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Scott Lyell Gardner

University of Nebraska - Lincoln, slg@unl.edu

Robert M. Timm

University of Kansas, btimm@ku.edu

Nancy Olds

Educational Testing Service

Hugh H. Genoways

University of Nebraska - Lincoln, h.h.genoways@gmail.com

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Obituary: Sydney Anderson (1927–2018)

On August 12, 2018, the American Society of Mammalogists (ASM) lost one of its giants of the latter half of the 20th century when Sydney Anderson quietly passed away at his home in Birmingham, Alabama, at the age of 91. “Syd,” to his many friends and colleagues, was born on January 11, 1927 in Topeka, Kansas, to Robert Grant and Evelyn Fern (Hunt) Anderson (Figure 1). He married Ratia “Justine” Klusmire on August 5, 1951 in Holton, Kansas, where Justine was raised. Three children were born to this marriage—Evelyn Lee Anderson Wheelhouse, who preceded Syd in death; Charles Sydney Anderson; and Laura Lynnette Anderson Dooley.

Syd began his post-secondary education with three years (1946–1949) at Baker University in Baldwin, Kansas, before matriculating at the University of Kansas (KU) to receive his B.A. in Zoology in 1950. He then completed his M.A. in 1952 and his Ph.D. in 1959 at KU under the direction of Professor E. Raymond Hall. Both his Master’s thesis (Anderson 1952; citations appearing with a year date are from the Literature Cited) and dissertation dealt with the montane vole, with the title of his dissertation being “Evolution in the montane vole, *Microtus montanus*” (see Anderson 1959).

Syd began his professional career at KU, where for four years (1955–1959) he served as Assistant Curator in charge of mammals in the Museum of Natural History, and Instructor in the Department of Zoology while he was undertaking his Ph.D. degree work. In 1960, he took the position (1960–1964) of Assistant Curator of Mammals at the American Museum of Natural History and progressed through the ranks to Associate Curator (1964–1969) and Curator (1969–1992). He served as chair of the department from 1974–1981, in which position he led a staff of long-serving mammalogical colleagues, including curators Richard Van Gelder, Karl Koopman, Guy Musser, Hobart Van Deusen, and curatorial assistant, Marie Lawrence. Upon his retirement, he became an emeritus curator, a title he held until his passing. Syd also served as an Adjunct Professor at the City University of New York, from 1969 to 1991, and at New York University in 1973.

The breadth of Syd’s professional scientific interests can be judged both by his publication record and by the societies that he joined as a life member in addition to the ASM—American Institute of Biological Sciences, American Ornithological Association, and the Southwestern Association of Naturalists (Charter Patron)—as well as the other societies in which he held memberships—AAAS (Fellow, 1963), American Ornithologists Union, American Society of Ichthyologists and Herpetologists, Ecological Society of America, Society of Systematic Zoology,

Wildlife Society, Sigma Xi, and Phi Sigma Biological Society.

In 1997 (Anderson 1997, part 1, page 2, this is an unpublished manuscript called “Here and There: A Troika”), Syd recorded his earliest memories of collecting animals, as he wrote: “My first collecting trip took me to our back yard in Topeka, Kansas. I found a dead monarch butterfly under the grape arbor. I was then 5 years old. Somewhere along the line, I had learned that butterflies could be saved by sticking pins through them and drying them. I got a wooden cigar box—those were the olden-times when they had such things—and put the butterfly in it. Thus began my career as a collector.”

As stated by Syd’s former colleague Ross MacPhee (in death notice): “Throughout his career he was attracted to fieldwork, and he and his wife Justine would spend many months collecting specimens, and ‘living hard’ as he put it, in places as completely different as central Colorado and highland Bolivia.” He got early guidance as a naturalist and curator as a high school student, when he made a significant insect collection that he maintained as an undergraduate and graduate student at KU. Perhaps his first mentor in biology and fieldwork was a well-respected herpetologist and mammalogist, Dr. George Rinker, the local dentist in Hamilton, Kansas, where Syd’s family lived. Syd’s younger brother Ben accompanied him on his early trapping adventures. While an undergraduate at Baker University, Syd’s biology professor encouraged his field efforts with mammals, discussing interesting specimens and localities where particular species (for example, southern flying squirrels) could be taken. In his first fall as a new student at KU, Syd conducted fieldwork locally, accompanying Dr. Rollin H. Baker, then curator of mammals at the Natural History Museum. Over KU’s Thanksgiving break, Baker, who was then working on pocket gophers, took Syd and five other students to the Norman, Oklahoma, area to collect specimens. Syd’s field notes from these early trips are quite detailed, and his interest in insects is evident. In the summer of 1950, Syd was able to join a seven-week field course led by Baker to the area around Cody, Wyoming. He wrote, “I am going as cook and as such receive no credit, but am paid. I am able to help also in collecting and preparing specimens.” Later that summer Syd and his brother Ben collected in southwestern Missouri staying with their uncle and aunt, and then to the Great Smoky Mountain National Park. He collected briefly in Ontario, then again in the Hamilton, Kansas, area later that fall. In 1951, he collected near the family home at Hamilton, at several sites in southwestern Kansas, and in Oklahoma, New Mexico, Colorado, and Wyoming.



Figure 1.—Sydney Anderson (1927–2018). Photograph taken October 1974. Courtesy of Alfred L. Gardner, Archivist for American Society of Mammalogists, and Tad Bennicoff, Smithsonian Institution Archives (Smithsonian Institution Archives. Record Unit 7357, Box 162, Folder 1).

