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Following The Trail Of Ants: An Examination Of The Work Of E.O. Wilson

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Edward Osborne Wilson was a born naturalist, in every sense of the word. As a child growing up in Alabama, he collected and studied species of snakes, flies, and the insect that became the basis of his life's work, ants. He made a goal to record every species of ant that could be found in Alabama—a childhood project that would eventually lead to his first scientific publication. By age 13, Wilson discovered a red, non-native ant in a local town in Alabama, and by the time he entered the University of Alabama, the fire ant had become a significant threat to the state's agriculture. The State of Alabama requested that Wilson carry out a survey of the ant's progress, and the study became Wilson's first published contribution to science. Continuing his work as a Junior Fellow of Harvard's Society of Fellows, E.O. Wilson eventually became the world's foremost expert on ants. Through his fascination with some of Earth's tiniest insects, Wilson made a number of sizable contributions to the field of evolutionary biology. But more importantly, he developed a love for life—that is, the life that exists in all of the living creatures on Earth's surface—and dedicated much of his life to saving it.

E.O. Wilson is a biologist, specifically a myrmecologist, by training. Myrmecology is the study of ants, and Wilson has become the most respected authority on almost all aspects of ant anatomy, ecology, and social behavior. But he is not simply a scientist. "One of Wilson's great gifts is synthesizing vast amounts of information, often from diverse fields" (Tyson, 2008). Thus, he does not shy away from the cosmic religious and philosophical questions regarding, for instance, the possibility of a transcendent intelligence or the purpose of human existence. He does not separate the physical sciences from the life

sciences from the social sciences. Rather, he seeks to incorporate numerous fields and perspectives in the pursuit of understanding human existence and how it came to be. Still, his views on human nature, religion, social behavior, and the environment are heavily influenced by his work as a scientist. Wilson has outlined these views in addition to his scientific achievements in over twenty books, two of which earned him the Pulitzer Prize for General Non-Fiction. His extensive work as a biologist, theorist, conservationist, and author makes him one of the leading public intellectuals of our time.

As a biologist, one of Wilson's major contributions to science was his first book, *The Theory of Island* Biogeography. A collaborative effort with mathematician and ecologist Robert MacArthur (1930-1972), *The Theory of Island Biogeography* created a mathematical model for species diversity on islands based on the size and relative isolation of the island. The book established island biogeography as a new biological discipline and remains a standard in the field today. Of course, Wilson's own study of the ant species on islands of the South Pacific served as the model for this new theory, which earned him the 1990 Crafoord Prize awarded by the Royal Swedish Academy of sciences, one of the most highly regarded and coveted awards in the field of ecology.

Wilson's lifetime work with ants yielded a number of significant advances in the understanding of the social insects. Namely, Wilson shared in the discovery of the first Mesosoic fossils of ants and helped uncover the complex communications systems involving pheromones that exist among ants. Furthermore, his studies led to an understanding of how caste systems are determined in ant colonies and how these caste systems may have evolved. At the time a number of other discoveries were made regarding the social behavior of termites, bees, and wasps, which, with ants, are collectively classified as the social insects. The goal of Wilson's second major book, *The Insect Societies*, was to synthesize all of the known information on the social insects, including classification, anatomy, life cycle, behavior, and social organization. Wilson brought together all the ideas and supporting evidence that had been published in obscure journals and reinterpreted it in the context of evolutionary theory and modern

biology, with implications for the young and budding fields of population biology and chemical biology. In this way, *The Insect Societies* established the foundation for future research in the field.

Wilson, however, recognized that the evolution of social systems in insects as discussed in *The Insect Societies* "provided a provocative backdrop for reflection on human sociality" (Wilson, 1993). The last chapter of the book, entitled "The Prospect of a Unified Sociobiology" gave Wilson the momentum he needed to put forth perhaps his most influential and controversial work, *Sociobiology: The New Synthesis*, a tome of 697 extra-large pages examining the social behavior of all animals from insects through humans. Wilson defines sociobiology as the systematic study of the biological basis of all behaviors. In his book, he explains social behaviors, including communication, aggression, dominance systems, sex, altruism, and parental care, in terms of adaptations that ultimately increase the survival and reproductive fitness of individuals within a group. Essentially, he reduces the spectrum of animal and human behaviors to its simplest unit—the gene. His reductionist perspective is evident in the opening passages: "In a Darwinist sense the organism does not live for itself. Its primary function is not even to produce other organisms; it reproduces genes, and it serves as their temporary carrier…the organism is only DNA's way of making more DNA" (Wilson, *Sociobiology*, 3).

