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Obituary: Gilberto Silva Taboada (1927–2022)

Gilberto Silva Taboada (Fig. 1) passed away on 15 January 2022 in Havana, Cuba, at the age of 94. Upon hearing of his passing, Miguel Mario Díaz-Canel Bermúdez, President of the Republic of Cuba, described Dr. Silva Taboada as "one of the greatest Cuban scientists and naturalists of all time, founder of the Museo Nacional de Historia Natural" [translated]. Noted Cuban scientist Manuel A. Iturralde-Vinent described him as "a master in the love of nature... Silva leaves a written work that must be studied to learn the methodology of science and to learn about Cuban nature. There is also the Museo Nacional de Historia Natural and the national network of natural history museums, an idea for which he fought and won to leave us a dream come true, where millions of visitors have learned to know and love nature" [translated]. Silva is survived by his wife, Yasmín Peraza, and his sons, Alejandro and Ricardo.

Born in Havana, Silva was a prominent zoologist and naturalist who studied both vertebrates and invertebrates inhabiting terrestrial, subterranean, and freshwater ecosystems throughout the Cuban archipelago for more than 60 years. His diverse expertise spanned the fields of biogeography, ecology, paleontology, and taxonomy of Caribbean mammals, especially bats. His seminal volume *Los Murciélagos de Cuba* (The Bats of Cuba, 1979) is a classic of mammalogy, integrating disparate perspectives from speciation to macroecology in a wide-ranging synthesis still unmatched in its novelty and content. Morgan (1981:864) stated that, "Few, if any, who have attempted such a review have equaled his thoroughness." Timm and Genoways (2003:3) wrote, "By far the most significant single contribution [to West Indian mammals] is Silva Taboada's *Los Murciélagos de Cuba* (1979), the authoritative compendium on Cuban bats."

Silva tirelessly advocated for investments in science and natural history throughout Cuba. Despite his graduate studies being interrupted by political unrest during the Batista dictatorship, his career in biology was catalytic for his country and multiple generations of trainees. He was a founding member of the Museo Cubano de Ciencias Naturales in 1961, which became the Museo Nacional de Historia Natural of Cuba in 1986. He was a board member for the creation of the Cuban Academy of Sciences and its first Secretary in 1962. In 1964, he was the founder of the Academy's Institute of Zoology, which together with the Institute of Botany, was the precursor of the Institute of Ecology and Systematics (IES). Today the IES houses the largest collection of Cuban mammals and other groups and continues to be a center of excellence in scholarship.

An early interest in cave biodiversity led Silva to help found the Sociedad Espeleológica de Cuba (Speleological Society of Cuba) in 1948, whose current president Divaldo Antonio Gutiérrez Calvache remembered him as one of its most important members. His interest in cave life quickly led to a life-long passion for the study of bats; this passion lives on in the students he mentored. He led research on as widely varying topics as the taxonomy and distribution of terrestrial and freshwater invertebrates, the identification of keratinophilic fungi in the soil, and the ecology of rabies and leptospirosis in wildlife populations, let alone many significant advances in the systematics, ecology, behavior, biogeography, paleontology, and conservation of mammals. In addition to *Los Murciélagos de Cuba*, two other influential scientific contributions to Cuban and Caribbean zoology stand out in his publication record—*Sinopsis de la Espeleofauna Cubana* (A Synopsis of the Cuban Speleofauna, 1988), and *Compendio de los Mamíferos Terrestres Autóctonos de Cuba Vivientes y Extinguidos* (A Compendium of Living and Extinct Cuban Mammals, 2007). These three outstanding volumes, each a masterwork by most definitions, remain among the most complete works about Caribbean biodiversity. These works and his other articles and texts are major contributions to our knowledge of Cuban and Caribbean zoology and provide a rich background for future studies.

Throughout his career, Silva maintained strong ties and collaborations with scientists from the United States and Canada. He led early expeditions across Cuba in the 1950s, one with the late Karl F. Koopman, then Curator of Mammals at the American Museum of Natural History. Working with Koopman was as transformative for Silva as it was for Koopman, and their team efforts resulted in an improved characterization of the fossil and living bat faunas for Cuba and the Caribbean. In 1956, Silva and Koopman caught one pallid bat of the genus *Antrozous* in western Cuba, as recorded by Orr and Silva Taboada (1960). Silva immediately knew it was a new species for the country and after careful study of the living individual, Koopman said it was *Antrozous*. They bagged it to wait until the morning to examine it in more detail, but when the sun came up, they found that the bat had escaped. It was not until 1958 that Silva found a single skull of this species from a Barn Owl pellet in a cave. Using this specimen, he collaborated with Robert Orr to publish the species description of *Antrozous koopmani*, in honor of Koopman. Several years later, Silva discovered a jar of 40 bats collected by Charles T. Ramsden in the 1920s and housed at the old Universidad de Oriente and labeled as "*Macrotus waterhousei*." Upon close examination, he concluded that two females were misidentified, and were in fact the first complete specimens of *A. koopmani* and he was

