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### IN MEMORIAM: EUGENE PLEASANTS ODUM, 1913–2002

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Eugene Pleasants Odum, a Life Member of the AOU since 1932, an Elective Member since 1943, and a Fellow since 1951, died 10 August 2002 of an apparent heart attack while tending his garden. Gene was born in New Hampshire on 17 September 1913 and spent most of his childhood and college days in Chapel Hill, North Carolina. He developed a keen interest in birds and natural history during grade school, encouraged by his cousin, Dr. George Mayfield of the Tennessee Ornithological Society. At high school, Gene and his friend Coit Coker started a bird magazine and a newspaper column called "Bird Life in Chapel Hill." Gene never tired of teaching and used every opportunity to inform people enthusiastically about birds and the environment. While at home on breaks from graduate school, he taught his younger brother Howard Thomas Odum (1924–2002), then in high school, much of the ecology that he learned from pioneers such as Victor E. Shelford and his major professor S. Charles Kendeigh. Howard, known as H.T. or Tom, described Gene as one of his five great teachers. Gene developed his holistic vision of science in part from the sociological teachings and interdisciplinary approaches of his father, sociologist Howard W. Odum.

Gene's studies in zoology began at age 15 at the University of North Carolina, Chapel Hill (A.B. 1934 and M.A. 1936). His grades in academic classes suffered, he said, from too much time in the field learning about plants and animals in relation to their environment. His ornithological career, which spanned 71 years, began with his first high school publications on backyard birds and the nesting habits of the Hooded Warbler (1930s) and ended with his paper on avian research at the Savannah River Site, South Carolina (2001). After a formative summer at the Allegheny School of Natural History, Gene began teaching half-time at Case Reserve University in Cleveland, Ohio during 1936–1937, replacing Charles Kendeigh, who left to join Victor Shelford at the University of Illinois-Champaign. Advice from ornithologist H. C. Oberholser of the National Museum in Washington, D.C. led Gene to study for his doc-

toral degree at the University of Illinois (Ph.D. 1939) under Kendeigh's direction. Gene's innovative spirit, evident throughout his life, was manifest in his dissertation, "Variations in the heart rate of birds: A study in physiological ecology" (1939 *Ecological Monographs* 11:299–326), using a "cardio-vibrometer" he helped invent to measure the heart rate of small birds.

During his last year at Illinois, Gene's sister Mary Frances introduced him to Martha Ann Huff, an artist. Engaged on their third date, they were married on 18 November 1939, beginning a 56-year loving marriage. His year as resident naturalist at the Edmund Niles Huyck Preserve, Rensselaerville, New York, was for them an extended honeymoon. Here, emulating Victor Shelford, Gene became more interested in the whole rather than the parts of the ecological system, conducting chickadee behavioral and physiological studies, and beginning to shift his attention to plant-animal systems.

Martha and Gene had two sons, William Eugene (1942–1991) and Daniel Thomas (1946–1987). Bill Odum became a well-respected ecologist and head of the Department of Environmental Sciences at the University of Virginia, but his life ended prematurely in 1991 after a short illness.

In September 1940, Gene's long and productive association with the University of Georgia in Athens began as an instructor in the Biology Department. The Odums moved onto a small acreage just outside Athens given them by his father. Gene began conducting bird studies in Athens and Highlands, North Carolina. When World War II began, he taught courses for medical and pharmacy corps, nursing, and pre-medical students for three years. With Earle Greene, Herbert Stoddard, William Griffin, and Ivan Tomkins, he published *Birds of Georgia: A Preliminary Check-list and Bibliography of Georgia Ornithology* (1945).

In 1946, Gene was spurred to begin writing *Fundamentals of Ecology* (1953) after a departmental faculty meeting in which others suggested that ecology was a subordinate, not a "basic discipline" of biology. When enquiries by some faculty members



EUGENE PLEASANTS ODUM, 1913–2002

(Gene Odum birding on Fripp Island, South Carolina in 2000. Photo by Terry L. Barrett.)

brought home to Gene that the principles of ecology were not yet formulated, he began organizing them with his brother, H.T., who collaborated with him on the first two editions. By approaching nature from the top down, the ecosystem first, *Fundamentals* has had a remarkably stimulating effect on students. Gene and H.T. adapted their vision of nature from writings of Clements, Shelford, Smuts, Tansley, Leopold, Lotka, and Lindemann, but they added the concept of holism (the whole is more than the sum of its parts). In a recent survey of membership of the American Institute of Biological Sciences, *Fundamentals of Ecology* was selected as the book that most influenced the members' careers. Recently, Gene and coauthor Gary W. Barrett

completed the fifth edition, which is planned for publication in 2004.

