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HISTORICAL PERSPECTIVES

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George Bernard Rabb

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***Editor's note*.—On 27 July 2017, George Rabb, zoologist and director of the Brookfield Zoo, passed away at the age of 87. He was one of the greatest champions of conservation, and we honor his legacy by reprinting this Historical Perspective that appeared in *Copeia* (103:1086–1092).**

FEW of us could ever have the breadth of influence that George Rabb has had in his lifetime association with herpetology, zoos, and conservation. He is a man of many talents, including being a gourmet cook and an expert at crossword puzzles. George Rabb (b. 2 January 1930) grew up largely in Charleston, South Carolina, with his two sisters. His family moved to Lumberton, North Carolina, at the beginning of World War II but moved back a year later to Charleston where he finished high school. His experiences in both of these places set him on the path –to become a premier zoo leader and champion of conservation.

George's interest in natural history began when he watched a line of carpenter ants around an oak tree in his grandparents' front yard in Lumberton. He placed objects in their path to see what they would do. He was five years old. George's first mentor was his ninth grade science teacher, Lena Petrie Bullard, who saw his potential and gave him the key to the school laboratory and showed him how to use the microscope. She also took her classes to study nearby natural environments, such as a field of Venus fly-traps. James E. Mosimann (b. 1930) and Thomas M. Uzzell (b. 1932) were boyhood friends in Charleston. George and Jim attended Charleston Museum's Natural History Society meetings where they met E. Burnham Chamberlain, curator of zoology at the Charleston Museum and after whom *Eurycea chamberlaini* (Chamberlain's Dwarf Salamander) is named. Chamberlain, widely recognized as the region's premier naturalist, took the boys on field trips around the South Carolina Lowcountry. They helped collect birds for a future book on the avifauna of South Carolina. George learned how to prepare bird skins and obtained his own .410 shotgun and permits to collect specimens. Chamberlain introduced them to the scientific literature and often handed George a journal to read. Jim and George also amassed a collection of live amphibians and reptiles during their weekend bicycle trips. Their range was 15 miles. George and Jim added high school student Tom Uzzell to the group in 1948; his aunt's Plymouth allowed for a greater geographic range for their collecting trips. A later addition was Julian R. Harrison, III (1934–2009). Julian obtained his Ph.D. at the University of Notre Dame and returned to the College of Charleston to teach.

George entered the College of Charleston in 1947 with a McIver Scholarship. His interest in birds during that time led him to become an editorial assistant with the *South Carolina Bird Life* project (Sprunt and Chamberlain, 1949). His job was to verify accuracy of all the citations. He was also Editor of the college newspaper. He spent the summer of 1948 as a Fellow in Biology at the Emory University Field Station in Newton, Georgia, under a scholarship arranged by local booksellers Edwin Peacock and John Zeigler. There he met John Crenshaw (1923–2004) who was studying *Sceloporus* lizards (Crenshaw, 1955). Together they collected amphibians and reptiles in the region for the museum (Crenshaw and Rabb, 1949). Between their junior and senior years, George and Jim Mosimann worked as archaeological crewmen for the Smithsonian Institution's Missouri River Basin Survey in a pre-impoundment assessment for the proposed Tiber Reservoir in Montana. Information on the 108 amphibians and 15 reptiles (11 species) they acquired on the side was summarized in a paper they published in *Copeia* (Mosimann and Rabb, 1952). They had already started to publish their observations in South Carolina in *Copeia* (Mosimann and Rabb, 1948).

After he graduated with an honors B.S., Harvard University and the University of Michigan offered him graduate scholarships. He chose Michigan because he thought Harvard Museum of Comparative Zoology was antiquated. George moved to the University of Michigan in 1950 to begin graduate studies and join Mosimann, who was already there. Mosimann was to become a biostatistician for the National Institutes of Health. After finishing his Ph.D. at Michigan, Uzzell taught at the University of Chicago, then joined the staff of the Academy of Natural Sciences of Philadelphia, and later moved to the Museum of Zoology at the University of Illinois before retiring to Philadelphia.