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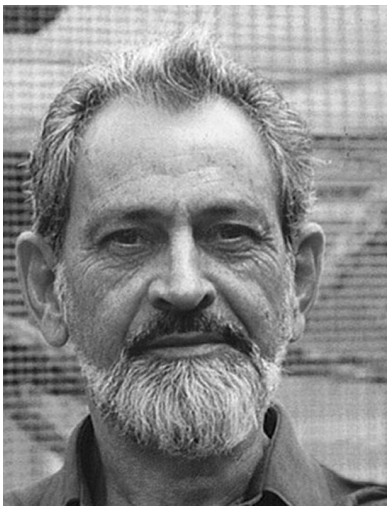

Fig. 1.—Gilberto Silva Taboada (1927–2022) at the Lubee Foundation in Gainesville, Florida in 1985. Courtesy of Frank Bonaccorso.

able to provide a detailed description (Silva Taboada 1976). These are the only complete specimens of the Cuban pallid bat known to exist, and additional fieldwork is needed to determine if this rare species is now extinct. JAS-C, CM, and colleagues are re-examining these specimens along with new owl pellet material recently excavated from caves to create a better understanding of the relationships of the Cuban pallid bat, the pallid bat (*Antrozous pallidus*), and Van Gelder's bat (*Bauerus dubiaquercus*).

Silva was the leader for several international projects focused on promoting Cuban biodiversity and conservation, including collaboration with the MacArthur Foundation, the Center for Marine Conservation, RARE Center for Tropical Conservation, Smithsonian National Museum of Natural History, the Bay Foundation, Association of Systematic Collections, and the Worldwide Fund for Wildlife. As recently as 2015, he played a key role in the planning of the first modern expedition to Cuba by US scientists to document the biodiversity of Parque Nacional Alejandro de Humboldt. Then a spry 88-year-old naturalist, he fully participated in the fieldwork, generating species inventories and new collections. On the first night of catching bats on the expedition, he commented to JAS-C, "1956 was important in Cuban science because this is when Karl Koopman brought the first mist nets here. Today is also an important day because it is the first time that we set a triple-high mist net. I never thought I would ever see something like this." Silva and Koopman's use of Japanese silk—*kasumi-ami*—nets in 1956 was one of the earliest efforts by mammalogists to capture bats in mist nets. Mist nets had been used in Japan to capture birds for centuries but were first introduced to mammalogists as a technique to capture bats only in the early 1950s (Genoways et al. 2020).

Silva had a keen eye and always made careful observations recorded in meticulously prepared notes, which he tirelessly worked on six days a week from his desk just outside the department of paleontology at the Museo. In working with Silva on the relationships of Antillean fruit-eating bats, Ronald Pine writes that he was, "greatly impressed with Silva's exceptional knowledge and ability... he had reached his conclusions by examination of skins and skulls and also by study of the postcranial skeleton, postural similarities, similarities in the use of the tongue in the eating of soft food, dietary preferences, flight times, preferred roosting sites, and affinities of ectoparasites." Silva and Pine communicated in the late 1960s via letters delivered through Randolph Peterson, then Curator of Mammals at the Royal Ontario Museum (ROM), Toronto, because the US trade embargo prohibited contact between American and Cuban scientists. Their exchange resulted in an article published in the first issue of *Biotropica* (Silva Taboada and Pine 1969). While Silva occasionally visited the US, the two scientists however would not meet in person until 2017 when the briefly lifted embargo allowed Pine, JAS-C, and NSU to visit Silva and other Cuban scientists in Havana.

A conservationist at heart, Silva served on the Commission for the Protection and Conservation of the Environment, a Cuban governmental committee established in 1976 that led to the development of over 250 protected areas, representing some 20% of Cuba's land area, that are still largely protected today. He contributed directly to the creation and development of Parque Nacional Península de Guanahacabibes in Pinar del Río, Cuba, a reserve that includes caves serving as home to one of the rarest bats in the world, the endemic Cuban greater funnel-eared bat (*Natalus primus*). He was also a member of the international Species Survival Commission of the World Conservation Union, contributing several species assessments for *The IUCN Red List of Threatened Species*.

