Donald Redfield Griffin, American Zoologist: Report on Archival Research

by Richard S. Nash

Abstract

Donald Redfield Griffin (1915-2003) was an American zoologist best known for his discovery of echolocation and for his later work on animal consciousness. He was a central figure in behavioral biology and sensory physiology in the United States, and he made important contributions to the disciplinary and intellectual development of animal behavior research in the second half of the twentieth century. During his early career, he focused on the sensory physiology of animal navigation. Along with fellow Harvard graduate student Robert Galambos (1914-2010), in the late 1930s, Griffin discovered the ultrasonic method of orientation in bats; in 1944, he coined the term "echolocation" to describe this phenomenon as a general method of perception. In addition to his discovery of echolocation, Griffin also made several contributions to understanding the physiological basis of bird migration and navigation, and he popularized in the United States zoologist Karl von Frisch's (1886-1982) dance language theory of the honeybee.

In 1976, Griffin surprised the scientific world by raising the question of animal consciousness, a taboo in professional science for most of the twentieth century. Beginning with his provocative book, *The Question of Animal Awareness* (1976), Griffin devoted the second phase of his career to making animal consciousness a scientifically respectable topic once again. Here again, he made significant contributions to the study of animal behavior by establishing a new field of science, cognitive ethology, which is centered on the evolutionary and comparative analysis of consciousness and cognition in animal behavior.

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Introduction

Donald Redfield Griffin (1915-2003) was an American zoologist well-known for his research on the sensory physiology of animals, animal behavior, and for his later work on the question of animal consciousness. Best known for his discovery of echolocation – a term he coined in 1944 – Griffin made enormous contributions to the scientific understanding of animal physiology and behavior. He was recognized by his peers as a preeminent authority in many fields of biological inquiry, including, in the 1970s, the emergent field of "cognitive ethology," a neologism Griffin gave to the study of animal behavior in terms of their cognition and consciousness.

Griffin spent the first half of his career, through the mid-1960s, at Cornell University and Harvard University. In 1965, he was recruited by Rockefeller University President Detlev Bronk (1897-1975) to his recently-formed university (the earlier Rockefeller Institute for Medical Research) to help establish an interdisciplinary program in the behavioral sciences along with the newly formed Institute for Research in Animal Behavior.[2] Throughout his long and prolific career, Griffin amassed a large archive of scientific and personal writings, which have been thankfully preserved and catalogued in the Rockefeller University Archives at the Rockefeller Archive Center in Sleepy Hollow, New York.[3] His archive is essential for understanding Griffin's life and career, as it contains not only a wealth of correspondence with his colleagues, family members, and interlocutors, but also many of his scientific notebooks that shed light on his scientific thinking and experimental methodologies.

Research Report

My doctoral thesis (Johns Hopkins University, January 2016) takes a biographical approach to Griffin's intellectual and professional development, and in so doing, explores several major themes and discoveries that are crucial for understanding the new directions taken within biology and the behavioral sciences in the postwar period.[4] One of the central questions I tackle is how Griffin's thinking about animals shifted from a mechanistic one grounded in behaviorism, to one that was open to the idea that animals were not only conscious, but that animal consciousness could be studied via scientifically sound methods. At the height of Griffin's intellectual shift in the 1970s, the question of animal consciousness was seen as unscientific and amateurish, especially in the United States, in which the European ethological tradition was not as prominent in professional biology. As a consequence, inquiry into animal consciousness was seen as unworthy of study by any respectable American scientist, particularly one like Griffin who had such a reputation for being a rigorous experimentalist. So, to answer the question of why Griffin turned to this line of inquiry in such a seemingly sudden fashion requires evidence that is not explicit in his published books and articles. Access to his archival materials was thus imperative for my own understanding of how this transformation took place gradually and over many decades.

For example, I discovered that in his personal correspondence with certain colleagues, Griffin had begun to consider the seeds of these cognitive ideas about animal behavior in the 1950s, well before he first made his views public in his infamous book, *The Question of Animal Awareness* (1976). Other archival materials such as notebooks and personal accounts about the significance of his wartime research on Griffin's thinking proved invaluable for my own understanding of this transformation as a gradual, rather than abrupt one.[5] For obvious reasons, much of Griffin's wartime research was not documented in published writings (journal articles, books, etc.). However, in his letters, Griffin

often speaks candidly about the research, and by examining these, I was able to better appreciate how that work shaped his thinking about animals in important and unexpected ways. For example, Griffin's wartime work at Harvard's Psycho-Acoustic Laboratory (PAL) exposed him to difficult problems with signal transmission and information processing, which shaped his understanding of echolocation in bats as a kind of communication between the bat and its environment. Also during the war, Griffin's personal and professional network included several key figures working on radar and sonar technologies. These relationships also helped to shift Griffin's thinking about animal sensory physiology; in fact, he came to understand echolocation in bats as fundamentally analogous to these sophisticated military technologies, which would prove hugely significant for the further development of his understanding of animal behavior.