Syd's research productivity spanned almost 50 years, with publications from 1954 (1, numbers appearing in parentheses without a year are from Syd's accompanying bibliography) on subspeciation in *Microtus montanus* through 2001 (146) concerning fenestrated crania in *Ctenomys*, with topics ranging from pure morphology to deep and original questions in zoogeography, speciation, distribution, and faunal evolution. Throughout his long career at the AMNH, Syd's research was based on specimens and his work depended on high-quality data associated

with each animal. Justine, Syd's wife and confidante, assisted him in collating and recording these data into his specimen ledgers for later use in his publications (Figure 2). We recall one such interaction that went something like this. From the specimen of an individual rat or bat at the Colección Boliviana de Fauna at the Bolivian National Museum in La Paz: "He would read some number and Justine would repeat the number and question whether it was correct, and he would check it and say yes, it is correct, or ask in his particular Syd voice, 'what?', and



Figure 2.—Sydney and Justine Anderson take a brief break in field camp near Estancia Cachuela Esperanza (16°47'S; 63°14'W), Departamento de Santa Cruz, Bolivia, in 1984. From the T. L. Yates slide archive, courtesy of Scott L. Gardner.

Justine would simply repeat her question, and Syd would say, 'that is what I said,' and they would move on to the next number in the series on the tag."

The twin pinnacles of Syd's research career were the publication of the results of two major mammalian biodiversity surveys. These studies resulted first in the "Mammals of Chihuahua: Taxonomy and distribution" that was published fairly early in his research career (68). Twenty-five years later, and closer to the end of his career in research, he published the monumental contribution "Mammals of Bolivia: Taxonomy and distribution" (143; Figure 3).

The "Mammals of Chihuahua" is among the most important mammalian biodiversity surveys completed in northern México. Syd's first fieldwork in México occurred in the summer of 1952 as a student of the KU summer field course led by mammalogists Rollin Baker and James Findley and ornithologist Harrison B. Tordoff. They collected in a number of localities in Aguascalientes, Coahuila, Durango, Hidalgo, México, Nuevo León, Puebla, Querétaro, San Luis Potosí, and Zacatecas. Later that summer he collected in Colorado and in the fall, in various localities in Kansas. Syd led the KU seven-week

summer field courses from 1956 through 1960 collecting primarily in Chihuahua. During these trips, students were exposed to rigorous conditions; they camped out, cooked their own meals, and each had a specific research project on which to focus. He and his students collected 3,790 mammals from Chihuahua that are deposited at KU. These well-prepared specimens and the excellent field notes, including photographs of habitats, became the partial basis for the Mammals of Chihuahua and several other publications (22, 27, 50, 60, 65, 68).

The research in Chihuahua had grant support from the University of Kansas, American Museum of Natural History, and the National Science Foundation. He recalled: "I have also collected in various parts of the other states adjoining Chihuahua, namely Texas, New Mexico, Sinaloa, and Sonora, and also in Arizona. I spent about seven months in fieldwork in Chihuahua. More than 6,400 specimens from Chihuahua have been studied, and I personally prepared more than 1,000 of these" (68, page 154). He goes on to outline some theoretical and practical advantages of faunal studies. These advantages hold as true today as they did when Syd was conducting his expeditionary field-research in México: "The chief theoretical



Figure 3. —Sydney Anderson and Joseph A. Cook, University of New Mexico, beginning to prepare a capybara (*Hydrochoerus hydrochaeris*) at the Estación Biológica del Beni, (14°49'S; 66°21'W), Departamento de Beni, Bolivia, in 1985. Courtesy of Scott L. Gardner.

advantages of faunal studies are: (1) their usefulness in generalizing and relating varied taxonomic, ecological, and evolutionary observations and conclusions; (2) their value as summaries to workers in the same and in other fields; and (3) their value in directing attention to other new and interesting problems" (68, p. 197).

Syd's introduction to South American mammals came in the years 1962 and 1963 when field parties from the AMNH worked in Uruguay collecting mammals and their ectoparasites. The focus of this research was on infectious and zoonotic diseases with mammals as reservoirs of these disease-causing organisms, with funding from the United States Army Medical Research and Development Command, Office of the Surgeon General. Traveling to Uruguay, Syd worked there for the final two months to close out the collecting expedition that had been running through the dry season and had been headed successively by Richard Van Gelder (first two months) and Karl Koopman (second two months). Syd was an author on two papers resulting from this work in Uruguay, one on body proportions of myomorph rodents (81) and a collaborative work with Alfredo Langguth: A manual for identification of mammals of Uruguay (91).

With a hemorrhagic fever outbreak beginning in 1963 in the Beni department of northeastern Bolivia, the AMNH mammalogists turned north—with continued support from the U.S. Army Medical Research and Development Command, Office of the Surgeon General and the National Geographic Society—to focus their fieldwork in Bolivia in the

course of the dry seasons of 1964 and 1965. Koopman, Van Gelder, and Syd mounted expeditions traveling through lowland tropical Bolivia and down the Río Beni past the cachuelas (rapids), 30 km from the Beni's confluence with the Mamoré (ca. 10°32'S 65°35'W). During one part of the expedition, the water in the Río Madre de Dios dropped so low that the boat they were using was stranded. Syd simply took the opportunity to collect and prepare more mammals from that area, including the best series that exists of the river dolphin, *Inia geoffrensis*, from Bolivia.