The publication of *Sociobiology* ignited one of the most heated scientific and political debates of the 1970s, propelling Wilson to the forefront of intellectual discussion. Most within the scientific community, such as Richard Dawkins, supported Wilson and his theory of a unified sociobiology to explain the range of animal and human behaviors. However, Wilson received strong opposition from prominent biologists and Harvard colleagues Stephen Jay Gould and Richard Lewontin. Within science, though, these differences came down to details. Gould and Lewontin did not disagree entirely with the use of evolutionary theory to explain animal behaviors, but they believed that the environment and human culture played a greater role in the evolution of human behaviors than did the genes. Ironically,

Lewontin was a geneticist, but when it came down to nature vs. nurture, Wilson was on the side of nature while his colleagues favored nurture.

The major opposition to Wilson and sociobiology came in the political arena from extreme left and Marxist groups who argued that Wilson attempted to use biological evidence to justify the status quo. In a letter signed by Gould, Lewontin, and 15 other academics in the Boston area, Wilson is accused of joining “the long parade of biological determinists whose work has served to buttress the institutions of their society by exonerating them from responsibility for social problems” (Allen et al, 1975). It is easy to see why some might oppose Wilson so vehemently. Indeed, throughout the book, Wilson provides an underlying biological explanation for warfare and genocide, male aggression, sexual dimorphisms, and division of labor. But he did it without a political agenda. "I thought my views were self-evident” says Wilson, “but they weren't acceptable in the '70s” (Reed, 1993). Wilson believed that sociobiology developed logically from evolutionary theory and the widespread evidence he had collected among insects, lower vertebrates, non-human primates, and humans. If evolutionary theory could be used to explain social behavior in lower animals, it followed that it could explain human behavior, as well. Wilson cleverly structures his book to reflect this logical flow of reasoning. But in the historical milieu of the 1970s, Wilson’s genetic determinism reeked of racism, sexism, and eugenics.

In response to the controversy, Wilson sought to more fully explain his views on human social behavior. In 1978, he published *On Human Nature*, which later won the Pulitzer Prize for General Non-Fiction. Consistent with *Sociobiology*, Wilson makes clear in the opening pages that humans are biological beings, and human nature results from the underlying genes. To some, this genetic determinist viewpoint suggests that development is confined to one single pathway determined by one set of genes. Wilson, however, makes an important distinction. “Rather than specify a single trait, human genes prescribe the *capacity* to develop a certain array of traits. In some categories of behavior, the array is limited and the outcome can be altered only by strenuous training—if ever. In others, the

array is vast and the outcome easily influenced" (Wilson, 1978). Here, Wilson addresses and affirms the old adage "Practice makes perfect" with respect to the influence of environment and training on behavior, but he maintains that the genes are important in establishing what traits and to what extent certain traits may develop. So, the newborn mind is not a *tabula rasa*, as John Locke suggested. Instead, humans are born with a set of genes that prescribes the capacity to evolve a vast, but still limited, set of behaviors depending on the society in which they are raised. In this way, Wilson understands and eloquently describes the relationship between genes and the environment that has been at the basis of the continuous nature vs. nurture debate.

Arthur Schopenhauer said, "All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident." Though Wilson's theories on the evolution of human nature were fiercely resisted after the publication of *Sociobiology* in 1975—he even had water dumped on his head while defending sociobiology at the 1978 meeting of the American Association for the Advancement of Science—*On Human Nature* seemed to quiet the opposition. Now, Wilson's views are generally accepted throughout the scientific community. But accepting that human behavior is genetically based poses two important dilemmas, which Wilson addresses in *On Human Nature.* The first dilemma is that "the species lacks any goal external to its own biological nature" (3). There is no self-fulfillment or actualization that transcends material existence. The second dilemma is that "innate censors and motivators exist in the brain that deeply and unconsciously affect our ethical premises; from these roots, morality evolved as instinct" (5). As humans, then, we must choose which innate censors and motivators to adhere to and which to ignore. The consequence of these dilemmas is the same—they inevitably degrade traditional religious and spiritual beliefs. Wilson suggests that the first dilemma can be assuaged by a union of the biological and social sciences and a deeper, introspective look at the evolution of the human mind as an "epiphenomenom of the neuronal machinery of the brain" (195). For Wilson, such an examination of the reality of humanity is an endeavor

far more fulfilling than traditional religion. The second dilemma, according to Wilson, may provide more of an opportunity than a problem. For with the knowledge of the biology of ethics, human beings can "make possible the selection of a more deeply understood and enduring code of moral ethics"—a universal human rights—that is not dependent on rigid religious beliefs (196).