Charles F. Walker (1904–1979) was George's major professor for his Master's and Ph.D. degrees. He was Walker's first doctoral student at Michigan. Between December 1952 and May 1953, while still a graduate student, George became one of three scientists on the Van Voast-American Museum of Natural History Bahama Islands Expedition (Fig. 1). They lived aboard a 43 ft. schooner named *White Wing* for 20 weeks and accessed islands in a dinghy. They were charged with describing the physical and ecological features of the 36

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Fig. 1. George Rabb (far left) with colleagues on Great Inagua during the Bahamian Island expedition in 1952–1953. The white foam was blown in from the salt pond to the right. This is Figure 5 in Rabb and Hayden (1957). Image courtesy of Kraig Adler.

collecting localities and making collections of insects (45,927, 17 orders), amphibians (684, 2 genera), reptiles (2106, 12 genera), and mammals (67, 4 genera). The extensive trip report was written by Rabb and entomologist Ellis Hayden (1957). In his typical style of understatement, George managed to include this line in the report (p. 18): "Daytime collecting was done in the morning and latter half of the afternoon, as midday was often too hot for insects, reptiles, and collectors." Later, a line hints to traditional misadventures of field work (p. 25): "….except that on the latter cay our pursuit of the numerous little geckoes (*Sphaerodactylus*) under fallen palm fronds was quickly halted when we uncovered several wasp nests." or misadventures not so familiar to herpetologists (p. 26): "Later, while attempting to enter a shallow harbor near Hawks Nest Point, we went aground on a reef, but luckily a near-by construction crew pulled us off with their barge."

George married Mary Sughrue Rabb of Charleston, South Carolina on 10 June 1953, less than a month after he returned from the Bahamas. She worked as a librarian in the Entomology Division of the Museum of Zoology during the years they were at the University of Michigan. She had a bachelor's degree in biology from the College of Charleston, and later taught a course in Biology with Marvalee Wake at the University of Illinois in Chicago during 1958–1959. Mary coauthored several scientific papers with George.

His Ph.D. dissertation was on systematics and biogeography of lizards in the *Liocephalus carinatus* complex in the Bahaman Islands. Source specimens were those he had collected on the islands during the 1953 AMNH expedition. He was unable to include Cuba in his list of islands due the revolution led by Fidel Castro. A taxonomic paper on this species was published in 1957 (Rabb, 1957).

George's first job was Curator and Coordinator of Research at the Chicago Zoological Park (Brookfield Zoo) in Brookfield, Illinois. It was the first position of its kind in the country for a Ph.D. scientist since a short-lived position at the New York Zoological Park in the 1930s. His arrival on 1 November 1956 was over-shadowed by the arrival on the same day of the zoo's first forest giraffe or Okapi (*Okapia johnstoni*; Fig. 2). He later conducted studies on the behavior and mother–infant relationships of this species and was instrumental in establishing the Okapi Wildlife Preserve in the Ituri Forest in the Democratic Republic of Congo (Bodmer and Rabb, 1985).

Chris Wemmer (Associate Curator for Conservation, Smithsonian Institution, emeritus) offered this story:

> "George is always the thoughtful soft-spoken intellectual, though he did at times blow his top and let forth with a stentorian 'Damn it'. This happened once in Brookfield's hospital building where George had his office. He used it only after hours, but Mary used to tend to it during the day as it was close to the zoo's book store which she managed. (Mary was a librarian by training as I recall, and she knew the scientific literature. Students from U of Chicago and beyond used to come to the zoo just to buy books, that's how good it was. I recall she marked down the prices if you were a student). George's office was legendary among staff because it was totally cluttered and seemed to have standing room only. It was filled with stacks of books and reprints, films in large canisters, and unopened