Another theme of my dissertation is the emergence of the strong interdisciplinary tradition in postwar American science. One of the most important figures in pushing for that style of inquiry was Rockefeller University President Detlev Bronk, a biophysicist firmly committed to the interdisciplinary ideal of scientific research. At Rockefeller University in the late-1960s, Bronk challenged behavioral scientists to ask difficult questions and to develop novel approaches to solving them by breaking down traditional disciplinary boundaries. As documented in Griffin's papers, Rockefeller University's invitation of philosopher Thomas Nagel – author of the famous 1974 essay *What Is It Like to Be a Bat?* – as a visiting scholar in the early 1970s proved to be a key moment in Griffin's intellectual journey. Bronk's papers are also helpfully catalogued in the Rockefeller University Archives, and they, too, were indispensable for my research and writing.[6]

While Griffin is primarily known for his discovery of echolocation and for his later work on cognitive ethology, throughout his career he was also consumed by the physiological basis of animal navigation – in particular, the mechanisms and character of bird migration. In his decades of research in this field, Griffin never discovered a kind of "smoking gun" akin to that of echolocation in bats; however, he did make slow incremental progress in understanding how birds perform their migrations through intricate sensory adaptations that allow them to orient themselves within massive environments. While Griffin did publish widely on this

topic, his personal correspondence reveals how challenging, and at times frustrating, this problem was for him. The archives also document Griffin's critical, and sometimes disdainful views of the work of other scientists who approached the problem in ways that he saw as either amateurish, or occasionally *too* mechanistic in their conception of birds. Thus, this work also helped to push Griffin toward more cognitive approaches to understanding animal behavior, as he encountered epistemological barriers that could not be overcome through mechanistic and behavioristic conceptions of animals.

Conclusion[7]

In 1976, Donald Griffin published a remarkable book in which he raised the specter of animal consciousness, a taboo in the mainstream of behavioral science.[8] *The Question of Animal Awareness* seemed to signal a sharp pivot from his earlier work on the sensory physiology of animal behavior toward this new, speculative area of biology. Although Griffin's work on the physiological basis of animal navigation shared little with behavioristic psychology, he too had ignored questions about consciousness. In his latest book, however, he argued that it was time to break free of those "obsolete strait jackets," and to return once again to questions that had occupied biologists and psychologists at the turn of the century.[9] Drawing on the Darwinian framework of evolutionary continuity, Griffin charged that animals had mental experiences akin to those of human beings, and that it was high time to take such concepts seriously and to develop rigorous methods for their study in a new field of biology, which he termed "cognitive ethology."

Griffin's act of cognitive dissidence was surprising for at least three reasons. First, animal consciousness was particularly taboo in biology. Such mentalistic concepts were exceedingly difficult to define, and more problematically, they were considered impossible to study objectively; to inquire about animal consciousness (especially in print) risked one's reputation as a serious and credible scientist. Furthermore, *The Question of Animal Awareness* was his first publication of any kind on the subject. Although he had discussed it in seminars at the Rockefeller

University beginning in 1974, most scientists working on animal behavior knew Griffin for his work on echolocation, and were unaware that his interests had shifted so significantly. His turn was all the more surprising given his reputation as a rigorous skeptic, working on the "hard end" of biology.[10] Broaching the subject thus shocked many of his colleagues; perhaps paradoxically, however, it also had the effect that his claims were taken seriously. As sociobiologist Edward O. Wilson explained at the time, "the very suggestion of a cognitive ethology might have been considered dangerous or even foolish by anyone other than an experimental biologist of Professor Griffin's stature. We will owe him a debt for breaking the taboo."[11]

Reflecting on his career in 1996, Griffin characterized his turn to animal consciousness as symptomatic of "philosopause," a period of philosophizing that scientists often experience late in their careers when their scientifically fertile days are behind them.[12] But his change was by no means the inevitable result of an otherwise skeptical scientist simply growing older, or perhaps more cynically, becoming senile.[13] Rather, particular circumstances facilitated his outspoken commitment to exploring new ideas about animal consciousness and to criticizing behaviorism. As I explore in my dissertation, surprising discoveries about the behavior of birds, bats, and bees played a large part in priming him to seek more complex explanations for animal behavior, and this later led him to impugn the mechanistic and behavioristic modes of twentieth-century biology and psychology.

