

George Christopher Williams, 1926-2010

George C. Williams, a renowned evolutionary biologist and Professor Emeritus of Ecology and Evolution at Stony Brook University in Stony Brook, New York, passed away on September 8, 2010.

Professor Williams is widely regarded by peers in his field as one of the most influential and incisive evolutionary theorists of the twentieth century, internationally respected for having shaped conceptual progress and new fields of research in evolutionary biology. He advocated and helped to build a “science of adaptation” that addresses the evolution of animal and human behaviors, organisms’ life histories, and other complex features. Together with Randolph Nesse, professor of psychiatry at the University of Michigan, he launched the field of “Darwinian medicine,” an evolutionary approach to human health and disease.

The study of evolution in the 1950’s was based on advances in the previous two decades that had established a powerful, very general theory of evolution by natural selection, cast in terms of genetic change of species. It applied to organisms’ features in the abstract; what was lacking, for the most part, was analysis of the causes of evolution of various puzzling features that vary among species. Why, for example, do some organisms reproduce sexually and others asexually? Why do some species have a short life span, whereas tortoises and redwoods can live for more than a century? How do we account for cooperation in social animals, when natural selection is based on selfish, individual advantage? To the extent that biologists addressed such questions, they generally supposed that these traits benefit the species as a whole, even if they are harmful to the individual. Senescence and death, for example, were thought to provide space and resources for a vigorous new generation, and so promote the species’ welfare.

Although Williams’s research area was the ecology and life history of fishes, he started to address such questions in 1957, when he published a theory to account for the evolution of senescence and short life span; this paper is now recognized in all major biological works on gerontology as a foundation for understanding the genetic and evolutionary bases of the age distribution of mortality. In the same year, he and his wife Doris were among the first to advance the modern theory for the evolution of cooperative behavior that is harmful to the cooperating individual but beneficial to the group. Williams, adhering to Darwin’s conception of natural selection, sought explanations based on the reproductive success of individual organisms and their genes, and rejected hypotheses based on “group selection” that promotes the “good of the species.” He developed these ideas at length in *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought* (1966), which had enormous influence and immediately established his reputation as one of the most original, incisive thinkers in evolutionary biology. In this book, in other publications, and in conversation, Williams had a gift for clear thinking about complex problems, and for explaining them in disarmingly simple terms.

Although much of evolutionary theory takes the form of mathematical models, Williams made sparing use of math, and developed almost entirely verbal theory. Nonetheless, he helped to establish the foundations for new subdisciplines within modern evolutionary biology, including behavioral ecology and sociobiology, sexual selection, and the evolution of sexual reproduction and reproductive systems, to which Williams devoted another book (*Sex and Evolution*, 1975). Richard Dawkins and others credit Williams with pioneering a reductionist approach to evolution, by analyzing how mutational changes in a characteristic would affect the reproductive success (fitness) of an individual organism or of the gene itself (i.e., the “selfish gene” paradigm). Despite some controversy, this approach is widely considered to have enhanced the explanatory power of evolutionary theory. Williams published five other books, including *Why We Get Sick: The New Science of Darwinian Medicine*, with Randolph Nesse (1994), that shows why an understanding of evolution is helpful and even necessary in the health sciences. Since then, Darwinian medicine has been the subject of numerous books and symposia, and is beginning to influence some medical school curricula.

Williams was born on May 12, 1926. After serving in the U.S. Army, he enrolled in the University of California at Berkeley and received a B.A. in zoology in 1949. He received his M. A. (1952) and Ph.D. (1955) at UCLA, held a postdoctoral fellowship at the University of Chicago for one year, and became an Assistant Professor at Michigan State University in 1955. In 1960 he moved to the nascent State University of New York at Stony Brook as Associate Professor and he became Professor of Biological Sciences in 1967. He was a key figure in establishing both the Department of Ecology and Evolution and the Marine Sciences Research Center at Stony Brook. He was appointed Senior Research Biologist in the Marine Sciences Research Center in 1967, but transferred to the Department of Ecology and Evolution in 1974. He retired as Professor Emeritus in 1990, but his contributions, such as the book on Darwinian medicine, continued unabated. His positions during sabbatical leaves included Distinguished Visiting Scientist at the University of Michigan, Fellow of the Center for Advanced Studies in Behavioral Sciences at Stanford, and Adjunct Professor at Queen’s University in Ontario.