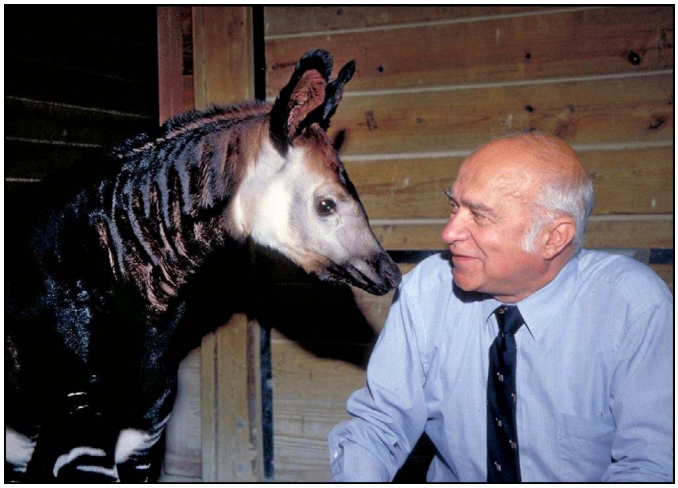

Fig. 2. George Rabb with an Okapi at the Brookfield Zoo. Photo by Jim Schultz.

envelopes containing reprints. Everyone knew the place was out of bounds because it looked like an ancient edifice on the verge of collapse. George was clearly a practitioner of the 'stack filing method,' and could probably find whatever he was looking for. If he couldn't, Mary would know. He also had tanks of his focal study animal *Pipa* there. One day a baboon that had been recovering in the hospital escaped. The keepers tried everything to get it back into its cage, but it was having no part of it. Its recovery had been complete, and it sprinted down the halls and ricocheted off the walls with amazing exuberance. Someone (probably Mary) had left George's office door open, and the baboon sought refuge among his stacks. Of course it went ballistic when they discovered it there and thoroughly trashed the place getting out. The chase went on, but the staff finally caught it. George's office was in a shambles, and everyone was horrified to think of the consequences. Mary was the first to see it and broke the bad news to George. The hospital staff was listening behind the scenes when George saw the wreckage. The only thing they heard was George's familiar expletive: 'DAMN IT, MARY!' "

Most of George's early research was on the ecology and taxonomy of salamanders in eastern North America and Mexico (Rabb, 1955a, 1956a). He, sometimes with his wife, published several papers on the behavior and reproduction of the Surinam Toad (*Pipa pipa*) based on observations at the zoo (e.g., Rabb and Snedigar, 1960; Rabb, 1961, 1969; Rabb and Rabb, 1961, 1963a, 1963b, 1965). His first taxonomic contribution was a description of the subspecies *Geoemyda* (now *Rhinoclemys*) *rubida perixantha* (Colima Wood Turtle) from western Mexico (Mosimann and Rabb, 1953). He described six species of amphibians, all from Mexico. His first salamander was *Parvimolge praecellens* (Admirable False Brook Salamander) from Veracruz (Rabb, 1955b). Wake and Elias (1983) placed the genus into the synonymy of *Pseudoeurycea*. He originally described *Chiropterotriton priscus* (Primeval Flat-footed Salamander) from Nuevo León (Rabb, 1958) as *Chiropterotriton prisca* (Rabb, 1956b). He described the subspecies *Chiropterotriton chrondostega cracens* (Graceful Flat-footed Salamander) from Tamaulipas (Rabb, 1958), but it was later elevated to full species by Darda (1994). In 1960, he described a salamander from Chiapas with huge nostrils as *Chiropterotriton megarhinus* (Long-nosed Bromeliad Salamander; Rabb, 1960a); it is now considered a species of *Dendrotriton* (Wake and Elias, 1983). The salamander George described as *Chiropterotriton magnipes* (Big-footed Salamander) from San Luis Potosí (Rabb, 1965) is considered critically endangered by the IUCN. He described an anuran with bulging lips as *Plectrohyla pycnochila* (Thick-lipped Spike-thumb Frog), reportedly from Veracruz (Rabb, 1959a). That frog remains legendary among herpetologists, as its type-locality appears to be in error and to this day no one has discovered its true location nor a wild population of this distinctive frog. He described the subspecies of Curly Tailed Lizard *Leiocephalus carinatus granti* (Grant's Northern Curly-tailed Lizard) from the Cayman Islands (Rabb, 1957). All of the taxa he described are still recognized. His research on amphibians and reptiles continued to the early 1990s, but his focus afterward was on conservation and education.

