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NOTES

OBITUARY: Daniel A. Livingstone (August 3, 1927–March 6, 2016)

J. Curt Stager

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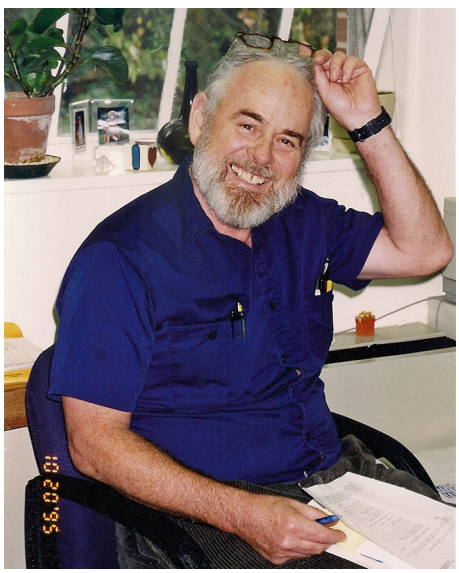

Dan Livingstone's career helped to change the way we see the world. The kinds of long-term perspectives on ecological change that he pioneered now serve us well as we struggle to deal with global warming, environmental degradation, and habitat restoration. He launched many scientific careers, including my own when I became his graduate student at Duke University in 1980, and the research initiatives that he instigated continue to inform and inspire. Dan died at home in North Carolina on March 6 after a long battle with a rare form of Parkinson's Disease. He is survived by his wife, Pat Palmer, his sister, Betty (Jay) Smith, his former wife, Bertha Livingstone, seven children and step-children, and eight grandchildren and step-grandchildren.

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Dan was born to Canadian parents in Detroit, MI, and spent most of his youth in Montreal and Cape Breton, Nova Scotia. After completing his Ph.D. degree at Yale University, where he studied remote lakes of Alaska under the guidance of Ed Deevey and G. Evelyn Hutchinson, Dan spent a year in a post-doctoral position at Cambridge University and then joined the Zoology Department at Duke University in 1956. While at Duke, where he remained for the rest of his career, he mentored a long line of graduate students, many of whom became prominent contributors to the fields of ecology, limnology, fisheries biology, and paleoecology including ecologist Paul Colinvaux, who also passed away recently.

Dan is perhaps best known as the creator of the Livingstone piston sampler, a coring device that he developed at Yale for his work in Alaska and that is now standard equipment for paleolimnologists. Most of his research at Duke, however, focused on the lakes of tropical Africa. Dan never gave me a straight answer as to whether he was closely related to the 19th century explorer of "Dr. Livingstone, I presume" fame. Perhaps not, but the presumed association apparently served him well in the field. I'm told that people whom he met on African expeditions sometimes greeted him with a respectful, "Welcome back."

In 1960, Dan and his graduate students Bob Kendall and Joe Richardson collected cores from lakes in the Ruwenzori Mountains and at lower elevations in Uganda and Zambia. A 40,000 year old core that Dan and Joe collected from Lake Cheshi was particularly memorable for having been taken using an improvised catamaran fashioned from two dugout canoes because a crocodile had attacked and sunk their inflatable raft the day before—with them aboard. These and later studies on East African rift lakes, the crater lakes of Cameroon, and Lake Bosumtwi, Ghana, produced results that are of continuing importance today.

For example, Dan and Bob were the first scientists to suggest that Lake Victoria, the world's largest tropical lake, dried out during what is now recognized as the most severe and widespread Afro-Asian megadrought in the history of anatomically modern humans, some 17,000 years ago. The desiccation also set the stage for the rapid evolution of hundreds of species of endemic cichlid fish. When Lake Victoria refilled 15,000 years ago, it triggered one of the world's most spectacular examples of "explosive speciation," now standard material in college biology textbooks.

Some of Dan's contributions are easily overlooked in part because he did not always seek recognition for them. During the 1980s, Dan was a prime mover behind early plans for deep coring of the African lakes which helped to pave the way for recent drilling projects on Lakes Malawi and Bosumtwi. Dan encouraged the first major geophysical survey of the rift lakes, which introduced me to Africa in 1981 and led to Duke University's Project PROBE, as a way to identify potential deep drilling sites. Most of the findings of an expedition that he led to Cameroon in 1985, in which he showed graduate student George Kling and me how to haul a 24-m Kullenberg core up through 100 meters of water at Lake Barombi Mbo, appear under the names of others to whom he generously granted first or sole authorship. The Barombi Mbo record showed that Cameroon was a crucial refuge for rainforests during the late Pleistocene megadrought that parched East Africa. When CO_2-charged Lake Nyos exploded the following year, killing 1700 people, Dan worked behind the scenes to help George launch intensive follow-up investigations and built a gas-trapping water sampler for me to use at Nyos, as well.

Dan's many awards included a Guggenheim Fellowship, a Kilham Memorial Lecturer award, the G. E. Hutchinson Medal, and a post as James B. Duke Professor Emeritus of Biology and Geology at Duke. Quite a legacy for a man whose research drew an ill-considered "Golden Fleece Award" from a United States senator during the 1970s, in a chilling prelude to more recent attacks on government-funded climate science by members of Congress.

Dan was also a scholar of folklore with an encyclopedic memory for traditional songs of Scotland and Cape Breton. I remember hearing him sing Celtic ballads non-stop for several hours while we rode in the open back of a pick-up truck in Cameroon, and one of his first publications was titled, "Yeahohs and Mating Possums." His love of language made him a superb and sometimes poetic writer and speaker. In his summary lecture at one of the first major symposia on global warming in 1972, Dan described his feelings on seeing the now-famous Keeling curve of atmospheric CO_2 concentrations. What most struck him was not the rising trend due to fossil fuel emissions, but the small seasonal oscillations due to

photosynthesis and respiration in forests and oceans. "The majestically rising (and falling) seasonal cycles," he said, "made me feel as if I had just put my finger on the living, beating heart of the world."

Last June Bob Kendall, Joe Richardson and I shipped his remaining African cores to the LacCore facility in Minnesota and helped to close up his lab at Duke. When I said my last goodbye at his home in Raleigh, Dan reached up from his bed, took my hand with a smile, and asked, "Are you happy with how your career has turned out?"

Yes I am, Dan, and many others among us feel the same, all thanks to you.

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