Gene Odum underwent two phases in his career. The first began in the 1930s and peaked in the 1940s to 1950s; it was centered on avian research, especially the role of fat deposition for protracted migratory flights, and on natural history subjects. The second, his ecosystem ecology and institution building phase, began in the 1950s and peaked in the 1960s to 1980s. He and Donald Scott helped to establish The University of Georgia's Sapelo Island Marine Institute in 1953 and his ecological research with a grant from the Atomic Energy Commission (AEC) led to the establishment of the Savannah River Ecology

Laboratory (SREL) in South Carolina. When the original grant of \$150,000, was reduced to \$10,000, his university collaborators decided not to participate. Gene, however, began with three graduate students, some equipment and a truck—a strategy, starting small and then growing, that he used successfully in other projects. Gene was proud that one of his graduate students, Robert Norris, the first resident ecologist at SREL, received the Mercer Award from the Ecological Society of America (1961) for his research on overwintering Savannah Sparrows at SREL. Gene also collaborated with H.T. on the AEC's Eniwetok Atoll project in the Pacific. H.T.'s techniques to study energy flows allowed them to test the idea that live coral polyps and green algae were symbiotic animal-plant relationships, leading to an understanding of the system as a whole. "Trophic Structure and Productivity of a Windward Coral Reef Community on Eniwetok Atoll," published in *Ecological Monographs* (25:291–320) in 1955, won the Mercer Award in 1956.

In 1969, Gene wrote "The Strategy of Ecosystem Development" in *Science*. That controversial essay focused on how ecosystem science could help resolve environmental dilemmas. Odum proposed a three-sided strategy for resolving human conflict with nature: use of nonchemical pest-control agriculture, a compartmental model for landscape zoning, and reorganization of society's goals by beginning ecological education in elementary schools.

In 1966, Gene became the first director of the Institute of Radiation Ecology, later renamed the Institute of Ecology of The University of Georgia. The Institute encouraged a network and interaction of scientists from many disciplines to solve environmental problems. The Institute prospered from successful outside grants and research conducted at many of its distant sites, such as SREL, the Sapelo Island Marine Institute, the Coweeta Hydrological Laboratory in North Carolina, and others such as the AEC's canal project in Panama. By obtaining abandoned land less than a mile from campus, he established Horseshoe Bend, an important area for ecosystem and ecological research. He helped create the Ecology Graduate Program at the Institute of Ecology, which grew to about 100 students by 2002. Gene's networking and interdisciplinary approach eventually culminated in the School of Ecology in 1993, which became part of the College of Environment and Design in 2001.

Eugene Odum received numerous awards and honors. He served as President of the Ecological Society of America from 1964 to 1965 and was honored with their prestigious Eminent Ecologist Award in 1974. In 1970, he was the first person from The University of Georgia to be elected a member of

the National Academy of Sciences. He received the Conservationist of the Year Award in 1975 from the Georgia Wildlife Federation and Educator of the Year Award in 1983 from the National Wildlife Federation. He and H.T. jointly received three prestigious international awards: the \$80,000 "Institut de la Vie" prize in 1975, the Tyler Ecology Award of \$150,000 presented by President Jimmy Carter in 1977, and the Craaford Prize of \$250,000, given by the Royal Swedish Academy, equivalent to the Nobel Prize, in 1987. Gene donated his prize monies to ecological research and education foundations, mainly at The University of Georgia. Six universities in North and South America awarded him honorary doctorates.

Gene at first did not accept retirement well, which in 1984 was required for all professors before their 71st birthday. With his title "Emeritus Director" in place of "Director," he remained busy and productive, as he said "racing against time." But he and Martha also enjoyed longer vacations to their cabin in the north Georgia hills and their second home on Fripp Island, South Carolina. An avid sports fan and fierce competitor, he and his wife took up croquet, competing on Fripp Island and on their home court in Athens, when his knees would no longer tolerate the stress of tennis. There was never a time that a former student dropped by that he and Martha did not take them to the Georgia Hotel for an evening of "catching up."

In 1995, Gene unexpectedly lost Martha after a short illness and he took some time to regain his life without her. He gathered many of her watercolor paintings for a 1997 show entitled *Martha Odum: Watercolors*, saying "Art and ecology have been a partnership in the Odum family for more than fifty years." Later you could see the joy in his face as he gathered all her watercolors to publish *Essence of Place*, a book of love for his wife, with ecological commentaries (he was always teaching).

Gene was generous to family, students, colleagues, the people of Georgia, and especially The University of Georgia. He willed his estate to ecological and educational institutions that he helped create. He put all his labor into his belief that ecologists can make a difference in the quality of life on Earth. An enthusiastic teacher, generous man, creative thinker, productive researcher, institution builder, he was a friend to many. On the day before his death, during lunch with friends, he was discussing the birds of Athens—the new breeding birds (such as Fish Crows)—and why were they here? We did not solve that question but did generate many hypotheses. We miss our friend.

We thank Betty Odum, wife of H.T., for providing H.T.'s notes, which she presented at Gene Odum's celebration of life shortly after H.T.'s death.