Williams distinguished himself by professional service: he was Vice President and later President of the Society for the Study of Evolution, and Editor of *The American Naturalist*. He was devoted to the *Quarterly Review of Biology*, housed at Stony Brook, serving in various editorial capacities throughout his career at Stony Brook University. His many honors and awards include election as Fellow of the American Association for the Advancement of Science (1984) and of the American Academy of Arts and Sciences (1990); being named Eminent Ecologist by the Ecological Society of America (1989); receipt of the Daniel Giraud Elliott Award from the U. S. National Academy of Sciences (1992) and the Raymond Pearl Award from the American Society for Human Biology (1997); and receipt of Honorary Sc. D. degrees from Queen’s University (1995) and SUNY-Stony Brook (2000). He was elected to the U. S. National Academy of Sciences in 1993, and was co-recipient (with John Maynard Smith and Ernst Mayr) of the highly prestigious Crafoord Prize, awarded by the Swedish Royal Academy, in 1999. (The Crafoord Prize is intended, according to the Swedish Academy, “to promote basic research in mathematics, astronomy, the biosciences (particularly ecology), the

geosciences and polyarthritis”, and is considered the equivalent of the Nobel Prize in fields for which no Nobel is specified.)

An articulate, daring writer, Williams was soft-spoken, unassuming, and laconic in person. Even if he said little in gatherings, his colleagues and students quickly learned to listen carefully when he did venture an opinion, for he almost invariably posed a provocative question, provided a novel point of view, or cleared confusion away with a simple analysis that left listeners enlightened. He was invariably friendly, and eager to discuss science and human affairs with peers or students. He held socially progressive, liberal, views, and was concerned in particular about socially significant misunderstanding or abuse of evolutionary theory. In 1992, in his article “Gaia, nature worship and biocentric fallacies” (originally entitled “Mother Nature is a wicked old witch”), he pointed out the cruelties in nature, and drew attention to the “naturalistic fallacy” whereby people attempt to find ethical justification of behavior in natural selection, on the supposition that “natural” is “good.” Earlier (1992), he wrote “A sociobiological expansion of *Evolution and Ethics*” to accompany a reprinting of T. H. Huxley’s 1893 essay of that title. Viewing natural selection as “a process for maximizing short-sighted selfishness,” he found much of nature, including our own “selfish genes,” a “morally unacceptable,” “powerful and persistent” enemy: “we need all the help we can get in trying to overcome billions of years of selection for selfishness.” Only by being aware of the morally unacceptable elements in human nature, he felt, can we hope to find our better angels.

Excerpts from Richard Dawkins, *The Selfish Gene* (new edition, 1989), Oxford University Press.

p. 11: "...I must argue for my belief that the best way to look at evolution is in terms of selection occurring at the lowest level of all. In this belief I am heavily influenced by G. C. Williams's great book *Adaptation and Natural Selection*."

P. 272: 'The definition [of gene] I want to use comes from G. C. Williams... Williams's book [*Adaptation and Natural Selection*] has now become widely, and rightly, regarded as a classic, respected by 'sociobiologists' and critic of sociobiology alike. I think it is clear that Williams never thought of himself as advocating anything new or revolutionary in his 'genetic selectionism,' and no more did I in 1976... Williams's most recent thoughts on the gene as the unit of selection, in his 'Defense of Reductionism in Evolutionary Biology,' are as penetrating as ever.'

Excerpt from Richard Dawkins, *The Greatest Show on Earth: The Evidence for Evolution* (Free Press, New York and other cities, 2009)

p. 364: "George C. Williams is one of the most respected American evolutionary biologists (his quiet wisdom and craggy features recall one of the most respected of American presidents – who happens to have been born on the same day as Charles Darwin and was also renowned for quiet wisdom)."