George worked closely with colleagues at the University of Chicago to help with their efforts to reinvigorate animal behavior study in the United States. Among others there, he fostered the development of herpetologist and ethologist Gordon Burghardt, mammalogist Devra Kleiman, and animal behaviorist Anne Clark. His own work in collaboration with Mary (Rabb and Rabb, 1961) on the reproductive behavior of *Pipa* stands as one of the first and best examples of the value of zoos in behavioral research. He assisted Alfred Emerson and Karl Schmidt, among others, in organizing the successful symposium on the 100th anniversary of the publication of *The Origin of Species* by Charles Darwin. The Darwin Centennial Celebration, as it came to be known, was held at the University of Chicago during 24–28 November 1959 and attracted 2500 registrants from 14 countries (Smocovitis, 1999).

Hyman Marx (1925–2007), then curator of herpetology at the Field Museum of Natural History (FMNH), became a close friend and confidant. They collaborated on several projects involving zoogeography, phylogenetics, and evolution of colubrid and viperid snakes (e.g., Marx and Rabb, 1965, 1970, 1972; Liem et al., 1971; Rabb and Marx, 1973; Marx et al., 1977, 1982). They, along with Karel Liem, named the subfamily Azemiopinae for Asian viperid *Azemiops*. Notes on other impacts of their collaborations are in Adler (2012). On George's first visit to the FMNH, Karl P. Schmidt (1890–1957) had to use a flashlight to find their way outside when all the lights went out to save costs. His interest in venomous snakes, particularly *Eristocophis*, was stimulated by Schmidt. George said the death of his friend Karl from the bite of a small boomslang (*Dispholidus typus*) was a tragic loss.

George remained with Brookfield Zoo his entire career. From the research curator position, he became the Associate Director of Research and Education (1964–1975), Deputy Director (1969–1975), and Director of the Park and President of the Chicago Zoological Society from 1976 to 2003 when he retired. He has been a world leader in the evolution of zoos and aquariums to change from displays of exotic animals solely for public recreation to conservation centers that educated visitors about nature and biodiversity. He introduced new ideas on how to exhibit animals in ways to ensure their welfare and educate park visitors. His many contributions stem from his broad vision to change zoos from living menageries to holistic conservation centers that use immersion exhibits and outreach to stimulate visitors of all ages to care about nature (Rabb, 2004). George established the Hamill Family Play Zoo in 2001 to inspire caring attitudes in children. It is one of the zoo's contributions to the field of conservation psychology. His vision included combining conservation with broad-based biological research in zoos, something never heard of when he started in the mid-1950s. He remains a director of the Australian Landscape Trust. He is deeply involved in a program called the Center for Humans and Nature in association with the IUCN Biosphere Ethics Initiative and continues to serve on its Board of Directors. In the 1970s, he was instrumental in developing Tropic World at the zoo, one of the first in the world to show multiple species living compatibly in realistic natural habitats (Ross, 1997). He directed his staff to study animal nutrition and genetic problems of small populations typical of zoo collections (Mullen, 2001; Lacy et al., 2013). He encouraged them to study the behavior of animals such as dolphins and baboons. He himself studied the behavior of tree shrews (Rabb, 1959b; Rabb et al., 1966), the okapi (Rabb, 1978; Bodmer and Rabb, 1985, 1992), wolves (Rabb et al., 1967), and the puma (Rabb, 1959c). He also continued his work on snakes (Rabb, 1960b; Lombard et al., 1986). He often sought to educate the public about conservation problems by promoting the role of zoos in conservation actions through lectures and numerous publications ("e.g., Rabb, 1994, 1995, 1996; Rabb and Saunders,

Fig. 3. George Rabb and Margaret Stewart at her symposium reception at the 1997 joint meetings in Seattle, Washington. Photo by Kiisa Nishekawa.

2005). Many written for the public appeared in *Bandarlog*, the zoo's magazine (e.g., Rabb, 1969, 1972).