The real impetus that accelerated Syd's work in Bolivia and continued for more than 17 years, from 1980 until the publication of the Mammals of Bolivia in 1997, was the collaboration between Syd and Terry L. Yates who was, at the time, Curator of the Division of Mammals, Museum of Southwestern Biology, of the University of New Mexico. At the time of his initial collaboration with Yates, Syd stated that Bolivia was about as well known, in terms of mammal diversity, as western North America around 1900. Syd, Justine, collaborators, and students traveled to Bolivia many times to collect mammals until the scale of the collecting trips ramped up starting in 1983 when Syd and Terry wrote the first of several collaborative National Science Foundation (NSF) grant proposals to conduct field-surveys of mammals of Bolivia. Funding was awarded in 1984 and the first Anderson/Yates NSF funded field expedition occurred during the dry season in Bolivia. The following is a quote from the Troika (Anderson 1997, part 1, page 33) that aptly captures the mode and action of fieldwork in Bolivia that Syd lived from around 1960 until the end of his research career. "In 1926, Francisco Steinbach trapped a rat near Comarapa, Bolivia. The specimen he prepared went to the British Museum (Natural History) in London where I studied it in 1988. In 1955, Oliver Pearson trapped another rat near Comarapa. The specimen was in the Museum of Vertebrate Zoology at Berkeley, California, where I studied it in 1984. Both specimens had the peculiar dentition of the genus *Abrocoma*, with relatively simple upper teeth and complex lower teeth. Pearson told me that Bill Glanz who had been a student at Berkeley thought the rat there might be of some undescribed and unnamed species. I got in touch with Bill, by then a professor at the University of Maine. I borrowed both specimens so I could compare them with each other and with other specimens in our collections in New York. The two problematical specimens both seemed to be of the same species so Bill and I wrote a paper together and named the rat *Abrocoma boliviensis*. Before we published this paper, several field parties had visited the area near Comarapa, including the cloud forest of Siberia. These biologists included Greg Schmitt, Flavio Hinojosa, and the Doñana group. Three different times our group collected there. No one caught another specimen of the new rat. This could be regarded as failure. However, on these expeditions the first specimens of two other new species of rodents were obtained, *Oxymycterus hucucha* and *Akodon siberiae*. Sometimes you lose, sometimes you win, and sometimes you do both."

The final push to finish the Mammals of Bolivia was massively assisted by collaborative grants written based on research published from data collected in the preceding years. In 1991, Syd, Yates, Joseph A. Cook, and Scott L. Gardner (SLG) were able to secure simultaneous collaborative NSF/USAID/NATO grants to finish a survey of mammals and their parasites in Bolivia. A concerted effort was made to collect through elevational transects in the Yungas, the eastern-range of the Andes. Because of this effort in the Yungas and valley regions, several new species of mammals were

discovered there, including three species of *Ctenomys* (one eventually named in Syd's honor; Gardner et al. 2014) and a new species of cricetid rodent collected in the southern Yungas at a locality called Tapeuca that Syd and Yates named *Tapecomys primus* (144). From this work in Bolivia, thousands of specimens of mammals were collected and distributed to museums in Santa Cruz de la Sierra (Museo Noel Kempff Mercado), La Paz (Colección Boliviana de Fauna), New York (AMNH), and New Mexico (MSB). The last few years of research work by Syd focused primarily on the mammals of Bolivia, producing at least 24 papers from 1982 through 2001 (96, 99, 101, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 129, 131, 135, 136, 137, 141, 142, 144, 146) on the Bolivian mammal fauna in addition to the monograph—*Mammals of Bolivia* (143). As work was progressing to identify the species of mammals collected during this work in Bolivia, Syd and SLG discovered that ctenomyids have a high prevalence of holes in their heads (incomplete closure among the anterior two frontal and posterior two parietal bones) that seemed to be related to habitat altitude. We recall one time at the Tapeuca locality, with low clouds rolling by and adult condors wheeling above the camp, when Syd called out across the camp: "Hey CO, look at the head of this tuco!" Indeed, this tuco had a hole in the head that was visible when the animal had its skin removed. This work resulted in Syd's last publication co-authored with Gardner (146).

Syd's *Mammals of Bolivia* stands with Husson's *Mammals of Suriname* (Husson 1978) as the most comprehensive mammalian biodiversity summaries for any country in South America, with the proviso that Bolivia, at 1,098,581 km² is almost seven times larger than Suriname's 163,820 km², with far greater topographic complexity, ecological variety, and faunal diversity. In *Mammals of Bolivia*, Syd provided the foundation for subsequent research on mammals in Bolivia and in fact for the central part of the Neotropical region. In this work, he provided complete information (distribution, behavior, known ecology, including parasites) on all species of mammals known from Bolivia at the time. Syd's inscription in our personal (SLG) copy of *Mammals of Bolivia* says: "Scott, well this is a start, now if someone would just work on all these parasites, that would be nice, Sydney Anderson, 1999." In the last paragraph of *Mammals of Bolivia*, Syd wrote: "The present summary of the mammalian fauna and the distribution of its species provides a basic, but general, picture of an incredibly diverse fauna and may help in future planning for its conservation" (143, page 80).

It may seem incongruous, but between expeditionary fieldwork in Chihuahua and Bolivia, Syd led trips to St. Catherine's Island, Georgia, in the late 1970s, getting to know the habits and movements of raccoons, *Procyon lotor*. The research involved monitoring, tracking, and learning about numerical density, population trends, and ranges of raccoons. From this work he produced papers on such subjects as learning in raccoons (87), the Mammalian Species account for *Procyon lotor* (88), radio-tagged raccoons on the island (90), raccoons and sea turtles (it was found that the raccoons do not change their habits to forage for sea turtle eggs, 92, 97), and finally that female raccoons on the St. Catherine's Island reduced their home ranges by 32–51% in the summer that they were studied (97).

