61-68.
- Dunn, E. R. 1915b. List of amphibians and reptiles observed in the summers of 1912, 1913, and 1914 in Nelson County, Virginia. *Copeia* (18): 5-7.
- Dunn, E. R. 1915c. Notes on the habits of *Sceloporus undulatus* (Latreille). *Copeia* (19): 9.
- Dunn, E. R. 1915d. Number of young produced by certain snakes. *Copeia* (22): 37.
- Dunn, E. R. 1915e. List of amphibians and reptiles from Clarke County, Virginia. *Copeia* (25): 62-63.
- Dunn, E. R. 1916a. Notes on Virginia herpetology. *Copeia* (28): 22-23.
- Dunn, E. R. 1916b. Two new salamanders of the genus *Desmognathus*. *Proceedings of the Biological Society of Washington* 29: 73-76.
- Dunn, E. R. 1916c. The song of Fowler's toad (*Bufo fowleri* Putnam). *Science* 44: 790.
- Dunn, E.R. 1917a. The salamanders of the genera *Desmognathus* and *Leurognathus*. *Proceedings of the United States National Museum* (2211): 393-433.
- Dunn, E. R. 1917b. Reptiles and amphibians collected from the North Carolina mountains, with especial reference to salamanders. *Bulletin of the American Museum of Natural History* 37: 593-634.
- Dunn, E. R. 1917c. The pine snake in Virginia. *Copeia* (51): 101.
- Dunn, E. R. 1918a. A preliminary list of the reptiles and amphibians of Virginia. *Copeia* (53): 16-27.
- Dunn, E. R. 1918b. The collection of Amphibia Caudata of the Museum of Comparative Zoology. *Bulletin of the Museum of Comparative Zoology, Harvard University* 62: 445-471.
- Dunn, E. R. 1919. *Tantilla coronata* in Virginia. *Copeia* (76): 100.
- Dunn, E. R. 1920a. Two new Virginia records. *Copeia* (77): 8.
- Dunn, E. R. 1920b. Some reptiles and amphibians from Virginia, North Carolina, Tennessee, and Alabama. *Proceedings of the Biological Society of Washington* 129: 129-138.
- Dunn, E. R. 1926. *Salamanders of the Family Plethodontidae*. *Smith College, Northampton, MA*. 441 pp. Reprinted by the Society for the Study of Amphibians and Reptiles, 1972.
- Dunn, E. R. 1928. The habitats of Plethodontidae. *American Naturalist* 62: 236-248.