George became a life member of ASIH about 1950. Thanks to Robert Inger's tutelage, he was Herpetological Editor of *Copeia* from 1964 to 1969, President of ASIH in 1978, and participated in writing two issues of *Dopeia* in 1956 and 1957. While officiating as President at the Tempe, Arizona, meeting in 1978, the sound system failed so he had to orate loudly during the business meeting. This was a challenge for the soft-spoken and shy George Rabb (Fig. 3). The ASIH meeting in New Orleans in 1970 was notable for the reception around the empty swimming pool that served as the repository of all the exoskeletons of the crawfish they ate. He said that his association with ASIH helped to establish him as a professional scientist.

George served professional societies and organizations in various ways. In addition to being an active member of numerous societies and organizations, he served several of them in leadership roles. They include Fellow of the American Association for the Advancement of Science, Professional Fellow and Board Director of the American Zoo and Aquarium Association (1978–1980), and Council Member for the Society for Conservation Biology (1986–1987). He was the chair of the American Zoo and Aquarium Association (AZA) Policy Advisory Group 1974–1989 and chairman of that organization from 1989 to 1992. He served as Vice President of Flora & Fauna International (1998). He has been a member of the Illinois State Museum Board of Directors since 1994 and served as Chairman 1999–2008. George was President of the Chicago Wilderness Magazine from 1998 until 2008. He served as member of the Board for Defenders of Wildlife from 2002 until 2011.

Reality of the global amphibian crisis became apparent in hallway and pub conversations at the First World Congress of Herpetology in Canterbury, England, in 1989. George, along with David Wake, connected the dots between the anecdotal field observations that were circulating around the Congress (Rabb, 1990). Upon return, George rallied key herpetologists and funding to call together emergency meetings to explore the possible reasons for amphibian declines. He started the multi-agency, cross disciplinary working group called the IUCN/SSC Declining Amphibian Population Task Force (DAPTF) and in 1990 persuaded David Wake to become the first chair (Heyer and Murphy, 2005). The USGS Amphibian Research and Monitoring Initiative (ARMI) also came out of these early organizational efforts that were quietly (and with his typical disregard for personal credit) masterminded by George's leadership and influence. By the early 2000s, after many acrimonious exchanges at conferences and in the literature, the reality of the terrifying effects of a previously unknown pathogenic fungus and the cumulative effects of an abused natural world on amphibians were undeniable. An enormous amount of work, mostly by graduate students scattered across various labs and agencies led to these conclusions. The influence of the DAPTF Seed Grants—and George's uncredited generous habit of funding worthwhile work directly out of his own pocket—made a huge difference. NSF was unlikely to fund a major project to investigate a phenomenon that some herpetologists claimed was not real.

Jim Murphy (former curator of herpetology at the Fort Worth Zoo) offered this insight into the problems DAPTF faced with funding:

> "We were bewildered as to the difficulty in finding stable funding. It seemed like we always lived from hand to mouth. What was unexpected was the lack of interest in the early days from some biologists and later from the corporate community. I asked my dad, who had been president of the Board of Underwriters in Chicago, to become involved in amphibians by convincing many colleagues to help financially. I said that insurance companies should certainly become involved since it would likely impact actuarial tables in the future, but that approach was ignored. My dad, George, and I were blown away by the collective indifference. George and I wanted to expand the DAPTF board to include people to advise us about putting together a more businesslike group besides amphibian biologists, but that really didn't happen. One of our anonymous donors regularly chided us about our lack of skill in tapping the broader business possibilities without a comprehensive business plan."

Soon to follow were other influential working groups, such as the RANA network in Latin America and the annual Amphibian Disease Meeting at Arizona State University. George supported these as well, directly and indirectly. George continues to this day to be an indefatigable champion for amphibians. As DAPTF merged into the IUCN Amphibian Specialist Group and as the Amphibian Survival Alliance and Amphibian Ark developed to address key issues in amphibian conservation, he continues to support and offer his leadership to all of these efforts. He attends most every meeting on the issue and, as we have seen at virtually every one of these meetings, he remains dead silent through most of proceedings. When asked for his opinion, his response always begins with a humble laugh and "Oh, I don't know…" and he then proceeds to perfectly summarize an entire day's discussion in three sentences and, with a final sentence, he frames out where the conversation needs to be steered next. In the final moments of a multi-day meeting, he will do the same for the entire event and often will grab a key, young energetic stakeholder on the way out the door and put a bug in their ear to suggest an important topic that should be followed up or expanded upon. His leadership, commitment, and vision truly led the charge in the 1990s and 2000s to understand and confront the reality of global amphibian extinctions. Without George, it is difficult to believe we would know as much as we do now.