Between the twin pinnacles of his research, Syd published several important papers on the assembly and evolution of regional and continental faunas, elucidating patterns embedded in the large-scale faunal studies (71, 73). The patterns discovered embedded in the data could only have been

discovered by analysis of large-scale faunal studies. Further, he produced a series of papers in which he explored faunal evolution at several scales. In the 1975 paper on Monte Carlo models, he and his coauthor (son Charles Sydney Anderson) demonstrated that a simple random or stochastic model that is in dynamic equilibrium fits certain aspects of the observed diversity of North American mammals. They concluded that random events may play a large role in generating observed faunal patterns and, in the clarity of writing that was typical of Syd, they stated: "A group may become abundant by luck as well as adaptive superiority. Organisms gamble for survival as well as struggle for survival" (73, page 6).

Syd continued to expand his working data set on the diversity of mammals and he began including data on other vertebrates. By using data derived from common sense estimates (by polling his colleagues), he showed that experts in ornithology and mammalogy consistently underestimate geographic area sizes for species of these vertebrates. He was a deep thinker, always questioning "well-known problems" and he published his ideas on the contribution of randomness in the process of allopatric speciation in the journal *Systematic Zoology* in 1978 (85), and a paper on interspecific competition and species geographic ranges with his long-time colleague Karl Koopman (93). Working in collaboration with Koopman, Syd (93) tested the hypothesis that competition limits geographic range size of species using data from bats and rodents. This represented a significant contribution to the discussion of the geographic size of ranges of species. Their conclusion was: "We use American bats and North American rodents as groups to discriminate between the two hypotheses and see that available space is a better predictor of distribution than is diversity. Thus, the competition hypothesis is weakened and the available space hypothesis is strengthened" (93, page 1). Much of the current state-of-the-art research on modelling species distributions supports this conclusion.

He continued exploring species' geographic ranges and expanded his regional and continental focus to include not only mammals and birds (104), but fishes, amphibians, and reptiles (105), which then led to the development and publication of a theory of range-size distribution (112). In that paper, he found that "the main ecological implication here is that in many complex situations...the best certain predictor of certain major patterns seems to be luck" (112, page 18). In 1965 (43), Syd published a paper in *Systematic Zoology* where he outlined the sources of errors that may be found in data on geographic collection localities. In discussing this, Syd's conclusion was that: "...everyone makes mistakes and it is wise to know how they make them and how great the mistakes are liable to be, so that one can decide whether the mistakes are important in any given case" (43, page 346).

While Syd was at KU, he assisted his advisor, E. Raymond Hall, and his mentor, Keith R. Kelson, in their preparation of the 1959 compendium *The Mammals of North America* (Hall and Kelson 1959). That two-volume set and Hall's subsequent revision and update in 1981 (Hall 1981) established a solid baseline for systematic work on the mammals north of the Panama–Colombia border. Syd saw that a similar-type work on South American mammals was sorely needed and would be a most valuable contribution. South American specimens were deposited in many countries across at least three continents—North America, South America, and Europe—and the literature was widely scattered and in several different languages. Syd enlisted Alfred L. Gardner and James L. Patton to collaborate on this undertaking to produce a

comprehensive mammals of South America. The project was originally conceived in 1977 and got underway in 1980 (Gardner 2007). The goal was to produce “an updated reference to the mammals of South America, one that would provide a thorough review of knowledge about mammals dating from the mid-1700s through today ... to document the rich nomenclatural history for all taxa ... describe morphological and other traits that aid in identification ... delimit species’ distributions ... and summarize available observations on natural history” (Patton et al. 2015, page xvii). The project was designed to have experts work up the various orders, families, and genera and the three would serve as editors. The first of these volumes appeared in 2008 (Gardner 2007); the second appeared in 2015 (Patton et al. 2015). Syd is not an author on any included sections, but according to Alfred Gardner: “Syd and Justine were working on Volume 3 until health issues stopped the work.” However, Syd’s efforts in the original conception and organization, the specimens he collected, his published works, his training of students—some of whom are authors on included sections, and the outstanding quality of the first two volumes are a lasting testament to his making the study and knowledge of the South American mammalian fauna more accessible and putting it on a stronger footing for future students and researchers.

Throughout his career, Syd was enthusiastic not only about his own research but that of others. In the opening paragraph to his *Mammals of Bolivia*, he wrote, “This work is dedicated to the hypothesis-testers of this world. Everything concluded here is subject to further testing” (143, page 3). In reference to this statement, Carleton et al. (2009) commented, “his laconic drawl, tinged with his gently prodding humor and punctuated by a trailing chortle, permeates this passage in our mind’s ear.” Their following description of a species of a climbing mouse new to science included the honorarium, “in the spirit of testing one of his conclusions, we are pleased to name this handsome Bolivian endemic of *Oecomys* in his honor” (Carleton et al. 2009, page 21).

As a curator, Syd oversaw and contributed to significant growth in the mammal collections both at the KU Museum of Natural History and at the American Museum of Natural History. His tenure at both institutions was perhaps best characterized by Carleton et al. (2009, pages 19, 21) as “All the while, he made these collections available to any serious scientist who needed to examine Bolivian specimens and was especially kind in allowing us unrestricted access to oryzomyine rodents, the results of which found their way into our own publications. Such selflessness and sterling ethics are typical of Syd.” During his years as an undergraduate and graduate student at KU, he personally collected nearly 3,100 specimens of mammals that are deposited there, as well as birds, reptiles, and amphibians.

During his span as curator of mammals (1955 through 1959), the KU collections grew in size by more than 19,000 specimens. Syd supervised all aspects of curation and the undergraduate and graduate students who worked with the specimens in addition to his own rigorous fieldwork schedule. At the American Museum of Natural History during Syd’s tenure, he and the other curators oversaw and contributed to more than 60,000 specimens being added to the collections.

Syd understood that the role of “curator” in its broadest, most responsible sense, involved not only research but specimen care, including obtaining financial resources to support the collections and contributing to the knowledge base of specimen care and research (Figure 4). He was the principal

investigator of three major National Science Foundation grants for collection support at the Department of Mammalogy totaling more than \$388,400 over a ten-year period.