- Dunn, E. R. 1936. List of Virginia amphibians and reptiles. Haverford College, Haverford, PA. Unpublished mimeograph. 5 pp.
- Dunn, E. R. 1937. The status of *Hyla evitatta* Miller. Proceedings of the Biological Society of Washington 50: 9-10.
- Dunn, E. R. 1938. Notes on frogs of the genus *Acris*. Proceedings of the Academy of Natural Sciences of Philadelphia 90: 153-154.
- Fowler, H. W. 1918. The spadefoot toad in Virginia. Copeia (55): 44.
- Fowler, H. W. 1925. Records of amphibians and reptiles for Delaware, Maryland, and Virginia. Copeia (146): 65-67.
- Fowler, H. W., & E. R. Dunn. 1917. Notes on salamanders. Proceedings of the Academy of Natural Sciences of Philadelphia 1917: 7-28.
- Fowler, J. A. 1943a. A new locality record for Holbrook's salamander in the District of Columbia vicinity. Proceedings of the Biological Society of Washington 56: 167.
- Fowler, J. A. 1943b. Another false map turtle from the District of Columbia vicinity. Proceedings of the Biological Society of Washington 56: 168.
- Fowler, J. A. 1944. The cave salamander in Virginia. Proceedings of the Biological Society of Washington 57: 31-34.
- Fowler, J. A. 1945. Notes on *Cemophora coccinea* (Blumenbach) in Maryland and the District of Columbia. Proceedings of the Biological Society of Washington 58: 89-90.
- Fowler, J. A. 1947. Record for *Aneides aeneus* in Virginia. Copeia 1947: 144.
- Fowler, J. A. 1951. Preliminary observations on an aggregation of *Plethodon dixi*. Herpetologica 7: 147-148.
- Fowler, J. A. 1952. The eggs of *Plethodon dixi*. Bulletin of the National Speleological Society 14: 61.
- Fowler, J. A., & R. L. Hoffman. 1951. *Gastrophryne carolinensis* (Holbrook) in southwestern Virginia. Virginia Journal of Science 2: 101.
- Goodwin, O. K., & J. T. Wood. 1956. Distribution of poisonous snakes on the York-James peninsula. Virginia Journal of Science 7: 17-21.
- Hay, W. P. 1902. A list of batrachians and reptiles of the District of Columbia and vicinity. Proceedings of the Biological Society of Washington 15: 121-145.
- Highton, R. 1962. Revision of the North American salamanders of the genus *Plethodon*. Bulletin of the Florida State Museum 6: 235-367.
- Hoffman, R. L. 1944a. *Eumeces anthracinus* (Baird) in Virginia. Proceedings of the Biological Society of Washington 57: 123-124.
- Hoffman, R. L. 1944b. Notes on *Cnemidophorus sexlineatus* in Virginia. Proceedings of the Biological Society of Washington 57: 124-125.
- Hoffman, R. L. 1945a. Notes on the herpetological fauna of Alleghany County, Virginia. Herpetologica 2: 199-205.
- Hoffman, R. L. 1945b. Range extension for *Eumeces inexpectatus* in Virginia. Proceedings of the Biological Society of Washington 57: 124-125.
- Hoffman, R. L. 1946. The voice of *Hyla versicolor* in Virginia. Herpetologica 3: 141-142.
- Hoffman, R. L. 1947. Distribution of two salamanders in Virginia. Herpetologica 4: 67-68.
- Hoffman, R. L. 1949. A geographic variation gradient in *Cnemidophorus*. Herpetologica 5: 149.
- Hoffman, R. L. 1951. A new subspecies of salamander from Virginia. Journal of the Elisha Mitchell Scientific Society 67: 249-253.
- Hoffman, R. L., & H. L. Kleinpeter. 1948a. Amphibians from Burkes Garden, Virginia. American Midland Naturalist 319: 602-607.
- Hoffman, R. L., & H. L. Kleinpeter. 1948b. A collection of salamanders from Mount Rogers, Virginia. Journal of the Washington Academy of Science 38: 106-108.
- Hugo, N. R., & D. M. E. Ware. 2012. Plant discovery and documentation in Virginia: a historical perspective. Pp. 6-23 In A. S. Weakley, J. C. Ludwig, & J. F. Townsend. Flora of Virginia. Botanical Research

