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OBITUARY

Crossing scales: Howard T. Odum

One of the founders of modern ecology, environmental science, ecological engineering and economics, H.T. Odum, passed away on 11 September 2002 in Gainesville, Florida, from cancer at the age of 78. He died less than a month after the death of his older brother and long-time collaborator, Eugene P. Odum. The two brothers published the classic ecological textbook of the early 1950s (Odum 1953; H.T. Odum's role was not credited until an acknowledgement page in the 3rd edition, published in 1971), one of the first modern holistic views of ecology, ecosystems and human impacts. Among numerous other prizes and awards, they jointly won the Crafoord Prize in 1987, equivalent to a Nobel Prize in ecology, and the Prize of the *Institut de la Vie* in Paris in 1976. Howard Odum produced 15 books, nearly 300 articles and was chairman for nearly 100 doctoral dissertations of which 75 were during his tenure at the University of Florida from 1970. His students are leaders in many fields of environmental science. His ashes were scattered in the Howard T. Odum Memorial Cypress Swamp, a cypress dome near the University of Florida campus that he donated to the University for research purposes.

Howard Odum was a transdisciplinary academic during his long and productive professional life. He graduated from the University of North Carolina at Chapel Hill in 1941 with a life-long interest in the natural history of birds. However, he strayed far from standard zoological investigations after working as a meteorologist for the US Air Force and completing a doctoral dissertation in biogeochemistry under the supervision of the prolific G. Evelyn Hutchinson (Odum 1951). His interests in the early 1950s included the productivity and diversity of aquatic ecosystems and he was the first ecologist to use diurnal oxygen curves to estimate ecosystem metabolism for springs and coral reefs. These early experiments led to his fascination with energy, power and its influence on ecological processes, diversity and the human economy. The ideas were formalized in a classic paper (Odum & Pinkerton 1955). He spent a good deal of his mid-career developing measurements to describe the whole-system function of microcosms and mesocosms, with a view to how the biosphere could be understood from small models (Beyers & Odum 1993). He was among the first ecologists to measure and experiment on a large scale, including building a 20 m high chamber for measuring *in situ* metabolism of forests in the 1960s and applying wastewater to wetlands in the 1970s. Maximum power became a banner statement for many of his studies and was the title of the book organized by his students for his 65th birthday to celebrate his professional life and accomplishments.

Howard Odum was a brave and compassionate investigator in environmental science and policy that engaged his ideas and their application far beyond the academy. His contagious and fearless desire to understand and apply knowledge to contemporary problems most influenced his students and collaborators and created a cadre of socially and environmentally-engaged scientists. His investigations, both experimental and mathematical, were a series of ingenious efforts to see humans and nature coupled in a healthy symbiosis. His synthetic and prophetic book *Environment, Power and Society* (Odum 1971) was a cornerstone for the academics involved in the environmental movement of the 1970s and, still relevant today, will be republished in a revised version this coming year (Odum 2003). Despite his interest in seeing ecological principles applied to the human economy, he was not a withering environmentalist but rather an ardent advocate for the resilience of nature, which was often a contentious issue with associates who were less optimistic about the future of the man and nature dyad. This real-world optimism is reflected in his final book written with his wife (Odum & Odum 2001), published after a protracted and contentious review process. The book expresses his often unpopular belief in the soon and inevitable return of humans and our economy to simpler, sustainable and more symbiotic relationship with nature but, atypical of some doomsday texts but consistent with his compassion, we are advised how to make this transition without suffering. This compassionate optimism in the ability of nature and humans to optimally self-organize is the main challenge to environmental science from his legacy.

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