As a curator at the AMNH, Syd was involved, on a daily basis, with issues surrounding the storage of museum collections and based on his experience in museums, he wrote several thoughtful papers on techniques and philosophy of collection management. He proposed a new field technique that enabled field-researchers to make flatter, more compact specimens of rabbits and large lagomorphs, this technique also was suitable for other mammals of a similar size. Syd’s conclusion (26, page 410) was that this method took less preparation time than the old and that the resulting specimen would “require less than two-thirds of the storage space needed for specimens prepared by other methods.” A long-standard and widespread technique used for cleaning skeletal material of vertebrate specimens in museums was using a dermestid beetle colony. Syd suggested two modifications to this method (75)—adding a bed of cotton under the skeleton to keep it clean of much of the beetle frass, which would speed subsequent cleaning, and applying small amounts of formalin to joints or teeth before subjecting the skeletons to the beetles, to keep them articulated and in their sockets by slowing the beetles’ feeding. Syd was an early leader in the efforts of information retrieval from museum specimens beginning writing on the subject as early 1963 (34), and chairing the American Society of Mammalogists’ Committee on Information Retrieval.

For Syd, the American Society of Mammalogist (ASM) was his primary professional society, and his time and devotion to the ASM are shown by the considerable number of tasks that he enthusiastically undertook. He joined the ASM in 1952 and was elected a Patron Member in 1990. His first recognition by the organization came in 1954 when he was awarded a student honorarium for a presentation at the 34th annual ASM meeting in Estes Park, Colorado, of his research paper “Subspeciation in the meadow mouse, *Microtus pennsylvanicus*, in Wyoming, Colorado, and adjacent areas.” Years later Syd explained in his own words the impact of this honorarium “... a ... student received one of the first awards (then \$175) established by the Society for presenting a paper at the annual meeting. This was at Estes Park, Colorado, in 1954. When the student returned to Kansas, Keith Kelson [of Hall and Kelson fame] explained why the award money should be used to pay for a life membership for the student. Thus, the money quickly returned to the Society’s Reserve Fund. This student subsequently also served the Society in various roles, most recently as a Trustee trying to make sure the \$175 was still productively invested. I was that student and those were good years ... ” (140, page xxix).

Syd did indeed hold several offices in the Society, beginning with being a member of the Board of Directors for three years (1964–1967). He stepped off the Board to become the Recording Secretary for seven years (1967–1974) and then served two years as President (1974–1976; Lane and Hoffmann 1994), which also made him a life-long member of the Board. His longest service in an office was 20 years as a Trustee (1984–2004) of the Society’s Reserve Fund, for which he was chair for four years (1985–1989).

Syd gave 103 service years of work to society committees, of which 24 years were served as chair of the committees. His committee work included service on the following: Development, 20 (1989–2009), chair for seven years (1995–2002); Bibliography, 19 (1966–1985), chair for six (1968–1974); Editorial, 19 (1968–1987); Honorary Membership, 10 (1976–1986), chair for two (1982–1984); Legislation and Regulations, 9 (1976–



Figure 4.—Sydney Anderson in the research collection of the Department of Mammalogy, American Museum of Natural History. Photograph taken October 1974. Courtesy of Robert S. Voss, Curator, Department of Mammalogy, and Tom Baione, Harold Boeschstein Director of Library Services, American Museum of Natural History.

1985), chair for five (1978–83); Resolutions, 7 (1963–1965, 1978–1983); Information Retrieval, 6 (1972–1978), chair for four (1972–1976); Membership, 5 (1963–68); Merriam Award, 3 (1980–1983); Systematic Collections, 2 (1976–1978); Jackson Award, 2 (1986–1988); Program, 1 (1988–1989). He also served four years on two ad hoc committees—Development (1986–1989) and Committee on Archives (1985–1986).

Syd had leadership roles in four activities that changed the society and how it honors its members. It was Syd who willed the Mammalian Species series into existence. He initiated the original planning for the series, served as its first editor for 15 years (1968–1983), and then five more years as its Associate Editor (1983–1988). In the beginning, he handled all correspondence, solicitation of accounts, and even took subscriptions. He wrote and published the first Mammalian Species account that appeared on December 29, 1969, covering *Macrotus waterhousii*. Now in its 50th year, the series has published 986 accounts of mammal species as of December 31, 2019.

Syd became interested in information retrieval from natural history collections in the early 1960s when he contributed a conference paper on the subject (34). His interests at this point were being able to find what specimens were available for study and where they originated. This early effort involved the microfilming of collection catalogs and sharing them with interested researchers (55). The American Museum of Natural History successfully used this technique for a number of years. His next effort at the museum was a complicated mechanical punch card/optical coincidence system, which now seems quaint in light of 50 years of technological progress (55). However, this exercise forced issues that later

would become important for standardization of nomenclature, taxonomy, and geographic references. At the 52nd annual meeting of the ASM, Standing Committees on Information Retrieval and Systematic Collections were established. In 1972, Syd was appointed the first chair of the Information Retrieval Committee and moved this area to prominence in the Society. Under Syd's guidance, the Committee on Information Retrieval received a grant from the National Science Foundation to examine the feasibility of developing a national data-retrieval system for recent mammal collections. At workshops in Washington, D.C., and Lubbock, Texas, a Network for Information Retrieval in Mammalogy was outlined (80). The most important outcome from these efforts was the development of guidelines, data standards, and suggested uniform data fields as detailed by Williams et al. (1979) and updated by McLaren et al. (1996) to support effective communication among members of the network, the first such standards in any zoological field (McLaren and Timm 2019). As Syd's career was closing, the move of specimen catalogs and other records to desktop computers and online databases was in progress (110). The usefulness of these online databases is clearly demonstrated by the rapidly evolving field of modelling species distributions and habitats, especially pertaining to climate change affecting the world's biota.