- Institute of Texas (BRIT) Press, Fort Worth, TX.
- Hutchison, V. H. 1956a. An annotated checklist of the amphibians and reptiles of Giles County, Virginia. *Virginia Journal of Science* 7: 80-86.
- Hutchison, V. H. 1956b. Notes on the plethodontid salamanders *Eurycea lucifuga* Rafinesque and *Eurycea longicauda longicauda*. National Speleological Society, Occasional Papers 3: 1-24.
- Hutchison, V. H. 1958. The distribution and ecology of the cave salamander, *Eurycea lucifuga*. *Ecological Monographs* 28: 1-20.
- Jenkins, R. E., & N. M. Burkhead. 1994. Freshwater Fishes of Virginia. American Fisheries Society, Bethesda, MD. 1079 pp.
- Johnston, D. W. 2003. The History of Ornithology in Virginia. University of Virginia Press, Charlottesville, VA. 256 pp.
- Lederer, J. 1672. The Discoveries of John Lederer, in Three Several Marches from Virginia to the west of Carolina ... Translated out of Latin by Sir William Talbot. London. Reprinted by G.P. Humphrey, Rochester, NY, 1902.
- Lynn, W. G. 1936. Reptile records from Stafford County, Virginia. *Copeia* 1936: 169-171.
- Lynn, W. G. 1937. Variation in scutes and plates of the box turtle, *Terrapene carolina*. *American Naturalist* 71: 421-426.
- Martin, J. R., & J. T. Wood. 1955. Notes on the snakes of the Dismal Swamp area. *Herpetologica* 11: 237-238.
- Martof, B. S., & F. L. Rose. 1962. The taxonomic status of the plethodontid salamander, *Desmognathus planiceps*. *Copeia* 1962: 215-216.
- Miller, G. S. 1899. A new treefrog from the District of Columbia. *Proceedings of the Biological Society of Washington* 13: 75-78.
- Miller, G. S. 1902. A fully adult specimen of *Ophibolus rhombomaculatus*. *Proceedings of the Biological Society of Washington* 15: 36.
- Mitchell, J. C. 1989. An historical review of the Fairfax County, Virginia, bog turtle record. *Catesbeiana* 9: 3-7.
- Mitchell, J. C. 1994. The Reptiles of Virginia. Smithsonian Institution Press, Washington, DC. 352 pp.
- Mitchell, J. C. 2009. Richard L. Hoffman's contribution to herpetology. Pp. 45-54 *In* S. M. Roble & J. C. Mitchell (eds.), *A Lifetime of Contributions to Myriapodology and the Natural History of Virginia: A Festschrift in Honor of Richard L. Hoffman's 80th Birthday*. Virginia Museum of Natural History Special Publication 16, Martinsville, VA.
- Mitchell, J. C., & J. M. Anderson. 1994. Amphibians and Reptiles of Assateague and Chincoteague Islands. Special Publication No. 2, Virginia Museum of Natural History, Martinsville, VA. 128 pp.
- Mitchell, J. C., & C. A. Pague. 2011 (2013). Advertisement call and distribution of the treefrogs *Hyla chrysoscelis* and *Hyla versicolor* in Virginia. *Virginia Journal of Science* 62: 139-148.
- Mitchell, J. C., & K. K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. Special Publication Number 1, Virginia Department of Game and Inland Fisheries, Richmond, VA. 122 pp.
- Mitchell, J. C., & D. S. Smith. 2013. *Copeia* 1913, Number 1: origin and authors. *Copeia* 2013: 189-193.
- Moriarty, E. C., & C. S. Hobson. 2003. Geographic distribution: *Pseudacris nigrita nigrita*. *Herpetological Review* 34: 259-260.
- Netting, M. G. 1932. *Desmognathus fuscus ochrophaeus* in Virginia. *Copeia* 1932: 101.
- Netting, M. G., N. B. Green, & N. D. Richmond. 1946. The occurrence of Wehrle's salamander, *Plethodon wehrlei* Fowler and Dunn, in Virginia. *Proceedings of the Biological Society of Washington* 59: 157-160.
- Netting, M. G., & L. W. Wilson. 1940. Notes on amphibians from Rockingham County, Virginia. *Annals of the Carnegie Museum* 28: 1-8.
- Newman, W. B. 1954. A new plethodontid salamander from southwestern Virginia. *Herpetologica* 10: 9-14.
- Newman, W. B. 1955. *Desmognathus planiceps*, a new salamander from Virginia. *Journal of the Washington Academy of Science* 45: 83-86.
- Pope, C. H. 1950. A statistical and ecological study of