George confessed in 2005 that he was disappointed in how long it has taken amphibian conservation to develop. His concerns about conservation are much broader than this one taxonomic group, however.

George's worldwide influence includes a network of zoos, leadership roles in global conservation organizations, and stimulating conservation research on several continents. George has been very active and influential within the International Union for the Conservation of Nature (IUCN), including serving as Chair of its Species Survival Commission (SSC) from 1989 to 1996. In honor of George, in 2012, the IUCN began bestowing the newly created George Rabb Award to Conservation Innovation. While Chairman of the SSC, he had the World Zoo Conservation Strategy published by the Chicago Zoological Society in 1993. This document is a statement on the role of zoos and aquaria in the world of conservation and forms a set of standards against which zoos can be judged on their success in conservation of biodiversity and public education (Wheater, 1995). It has been translated into four languages. George continued his service to the SSC as Vice-Chair of Communications from 1997 to 2001. He described this program in depth in Rabb and Sullivan (1995). He participated in the IUCN Amphibian Conservation Summit conference in Washington, D.C., in 2005 that produced the Amphibian Conservation Action Plan (Gascon et al., 2007). In recognition of his service, the IUCN established The George B. Rabb IUCN-SSC Internship in 1996 to support graduate student research. In the 1970s, George organized the first session of the American Zoo and Aquarium Association on research in zoos. From that meeting arose the International Species Information System, whose board he chaired from 1974 to 1992.

George Rabb was involved with Newt Gingrich and others in saving the Endangered Species Act in 1994. Gingrich was a major figure in the behind-the-scenes plot; very few people knew about it at the time. Before he went to Congress, Gingrich's dream had been to become a zoo director and his love of animals continues to this day. He spent a day at Brookfield Zoo with George escorting him around, and George visited him in his Georgia office. The full story is described in Bean (1999).

George has a long list of honors and awards for his service to conservation of biodiversity and nature education. They include the D. Humane Letters, College of Charleston, 1995; Marlin Perkins Award, American Zoo and Aquarium Association, 1995; Heini Hediger Award, World Zoo Organization, 1996; Peter Scott Award, IUCN Species Survival Commission, 1996; Silver Medal of the Zoological Society of London, 1997; Society for Conservation Biology Service Award, 1998; Conservation Medal of the Zoological Society of San Diego, 1999; Honorary Member, World Conservation Union–IUCN, 2000; Field Museum Award of Merit, 2002; Chicago Audubon Society Protector of the Environment Award, 2002; Friends of Ryerson Woods Award, 2003; Lifetime Professional Achievement Award, Illinois Association of Museums, 2003; Lifetime Achievement Award, National Council for Science and the Environment, 2008; IUCN award for distinguished service in conservation, 2012; and the Defenders of Wildlife Legacy Award, 2012. The Board of Trustees of the Chicago Zoological Society created the Conservation Leadership Award in 2005 to honor the lifelong legacy of animal welfare and the worldwide conservation leadership of George Rabb. These awards have been given to conservation biologists and educators. For example, Richard Louv, author of the national bestselling book *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, received the award in 2009. Another recipient of the award has been ichthyologist Carl Safina, author of *Beyond Words* and other books.

Fig. 4. George Rabb, with *Ecnomiohyla rabborum,* named in honor of George and Mary Rabb in 2008. Photographed by George's niece, Lara Long, at the Atlanta Botanical Garden in 2011.

Two species have been named after him. Lynch and Wake (1975) described *Dendrotriton rabbi* (Guatemalan Bromeliad Salamander) from western Guatemala. Mendelson et al. (2008) described *Ecnomiohyla rabborum* (Rabbs' Fringe-limbed Treefrog), a spectacular arboreal gliding species from cloud forests of El Valle de Antón in Panama for George and Mary. George is holding the last known living individual at the Atlanta Botanical Garden in a photograph taken in 2011 (Fig. 4). The IUCN lists *E. rabborum* as endangered, but it is now considered extinct (Mendelson, 2011).