When the Board established the C. Hart Merriam Award in 1975 for outstanding contributions to mammalogy through research, teaching, and service, there was considerable discussion about what would be the appropriate form of the plaque/memento to be given to awardees. Syd took charge and chose the maquette of a spectacular bison cow in the collections of the American Museum of Natural History, obtained permission for its replication, and 40 of these impressive art pieces have been presented to awardees as of 2019 (Figure 5).

Beginning in 1993, Syd started the effort to establish a Pooled Income Fund in which gifts of liquid assets to the ASM could be pooled with the donor directing use of the "income interest" and the Society receiving the "remainder interest" upon death of the donor. It took until 1997 before all of the legal documents were ready for approval by the Board to establish the fund. Finally, in 1999 the Pooled Income Fund was incorporated into the revised Bylaws and Rules of the Society (Article IX, Section 3) with the invested funds managed by the Trustees. As of 2019, the value of this fund was approaching \$100,000.

Syd received the Hartley H. T. Jackson Award in 1995 in recognition of his long and outstanding service to the American Society of Mammalogists. In 1992, he became the 57th person to receive the Society's highest tribute as an Honorary Member, conferred in recognition of a distinguished career in service to mammalogy.

In addition to being honored by the ASM, Syd was also recognized by the Red Boliviana de Mastozoología (Bolivian Network of Mammalogy) with the establishment of the Sydney Anderson Award in 2009. The Sydney Anderson Award is given to researchers who have a remarkable track record in the field of mammalogy, Bolivian conservation, and in recognition of major contributions in the development of mammalogy in the country. This award is a tribute to Syd, who was a fundamental pillar in contemporary Bolivian mammalogy. As of 2018, this award had been given to eight scientists (see <http://mastozoologiabolivia.org/premio-sydney-anderson>, accessed December 19, 2019).

Syd has also been immortalized, with five species of mammals, a nematode, and a chewing louse, named in his

honor: One mouse opossum, four rodents, one filarioid nematode, and one eutrichophiline louse. The naming of new species with patronyms also gave authors the opportunity to describe the contributions of the honoree. The first of these patronyms was for the heavy-browed mouse opossum, *Marmosa andersoni*, described by Ronald Pine (1972, page 281) based a single specimen from southeastern Peru. Pine had been an undergraduate student who worked with Syd at the University of Kansas in the late 1950s and participated as a student in one of Syd's field courses to Chihuahua, thus motivating him to name this species in Syd's honor "in recognition of his outstanding contributions to mammalogy and his efforts in encouraging students in this field."

Salazar-Bravo and Yates (2007) described *Thomasomys andersoni*, a rodent of the subfamily Sigmodontinae from central Bolivia. Jorge Salazar-Bravo referenced his own experiences with Syd when he wrote "An undeterred champion of Bolivian collections of natural history, he has been instrumental in the academic formation of Bolivian personnel, including that of the senior author" (Salazar-Bravo and Yates 2007, page 758).

A second patronym for a sigmodontine rodent is *Oecomys sydandersoni*, from eastern Bolivia. Carleton et al. (2009, page 21) stated: "The first three examples of *O. sydandersoni* were collected by Sydney Anderson... and members of his field team in 1964 and 1965, along the Río Iténez in eastern Bolivia. As a fresh-faced assistant curator in 1963, he had revived the earlier natural history explorations in Bolivia undertaken for the American Museum of Natural History, notably those of Anthony and Tate in the 1920s... Over the next three decades, Syd and his field collaborators amassed impressive series of Bolivian mammals that he utilized in numerous taxonomic reports on this biotically rich but poorly understood country, culminating in his weighty treatise (Anderson, 1997) on the 'Mammals of Bolivia, Taxonomy and Distribution.'"

A third member of the subfamily Sigmodontinae named in Syd's honor is *Oryzomys andersoni* described from Bolivia by Brooks et al. (2004); this species is currently considered a junior synonym of *Cerradomys scotti* in the latest revision of the group (Percequillo et al. 2008), but geographic variation is not well documented within this species. Brooks and his colleagues (Brooks et al. 2004, page 3) attributed this species to Syd because his "studies of Bolivian mammals have spanned over three decades."

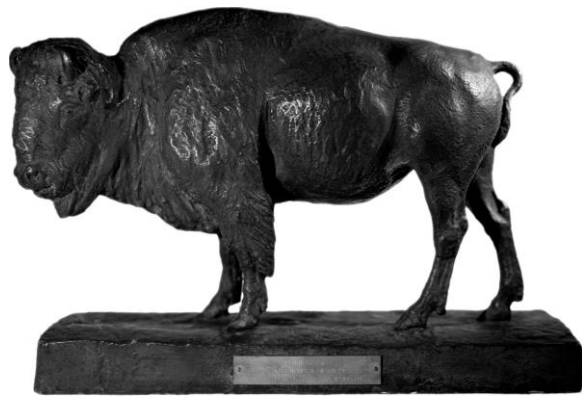


Figure 5. — Photograph of the reproduction of the maquette of a bison cow in the collections of the American Museum of Natural History selected by Sydney Anderson for presentation by the American Society of Mammalogists to C. Hart Merriam awardees. Courtesy of Mary Anne Andrei.

The caviomorph rodent *Ctenomys andersoni* is a subterranean species known only from the type locality of Cerro Itahuaticua, Bolivia, described by Gardner et al. (2014). The three authors of this new species were with Syd doing field research in Bolivia, stating in their etymology (Gardner et al. 2014, page 24) that Syd was "A great mentor and a dear colleague, we remember him examining the day's catch and then preparing specimens for hours on end."