- the salamander *Plethodon yonahlossee*. Bulletin of the Chicago Academy of Sciences 9: 79-105.
- Pope, C. H., & J. A. Fowler. 1949. A new species of salamander (*Plethodon*) from southwestern Virginia. Natural History Miscellanea, Chicago Academy of Science 47: 1-4.
- Pope, C. H., & N. G. Hairston. 1947. The distribution of *Leurognathus*, a southern Appalachian genus of salamanders. Fieldiana: Zoology 31: 155-162.
- Pope, C. H., & S. H. Pope. 1949. Notes on growth and reproduction of the slimy salamander, *Plethodon glutinosus*. Fieldiana: Zoology 31: 251-261.
- Richmond, N. D. 1940. *Natrix rigida* Say in Virginia. Herpetologica 2: 21.
- Richmond, N. D. 1944. How *Natrix taxispilota* eats the channel catfish. Copeia 1944: 254.
- Richmond, N. D. 1945a. The habits of the rainbow snake in Virginia. Copeia 1945: 28-30.
- Richmond, N.D. 1945b. Nesting of the two-lined salamander on the Coastal Plain. Copeia 1945: 170.
- Richmond, N. D. 1945c. Nesting habits of the mud turtle. Copeia 1945: 217-219.
- Richmond, N. D. 1947. Life history of *Scaphiopus holbrookii holbrookii* (Harlen). Part I: larval development and behavior. Ecology 28: 53-67.
- Richmond, N. D. 1956. Autumn mating of the rough green snake. Herpetologica 12: 325.
- Richmond, N. D., & C. J. Goin. 1938. Notes on a collection of amphibians and reptiles from New Kent County, Virginia. Annals of the Carnegie Museum 27: 301-310.
- Roberts, J. K. 1942. Annotated Geological Bibliography of Virginia. Deitz Press, Richmond, VA. 726 pp.
- Roberts, J. K. 1950. History of the development of geology. Pp. 442-552 In James River Project Committee, Virginia Academy of Science (compilers), The James River Basin, Past, Present, and Future. Virginia Academy of Science, Richmond, VA.
- Roble, S. M., & J. C. Mitchell. 2012. Obituary: Richard Lawrence Hoffman (1927-2012). Banisteria 40: 5-14.
- Rose, R. K. 2013. The history of mammal studies in Virginia. Banisteria 41: 17-26.
- Schmidt, K. P. 1953. A Check List of North American Amphibians and Reptiles. American Society of Ichthyologists and Herpetologists, University of Chicago, IL. 280 pp.
- Schmidt, K. P. 1957. Emmett Reid Dunn, 1894-1956. Copeia 1957: 75-77.
- Smith, H. M. 1899. On the occurrence of *Amphiuma*, the so-called congo snake, in Virginia. Proceedings of the United States National Museum 21: 379-380.
- Smith, H. M. 1946. Handbook of Lizards, Lizards of the United States and of Canada. Cornell University Press, Ithaca, NY. 557 pp.
- Smith, J. 1612. A Map of Virginia, with a Description of the Countrey, the Commodities, People, Government, and Religion. Reprinted in P. L. Barbour (ed.), The Complete Works of Captain John Smith (1580-1631). University of North Carolina Press, Chapel Hill, NC. 1986.
- Tilley, S. G., R. L. Eriksen, & L. A. Katz. 2008. Systematics of dusky salamanders, *Desmognathus* (Caudata: Plethodontidae), in mountain and Piedmont regions of Virginia and North Carolina, USA. Zoological Journal of the Linnean Society 152: 115-130.
- Tobey, F. J. 1988. VHS celebrates its thirtieth anniversary. Catesbeiana 8: 21-26.
- Wake, D. B. 1972. Emmett Reid Dunn and the development of scientific studies in salamander biology. Pp. iii-x In E. R. Dunn, Salamanders of the Family Plethodontidae with introductions by David B. Wake and Arden H. Brame, Society for the Study of Amphibians and Reptiles, Athens, OH.
- Wood, J. T. 1951a. An ecological and biometric study investigation of the nesting of the four-toed salamander, *Hemidactylum scutatatum* (Schlegel) in Virginia. Master's Thesis, College of William and Mary, Williamsburg, VA. 47 pp.
- Wood, J. T. 1951b. Protective behavior and photic orientation in aquatic adult and larval two-lined salamanders, *Eurycea b. bislineata* x *cirrigera*. Virginia

Journal of Science 2: 113-121.

Wood, J. T. 1953a. Observations of the complements of the ova and nesting of the four-toed salamander in Virginia. *American Naturalist* 87: 77-86.

Wood, J. T. 1953b. The nesting of the two-lined salamander, *Eurycea bislineata*, on the Virginia Coastal Plain. *Natural History Miscellanea, Chicago Academy of Science* (122): 1-7.

Wood, J. T. 1954a. The distribution of the poisonous snakes in Virginia. *Virginia Journal of Science* 5: 152-167.

Wood, J. T. 1954b. A survey of 200 cases of snake-bite in Virginia. *American Journal of Tropical Medicine and Hygiene* 3: 936-943.

Wood, J. T. 1955. The nesting of the four-toed salamander, *Hemidactylum scutatum* (Schlegel), in Virginia. *American Midland Naturalist* 53: 381-389.

Wood, J. T., & O. K. Goodwin, 1955. Observations on the abundance, food, and feeding behavior of the newt

Notophthalmus viridescens viridescens (Rafinesque), in Virginia. *Journal of the Elisha Mitchell Scientific Society* 70: 27-30.

Wood, J. T., & R. H. de Rageot. 1955. The eggs of the slimy salamander in Isle of Wight County, Virginia. *Virginia Journal of Science* 6: 85-87.

Wood, J. T., & R. H. Wilkinson. 1952. Observations on the egg masses of spotted salamanders, *Ambystoma maculatum* (Shaw), in the Williamsburg area. *Virginia Journal of Science* 3: 68-70.

Wood, J. T., & R. H. Wilkinson. 1955. Size variations and sexual dimorphism in a brood of common garter snakes, *Thamnophis o. ordinatus* (L.). *Virginia Journal of Science* 3: 202-205.

Wright, A. H., & A. A. Wright. 1949. *Handbook of Frogs and Toads in the United States and Canada*. Cornell University Press, Ithaca, NY. 640 pp.

Wright, A. H., & A. A. Wright. 1957. *Handbook of Snakes in the United States and Canada*. 2 Vols., Cornell University Press, Ithaca, NY. 1105 pp.