Silva Taboada (1997) provided a valuable review of the history of Cuba's natural history collections and the Museo Nacional de Historia Natural noting that the early naturalists—1770s through much of the 19th century—were primarily Europeans and their collections were predominantly deposited in the major European museums. By the middle of the 19th century, American scientists had replaced European scientists and significant collections were assembled both in the United States and in Cuba. US–Cuba collaborations flourished with political and economic advantages after the Cuban War of Independence from Spain and the founding of the Republic in 1902. Silva Taboada (1997:315–316) stated that, "collections that remained in the country were instrumental either in teaching at university faculties and other centers of formal education, or for research at government agencies or private foundations." However, the establishment of the Museo Cubano de Ciencias Naturales in 1961 was primarily focused on public galleries and educational programs with no research staff or curators. The 1986 reorganization of the Museo (that he led) was critical in developing the national reference collections with curatorial staff, developing research and educational activities, training students, and promoting social awareness about preserving the nation's natural heritage. During the planning stages, Silva, and others from Cuba, visited several Canadian natural history museums for development ideas and assistance. Through initial contact with Randolph Peterson, who met Silva at the 1957 American

Society of Mammalogists' (ASM) meetings, these visits were facilitated by Graeme Gibson—Canadian writer, bird conservationist, and Cuba supporter—who later, in the 1990s, also assisted in the shipment of surplus specimen cases from the ROM to Havana for the rapidly growing scientific collections in the Museo. In honor of Randolph Peterson's help in getting books and reference papers to assist in his study of bats, Silva Taboada (1974) described the distinctive big brown bat subspecies *Eptesicus fuscus petersoni*, from Isla de la Juventud, based on its shorter forearm and shorter occipito–premaxillary length than those from the Bahamas and mainland Cuba.

Silva was the mentor to many young biologists, including several who have, in turn, made key contributions to Cuban and Caribbean mammalogy and biodiversity studies. Mentorship in Cuba is often characteristically informal. Through friendship and teaching in the field or the Museo, always accompanied by a café cubano and a Havana cigar, Silva inspired a successful cadre of zoologists from Cuba and beyond. His mentorship style was a unique blend of scientific inquisitiveness mixed with stories from the field and a good sense of humor that easily captured anyone's attention. Yet, because of his humble personality, Silva did not record his efforts with students or seek to take personal credit for their achievements.

Upon retirement from the Museo Nacional de Historia Natural, he was appointed curator emeritus, a title he cherished for the rest of his life, and retirement didn't seem to slow him down. In 2007, he received the North American Society for Bat Research's Spallanzani Award for his life's work in the study of bats. He was designated "Researcher of Merit" by the Cuban Ministry of Science, Technology, and the Environment in 2011. In 2012, he was elected as an honorary member of the Cuban Academy of Sciences and was awarded the Carlos J. Finlay medal, the highest scientific honor awarded by the Consejo de Estado de la República de Cuba. He was awarded the title of Doctorate of Science *Honoris Causa* by the Richard Gilder Graduate School of the American Museum of Natural History, New York, for his dedication to the study of Cuban and Caribbean biodiversity, especially bats, in 2016. In recognition of his long and fruitful scientific career and contributions to Cuban mammalogy, cave fauna, and Cuban natural history museology, he received the 2021 Cuban National Cultural Heritage Award.

In 2018, he was elected an Honorary Member of the American Society of Mammalogists for his "distinguished career in service to mammalogy." He had a strong appreciation for the ASM and often humorously reminisced of his attendance at the mammal meetings hosted by the University of Kansas in Lawrence in 1957 (Fig. 2). Six decades later, he recounted this trip vividly, which began with a short, pleasant flight from Cuba to Miami, and he then spent several days on a miserably hot bus trip through the southern US arriving in Kansas tired from lack of sleep, hungry for lack of food, and feeling desperately in need of a shower. But he thoroughly enjoyed the meetings and presented a paper entitled "Mammalogy in Cuba" to the group. He considered the ASM his "home society," despite that he could not attend any subsequent meetings.

Fig. 2.—Gilberto Silva Taboada (rear) and Dr. Karl F. Koopman (front) in the group photo on the front steps of the Natural History Museum at the 37th Annual Meeting of the American Society of Mammalogists in Lawrence, Kansas, June 1957. Courtesy of the Kenneth Spencer Research Library, University of Kansas Libraries (Personal papers of E. Raymond Hall, PP 513, Box 2, Folder 49).

The US and Cuba have been seemingly irreparably divided on ideological principles and the trade embargo has clearly hit Cuba and its scientific community hard. Despite that, Gilberto Silva Taboada's accomplishments were remarkable. Hugh Genoways, who has worked extensively on Caribbean bats, regards Silva's work on Cuban bats as "excellent." The international community of scientists have worked together to overcome many of the political hurdles hindering Cuba's education and conservation efforts. It is an exceptional testament to Silva's skills and dedication that he was able to persevere under adverse conditions, in the process making indelible contributions to our collective knowledge of Caribbean biodiversity.

Well into his 90s, Silva spoke and wrote with the same fluidity and clarity of any young professor, often claiming, "I do not speak English" before entering a conversation in which any listener could easily tell otherwise. He was active in systematics, biogeography, and conservation of Caribbean mammals and especially serving as a mentor and role model for Cuban students. Silva has passed a torch of old-time intellectual heroics to a new generation of scientists for which the technology to address biological questions does not obviate the need for dedication, courtesy, and above all a respect for natural history.

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