In addition, an important professional move in his later career bolstered Griffin's intellectual fortitude. In 1965, Rockefeller University President Detlev Bronk recruited him to the behavioral science program as the director of the newly established Institute for Animal Behavior Research.[14] As a formidable scientist with an unassailable reputation as a rigorous experimentalist, Griffin thus entered an intellectual environment that encouraged heterodox thinking about behavior, which would prove crucial for the further development of his ideas about animal consciousness. Analogously, the Rockefeller University Archives proved an invaluable resource for my own understanding of how Griffin's thinking evolved in this fascinating direction.

[1] Abstract adapted from my dissertation, defended in January 2016. Richard S. Nash, Ph.D., "Sensory Physiology and the Return of the Animal Mind in the Career of Donald Redfield Griffin, 1934-1986." (Doctoral Thesis, Johns Hopkins University, 2016).
[2] Initially founded as the Rockefeller Institute for Medical Research in 1901, it gave its doctoral degree in 1959, and then officially became known as "Rockefeller University" in 1965. Bronk served as its first president from 1953 until his retirement in 1968.
[3] Donald Redfield Griffin Papers. RG 450 G875. Rockefeller University Archives, Rockefeller Archive Center, Sleepy Hollow, New York.
[4] Richard S. Nash, Ph.D., "Sensory Physiology and the Return of the Animal Mind in the Career of Donald Redfield Griffin, 1934-1986." (Doctoral Thesis, Johns Hopkins University, 2016).
[5] Between 1941 and 1945 Griffin worked for several different research labs focused on wartime technologies.
[6] Detlev Wulf Bronk Papers. RG 303. Rockefeller University Archives, Rockefeller Archive Center, Sleepy Hollow, New York.
[7] Conclusion adapted from my dissertation, defended in January 2016. Richard S. Nash, Ph.D., "Sensory Physiology and the Return of the Animal Mind in the Career of Donald Redfield Griffin, 1934-1986." (Doctoral Thesis, Johns Hopkins University, 2016).
[8] Donald Griffin, *The Question of Animal Awareness: Evolutionary Continuity of Mental Experience* (New York: Rockefeller University Press, 1976).
[9] Donald Griffin, *The Question of Animal Awareness*, p. 74.
[10] On Griffin's reputation as a skeptic, see: Charles Gross, "Donald R. Griffin," *Biographical Memoirs of the National Academy of Sciences of the United States*, Vol. 86 (2005), p. 14. British ethologist Marian Stamp Dawkins used the phrase "hard end" of biology when describing her surprise at Griffin's turn. Marian Stamp Dawkins, e-mail message to Richard Nash, 12 November 2015.
[11] Donald Griffin, *The Question of Animal Awareness* (New York: Rockefeller University Press, 1976). This quote appears on the dust jacket. In the previous year, Wilson had published his provocative book, *Sociobiology: The New Synthesis*, which sparked a series of scientific and sociopolitical debates in the 1970s-1980s. E.O. Wilson, *Sociobiology: The New Synthesis* (Cambridge: Belknap, Harvard University Press, 1975).
[12] Donald Griffin, "[Autobiographical Memoir]," in *History of Neuroscience in Autobiography* [Vol. 2]. Ed. Larry Squire, p. 68-93 (San Diego: Academic Press, 1998), p. 88. "Philosopause," obviously a metaphorical play on menopause, was one among many creative terms that Griffin coined later in his career. The analog for historians might be called 'tenurapause.'
[13] Apparently, some colleagues and former students initially suspected that senility might have been to blame for Griffin's sudden turn. The clarity and volume of his published works on animal conscious provide clear evidence that this was certainly not the case. See: Charles Gross, "Donald R. Griffin," *Biographical Memoirs of the National Academy of Sciences of the United States*, Vol. 86 (2005): 1-20, p. 14; James Gould, "Thinking about Thinking: How Donald R. Griffin Remade Animal Behavior," *Animal Cognition*, Vol. 7 (2004): 1.
[14] The Institute for Animal Behavior Research was jointly sponsored by the New York Zoological Society, and Griffin directed it until 1969 when ethologist Peter Marler (1928-2014) took over.