The fact remains, though, that approximately 80 percent of people in the world claim to be religious. Interestingly, E.O. Wilson was raised under the tradition of Southern Baptist Evangelical Christianity. At age 14, he made the decision to be baptized and was "born again." So he, more than other scientists perhaps, recognizes the powerful influence that religion has. Some form of religion has evolved in every type of society from hunter-gatherer bands to democratic states. Thus, religion itself must have some adaptive value. Indeed, Wilson states that religious belief is an "ineradicable part of human nature" (*On Human Nature,* 169) that is "tribalist but necessary" (Paulson, 2006) in most societies. In college, Wilson came to realize that evolutionary theory explained everything that he loved in nature as a child. It made complete sense, and he was converted. For most, however, science and evolutionary theory is not a satisfying replacement for traditional religion. And for Wilson, that's fine. He may believe that religion is wrong—it cannot explain the meaning of life on Earth—but he also understands that it is probably necessary for the successful functioning of any society. For now, the two worldviews can exist simultaneously side-by-side.

Wilson, however, is a synthesizer. In 1998, he describes in *Consilience* how the gap between the social sciences and the natural sciences must be bridged in order to solve humanity's problems. According to Wilson, theology, philosophy, sociology and psychology are dependent on biology, which is dependent on chemistry, which is essentially dependent on physics; and all are necessary to understand the natural world and solve the problems it faces. Thus, he sees the potential of utilizing both science and religion to solve what he considers to be one of the most pressing matters of our time—the destruction of Earth's biodiversity. Biodiversity refers to the number and variety of the species in a given

ecosystem, biome, or even a whole planet and is often an indicator of how well an ecosystem functions. We are fully dependent on functioning ecosystems that are rich in biodiversity to filter our water, enrich our soils, and produce the air we breathe. Wild species provide food and resources, including a number of antibiotics and pharmaceuticals. Unfortunately, the number of species on the Earth is rapidly declining as a result of a combination of forces that Wilson summarizes with the acronym HIPPO: Habitat destruction, Invasive species, Pollution, Population, and Over-harvesting (Ted Talk). If humanity continues down this destructive path, half of the living species on Earth could be extinct or critically endangered by the end of the century.

In the midst of this catastrophe, Wilson makes a plea on behalf of his "constituency," the ants and the million trillion other insects and tiny creatures he has loved his whole life (Ted Talk). He directs it to the two most powerful forces in society today—science *and* religion. Wilson believes that human beings are fundamentally inclined to care deeply about nature, as he eloquently explains in *Biophilia*. Consequently, the preservation of the natural world is an inherent part of human nature. In *The Creation*, Wilson makes an argument that human beings depend on nature, on the Creation, for their physical and spiritual well being. The bottom line is this: "The fate of the Creation is the fate of humanity" (14). The differences between religion and science should not come between the two forces in the pursuit of preservation of the natural world. In *The Creation*, Wilson writes to a Southern Baptist Minister, addressing the differences between science and religion and begging him to transcend these differences in the pursuit of a common goal:

> "For you, the glory of an unseen divinity; for me, the glory of the universe revealed at last. For you, the belief in God made flesh to save mankind; for me, the belief in Promethean fire seized to set man free. You have found your final truth; I am still searching. I may be wrong, you may be wrong. We may both be partly right. Does this difference in worldview separate us in all

things?... I suggest that we set aside our differences in order to save the Creation. The defense of living Nature is a universal value" (4).

As humans, we are aware of our place in nature and the impact we may have on it. Moreover, we are in a position to do something about it. E.O. Wilson has dedicated much of his time and effort into educating people about the human impact on the living Earth. He appeals to both science and religion in an effort to accomplish one goal: Save Creation. Preserve biodiversity and allow for the perpetuation of life on Earth.

At 82 years old, Wilson has fought the battle against human destruction of the natural world with a youthful passion that, no doubt, launched his life-long endeavor as a naturalist when he was just a boy growing up in Alabama. His love for all living things is the foundation on which he built his immensely successful career as a scientist, theorist, and conservationist. Wilson has been called "Darwin's Natural Heir," (Douglas, 2001) and there are undeniable similarities between the two. Both men were naturalists, and their simple observations of the natural world led to revolutionary ideas about the origin of species, including humans. Both were deeply religious before science provided a more fulfilling explanation for the diversity of the natural world they loved so much. The ideas of both men were fervently opposed. Finally, both will remain forever highly revered, yet controversial, figures in the history of science. Like Darwin's finches have come to represent evolution in action, Wilson's ants may become a symbol of sociobiology. And perhaps remembering what these little creatures have taught us so far will remind us of the vast amounts of knowledge still undiscovered in the natural world. Maybe, they will remind us of why the species of the Earth need saving, and Wilson's fight to preserve the Creation may one day be won.

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