Kraig Adler said, "Part of George's gift is that he is incredibly bright. My wife Dolores is an inveterate fan of the *New York Times* Crossword Puzzles which are among the most challenging ever produced. There is a weekday version and then the really tough ones that appear in the Sunday Magazine Section. George likes them too, but he just whizzes through them like a hot knife in butter. Without any reference sources or other help he just sits down when he has a few (rare) quiet moments and marks the words down like he's writing an essay." He also has a sense of humor. He wrote the verse for an unpublished leaflet in 1955. "The Permian Story" is a spoof of Alfred S. Romer's presentation "Red Beds, Fossils, and Vertebrate Evolution" given at the first Ermine Cowles Case Memorial Lecture on 2 November 1955 in Ann Arbor, Michigan. One of the six poems illustrates his talent.

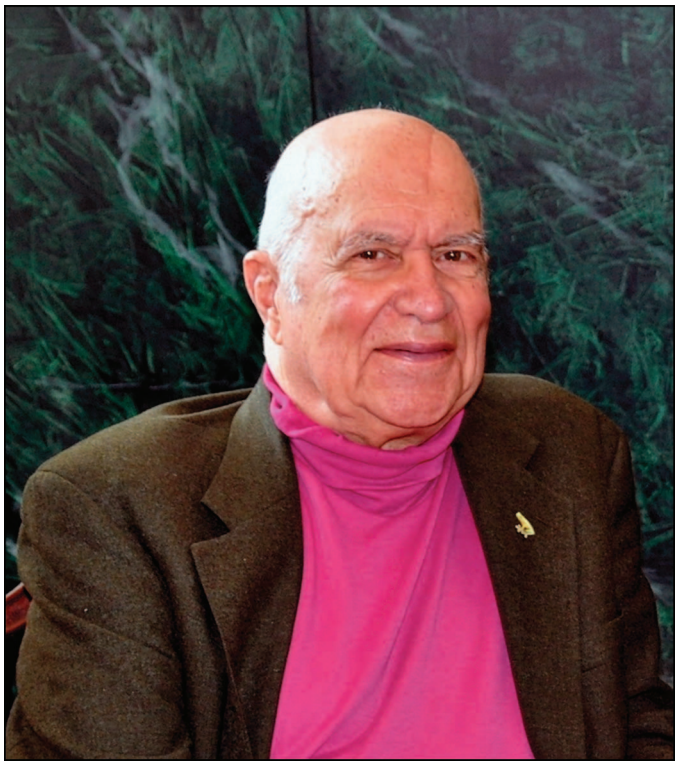

Fig. 5. George Rabb on 28 September 2010 in Chicago, Illinois. Used with permission from the Zoo & Aquarium Video Archive (www.zoovideoarchive.org).

The Doublecrossop
Sneaky Coelacanth, Return to the deep!
Join in Eusthenopterpon's sleep!
To Romer's usual lobe-fin lecture
You've given a case of apoplecture.
And how can you be so smug a stoic
Just for outliving the Mesozoic?
For you retreated when it got rough,
Leaving Osteolepis in drying duff.
A cowardly trick, foul Latimeria
You deserve a turn in fishes' Siberia.
Craven subject of frantic dissection
Amid whispers of Gallic inflection
To reappear why were you behooved
After Romer had already proved
It is better to be a brainy Rhipidistian
Than a common zany Actinistian?

His humorous bent was later reflected in zoo education work such as "The Unicorn Experiment" (Rabb, 1970). George Rabb (Fig. 5) radiates leadership in everything he does. He became a silverback of zoo leaders despite his shyness and quiet, soft-spoken demeanor. He is well-respected globally for his ability to command the big issues in conservation. Of all his many accomplishments, he is most proud of his participation in amphibian conservation and the transformation of zoos and aquaria into conservation institutions.

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