A filarioid nematode, *Litomosoides andersoni*, described by Brant and Gardner (1997) was isolated from the abdominal and thoracic regions of the tucu *Ctenomys opimus*. Brant and Gardner (1997, page 702) named the species "in honor of Dr. Sydney Anderson, leader of our field expeditions and a pioneering mammalogist in Bolivia." The chewing louse, *Eutrichophilus andersoni*, described by Timm and Price (1994) was retrieved from a South American porcupine, *Coendou bicolor simonsi* collected in Puerto Caballo, Beni, Bolivia. The new louse was described in Syd's honor because he was "the collector of all specimens that are known, and in recognition of his extensive contributions to South American mammalogy" (Timm and Price 1994, page 14).

Syd was a tinkerer and quite skilled with his hands . . . he would see a technique or situation that could be improved or made to work more efficiently and he would set out to find a solution. He expertly ground down the tips of his calipers so that he could take accurate measurements of the minutest quarters of a small skull. When Patricia Freeman departed from her position as a research assistant at the American Museum for graduate school in New Mexico, she was presented with a high-quality caliper as a gift. She immediately asked Syd to grind down the tips so that she too could take accurate measurements of small features, as she had learned to do at the American Museum.

To speed his morphometric work measuring the crania of mammals, Syd devised two craniometers, including a movable mechanical stage on a dissecting microscope and incorporating dial caliper (59, 66). The second device added an automatic data recorder, which was done with express purpose of speeding the process of reading and recording measurements.

In addition, some of Syd's field research with raccoons on St. Catherines Island was based on technology using radio tracking with a Davtron Model series MT-300 radio transmitter, the radio receivers used to track the animals were portable models attached to Yagi-Uda receiving antennas (87, 90, 92, 97). To improve the results in finding the exact location of the raccoons, two tripod azimuth tables were constructed upon which an antenna could be mounted on a central post and rotated until the strongest signal was obtained.

During his long-career, Syd held positions in which formal teaching was not required or was a low priority; nevertheless, he found opportunities to work with and teach students about Mammalogy. His first professional position while still at the University of Kansas undertaking his Ph.D. work was as an Assistant Curator in charge of mammals, and as an Instructor in the Department of Zoology, for four years (1955 to mid-1960), with primary teaching responsibility for a summer field course in collecting and preparing scientific specimens for the mammal collection at KU. Syd chose to lead his field party throughout several Mexican states and then focused on Chihuahua. Syd recalled that "When we went into the Barranca del Cobre [Chihuahua], we got a local wrangler to find enough horses and mules to transport us and our gear. We rode on mules. They have more placid dispositions than horses and are less likely to fall off the narrow trail and down

a cliff. I have always thought that riding a mule was like doing statistics. You don't do either for pleasure but only when there is not some easier way to get where you want to go or do something you want to do" (Anderson 1997, part 1, page 4). Clearly, Syd was supportive of his students in the courses, but at times this may not have been evident to them. Syd told the story "On one expedition, we also had a college freshman who was fiercely determined to become a professional scientific naturalist. This was an attitude that I sympathized with, so I took him along with the bunch of graduate students. The social and academic distance resulted in the freshman being sort of the low man on the totem pole ... When a future genetics professor shot himself in the foot, this took some of the heat off the freshman" (Anderson 1997, part 1, page 6).

After his move to the American Museum of Natural History in the summer of 1960, Syd periodically taught advanced courses in the Graduate Program in Evolutionary Biology sponsored by the Museum with the City University of New York beginning in 1969. One of the students in this program with whom Syd worked closely was Nancy Olds. Nancy remembers applying to the CUNY program because she would be able to continue her relationship with the museum and take advantage of the research opportunities available within the mammalogy department. She recalled, "At one point, Syd taught a graduate-level mammalogy course. It was great fun. We looked at all sorts of specimens in the collection, many of which looked alike (lots of small rodents and small dark-colored bats), but we learned how to distinguish them, learned how to look more closely at morphological characters, and learned what characters were more significant. At the end of the course, Syd's final practical exam included stations with skulls, skins, etc., and a final question, which stumped us all. He asked what the name of the janitor in the department was. That particular question provides an insight into the kind of man Syd was, and I found it to be an important life lesson. We talked about getting me involved in his Bolivian mammal project. So, I got started working on Bolivian specimens, cataloging them, identifying them, comparing them, and learning. For several years, I spent most of my time in the museum, hidden at a desk in the collection, but would wander down to see Syd regularly. He was always helpful when reviewing my papers and the versions of my dissertation. These were the days of word processors, so I would print it for him. He would use a red pen and edit, twirling his mustache at the same time. If there was a page with no red ink, he'd say "I must not have read that page. When I finally defended my dissertation, Syd, as the chair of my Graduate Committee, was there. At the end, he did another Sydneism – he said, "Well, that and fifty cents will get you on the subway." Nancy completed her degree in 1988 with a dissertation entitled "A revision of the genus *Calomys* (Rodentia: Muridae)." Nancy was not the only student to benefit from Syd's work in Bolivia. Those students whose research theses or dissertations were based primarily on material collected by expeditions to Bolivia included Sara Brant (*Ctenomys* parasites, nematodes), Allan Dickerman (*Oligoryzomys*), Joseph Cook (*Ctenomys*), Mariel Campbell (marsupial cestodes), Scott Gardner (*Ctenomys* and parasites), Agustín Jiménez-Ruiz (marsupials, *Pilosa*, Rodentia, and their parasites), Jorge Salazar-Bravo (*Akodon*), and Elisa Pucu de Araújo (*Ctenomys*, lice, and fleas).

