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John C. Avise. *The Genetic Gods: Evolution and Belief in Human Affairs*. Cambridge: Harvard University Press, 1998. Pp. viii + 27. $29.95 (paper).

[1] As we stand at the cusp of the 21st century there exists a deep chasm between the epistemological worldviews of science and some religious traditions. On the one hand, scientists are developing exponentially an understanding and insight into the foundational questions explaining human existence, especially through human molecular genetics. On the other hand, millenialists (primarily fundamentalists) claim the imminent end of the world and have little tolerance for, understanding of, or interest in, such scientific endeavors. John Avise's book presents a "simplified discussion" (vi) of recent findings in evolutionary-genetics. In a detailed study, Avise depicts the profound impact genes have not only on our physiological makeup, but also on our spiritual, emotional, psychological, ethical and religious characteristics. Our genes or "genetic gods" explain much about who we are as human beings and provide insight into ultimate questions that are typically reserved for theology or mythology. Avise's goal is to "diminish the hostility" (vii) between these differing epistemological perspectives. In demonstrating the inherent compatibility between science and religion, he structures the 8 chapters of his book according to various theistic traditions' doctrines, myths and beliefs.

[2] Chapter 1 details the *credo* of scientific inquiry and serves as the introduction to Avise's text. "The Doctrines of Biological Science" are the essential beliefs of all successful 20th century biological research and include mechanism, natural selection, and historicity. The doctrine of mechanism directly confronts theological vitalistic and teleological theories of nature, and asserts that "all functions and processes in living organisms in principle are understandable in terms of physical and chemical phenomena, as played out in an evolutionary theatre" (4). Natural selection challenges creationist theories by explaining the natural evolution of a species whereby "some individuals and their genes tend to survive and reproduce better than others in a given environment, and these become disproportionately represented in subsequent generations" (9). Finally, historicity challenges the theological concept of an omnipotent creator with a "divine plan" and posits, instead, "the contingency of evolutionary outcomes on prior events" (16). For some, these biological doctrines might

be a direct challenge to theological doctrines which posit an omniscient, omnipotent creator. As Avise points out, however, humankind's evolution through natural causes can be just as miraculous and awe inspiring as a creationist account given the wonder of evolution. In this sense, religion and science need not be odds with one another.

[3] Chapters 2-4 are structured according to the "Genesis" myth of the Judeo-Christian tradition in their explanation of the "Geneses" of genes (ch. 2), and the explanation of "evil" (ch. 3) and "good" (ch. 4) as these pertain to the human genetic makeup. Chapter 2 begins by detailing several creation myths from various traditions and delineates the common characteristics of these myths which, if interpreted allegorically, are not incompatible with current scientific knowledge. Avise then explains the scientific reality underlying these myths, the "biotic geneses," which has arisen and developed over the last 150 years in order to account for the genesis of primordial genes, human genes and an individual's genes. Avise ends the chapter by drawing out the implications of this scientific knowledge for theological-scientific discourse. Chapter 3 struggles with the question of theodicy, i.e., if god is all-loving, good and powerful, why is there such tremendous evil and suffering in the world especially among those who are most innocent (e.g., children who suffer from Lesch-Nyhan syndrome)? Whereas theological explanations frequently relied upon "spiritual demons" to explain such "evils," Avise investigates the role and function of "genetic demons" that account for these genetic maladies. Not only are the "genetic gods" responsible for human suffering in the form of genetic diseases, but they also explain the origins of "good" through adaptation and evolution. Chapter 4 explains numerous beneficent characteristics of the genes and confronts both the providential and scientific enigmas raised by such characteristics.

[4] While the Judeo-Christian (and similar) myth(s) of creation and the explanation of physiological good and evil structured the previous section, Avise shifts traditions in chapter 5, likening the genetic gods more to the polytheistic Greek gods than the monotheistic God of Christianity, Judaism or Islam. The genes' multiplicity, eccentricity and functionality resemble the relationship between the Greek gods where individuality, cooperation and conflict constitute their theological makeup. These genetic dimensions, grounded in the mechanistic doctrine, explain in large part "life's greatest mysteries," reproduction, senescence and death, the focus of chapter 5.

[5] While the previous chapters focused primarily on the physiological impact of the "genetic gods," chapter 6 shifts to the "ethereal" dimension of genes. That is, what are the implications of one's genetic makeup on human qualities such as intelligence, personality, or ethical behavior as compared to environmental factors? The nature/nurture debate. This discussion parallels moral theological discussions on free-will and determinism. In the end, Avise concludes that there is a complex dialectic between genes and culture and their impact on the ethereal dimensions of human beings.

[6] Chapter 7 conjures up images of the Garden of Eden and the serpents temptation of Eve with the fruit in order that she "will be like God." The modern "fruit" of genetic scientists is the potential of molecular biotechnology and genetic engineering to manipulate our genes and direct, or even create (e.g., cloning), life. While such manipulations can certainly increase the quality of life for many human beings by eliminating debilitating

genetic diseases, the potential abuses from such manipulations are numerous. One of the limitations in the area of genetics is that technology and its possibilities frequently seem to dictate ethics rather than ethics determining what we should or ought to do given technological capabilities. Avise addresses this lacunae by investigating some fundamental ethical questions regarding genetic interventions.

[7] Avise concludes in chapter 8 with reflections on the meaning of the development of the science of evolutionary genetics in relation to religious frameworks and proposes peaceful coexistence and dialogue between the two epistemological worldviews rather than suspicion and antagonism. From certain religious traditions (e.g., the Catholic Christian tradition) Avise's book is God-affirming in that it recognizes the goodness of creation and the meaning of human existence that is grounded in, and evolved out of, that creation. As Avise notes, "the emergence of *Homo sapiens* under natural evolutionary processes can be interpreted as even more miraculous and awe-inspiring than human creation by a god" (210). It is important to note that the target of the disparity between science and religion seems to be fundamentalists who tend to take religious texts quite literally. Avise points out that by no means do all religious traditions fall into this trap. In particular, he cites Pope John Paul II's various statements on the compatibility between science and religion. We must keep in mind, however, that this insight within the Catholic Church was only reached quite recently in its history, and overturns a centuries long suspicion of science and scientific method. No doubt Avise could attribute this awareness to "genetic insight" rather than divine revelation; some theological perspectives take longer than others to evolve, so there is still hope for fundamentalism. Avise's text provides both evidence and an explanation for this compatibility.

[8] While Avise claims that his text is a "simplified discussion" of recent scientific developments in evolutionary genetics, by no means is it an easy read. The scientific terms and concepts are quite complex. In order to navigate one's way through the text, Avise provides helpful diagrams throughout the text as well as a detailed glossary which make for an informative and challenging text.

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