Beginning in 1977, the AMNH started a Curatorial Research Interns program to help young scholars to study in the collections, gain curatorial experience, and improve the arrangement and usefulness of the collections themselves. Over the years, Syd sponsored a large number of these student

interns, including such future notable mammalogists as Sarah George and Virginia Naples. In the late 1970s, while conducting fieldwork on raccoons on St. Catherines Island, he sponsored several groups of undergraduate students and volunteers to participate in this research. Financial support for this research was provided by grants from the American Museum of Natural History, St. Catherines Island Research Program, Edward John Noble Foundation, and Earthwatch, Inc.

In addition to working directly with students in formal teaching about mammals, Syd attempted to make the rapidly evolving scientific literature more widely available to students, professionals, and the interested public through a broad array of publications. In 1957, Syd along with KU colleagues assembled the first checklist of scientific and common names of North American mammals entitled "Vernacular names for North American mammals north of Mexico" (12). This format has been followed and updated numerous times subsequently by other authors. The compendia *Readings in Mammalogy* (64) and *Selected Readings in Mammalogy* (76) were aimed at introducing more advanced undergraduate students and graduate students to the historical literature in mammalogy. Two co-edited books with his former fellow graduate student and good friend J. Knox Jones, Jr., were aimed at providing advanced students and young professionals with an up-to-date reference – *Recent Mammals of the World, a Synopsis of Families* (52) and the updated *Orders and Families of Recent Mammals of the World* (106) – and were widely used in mammalogy courses throughout the country for several years.

Syd always delighted in sharing the wonders of nature, his beloved mammals, and interesting techniques, with the broader audience. To this end, he wrote several encyclopedia articles on zoology, many of which were directed for a younger audience. Some of these were republished in subsequent years' volumes. These articles include "Zoology" in the *World Scope Encyclopedia* series (issued at least six times over the years [23, 30, 33, 36, 40, 47]); "Zoology" for the Americana Corporation (57); "Zoology" for the *General Reference Encyclopedia* (51, 58); "Monkeys, apes, and other primates" in *The New Book of Knowledge* (57); "The lives of animals" for the Creative Educational Society (48); and an informative review of beaver biology, historical harvest, and population rebounds entitled "Return of the beaver" (38), which was republished by the *Carnegie Magazine* (46).

Syd served as the American editor of the comprehensive 1983 field guide-sized book, Simon and Schuster's *Guide to Mammals*, which was widely available commercially, and served many students as an accurate informative summary of the world's mammals. The volume is an English translation and considerably revised and expanded version of the reference book, *Mammiferi*, originally published in Italian by Luigi Boitani and Stefania Bartoli (100). The *Macdonald Encyclopedia of Mammals* 1986 from Little, Brown and Company (115) was another guidebook, with similar contents and bibliographic history as the Simon and Schuster book.

In the 1960's, the American Museum of Natural History renovated the Hall of Primates exhibit and Syd undertook the planning of the scientific content and oversight of the renovations in the installation. Like his books, he attempted to give the observer and reader an informative snapshot of diversity of the world's primates. He published a summary article in the journal *Curator* entitled "Old monkeys in new cases" (39). In assessing a quite old orangutan mount, it was discovered that the specimen needed to be improved considerably before it could be considered acceptable for a newly renovated major

exhibit. Syd thought it quite humorous and wrote that the museum's skilled taxidermist, "found an old bison skin rug with reddish brown hair of the right length ... the hair was transplanted to the orangutan ... the results concealed the long dorsal suture" (Anderson 1997, part 2, page 3).

He had a special fondness for skunks and raccoons, dozens of which became regular visitors to his backyard in Closter, New Jersey, where he and Justine could comfortably (and safely) observe their habits. A well-documented, as well as interesting account, of their observations and feeding trials with striped skunks was published, entitled "Sixty-four skunks in our backyard" (95). It remains a valuable contribution on behavior among individuals, as well as among skunks and two other species of carnivores—domestic cats and raccoons. It continues to be the best-illustrated documentation of color variation in striped skunks. Syd submitted a photograph of one of their backyard skunks to the ASM's Mammal Slide Library and was quite pleased as well as amused that it became (and remains) the most frequently requested image of the hundreds of images on the site.

Syd retired from the American Museum in 1992, but remained active in local affairs, serving as a Trustee of the Closter Nature Center Association in Closter, New Jersey. Today the Closter Nature Center is a very active suburban nature center offering public programs to all ages. He also remained close to the AMNH; just prior to Syd's death, he and his family established the Sydney Anderson Travel Award program at the AMNH to fund travel by graduate students and post docs for research purposes.

Sydney Anderson was a man of few spoken words, even to the point at times of being taciturn. His modest, cheery, good-natured, homespun personality, as well as his role as an organizer and leader, and his competent demeanor, instilled a sense of calm, fun, and esprit de corps in fieldwork. Syd was an amazingly compassionate person, a staunch supporter of scientific principles, a field mammalogist, and a focused museum curator who was able to study in depth mammals in their various habitats on two continents—but also publish on mammals globally. Syd was instrumental in the development of mammalogy in South America and his research contributions will last forever in the annals of mammalian biodiversity. Because of Syd, the world is better—students got trained, research was conducted and published, a number of long-standing techniques on various aspects of curation were reassessed and improved upon, and science and conservation issues became stronger and more widely communicated to a broad audience.

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Authors and Publication Details

Scott L. Gardner
 University of Nebraska State Museum
 Lincoln, Nebraska, USA
slg@unl.edu

Robert M. Timm
 University of Kansas
 Lawrence, Kansas, USA

Nancy Olds
 Educational Testing Service
 Princeton, New Jersey, USA

Hugh H. Genoways
 University of Nebraska State Museum
 Lincoln, Nebraska, USA

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