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Michael Ruse's *The Philosophy of Human Evolution* covers a broad range of topics: evolutionary theory (Chapters 1–3), the concept of “progress” (Chapter 4), knowledge (Chapter 5), morality (Chapter 6), sex and race (Chapter 7), and evolutionary medicine (Chapter 8). This book on human evolution is written in a direct, effective style, with a promising chapter architecture. Ruse's historical framing of philosophical topics surrounding human evolution is a welcome supplement to recent books on human evolution by biologists, including Douglas Futuyma's *Science on Trial* (1995), Massimo Pigliucci's *Denying Evolution* (2002), and D. S. Wilson's *Darwin's Cathedral* (2003). First, as part of posing questions and clarifying themes about human evolution, Ruse advocates a substantive Dawkins-style view of evolution, also informed by theorists such as G. C. Williams and E. O. Wilson, among others. Second, Ruse brings to the fore a diversity of important questions regarding human evolution. Third, further relevant theoretical frames from evolutionary biology are worth considering for understanding both human evolution and the role of the historian and philosopher of science in this area of inquiry. We explore each of these points in turn.

Evolutionary biology is a rich theoretical territory. In the first part of the book (Chapters 1–2), Ruse paints evolutionary theory with a broad brush, taking Charles Darwin as the point of departure. Ruse understands “consilience” (pp. 29–38) as essential to Darwin's theory. That is, Darwin brought together many strands of evidence from paleontology, biogeography, instinct, and morphology under a single theory about natural selection and common descent. Ruse's theoretical heroes are W. D. Hamilton, J. Maynard

Smith, G. C. Williams, R. Trivers, E. O. Wilson, and R. Dawkins (listed here in order of appearance on p. 29). Ruse addresses what he describes as alternatives to “Darwinism” (p. 26). He faults M. Kimura's “neutral theory” (T. Ohta is not mentioned) as not being about “the physical level of organisms, about which Darwin was writing” (p. 26). While accepting “some truth” in S. J. Gould and N. Eldredge's punctuated equilibrium “hypothesis,” Ruse judges the theory exaggerated (p. 31). Finally, S. Wright's shifting balance theory is deemed to be “about as non-Darwinian a theory as it is possible to have,” and “Fisher said [this] repeatedly before me” (p. 25).

Ruse discusses a broad variety of interesting themes and questions that, while being quite philosophical, are highly relevant to scientific concerns surrounding human evolution. Chapter 3 (*Real Science? Good Science?*) considers the nature and structure of evolutionary theory itself. Is evolution a set of laws (and/or models), and what glues or “conciliates” the theory together? Must we take constraints (e.g., spandrels, pp. 81–83) and cultural adaptations (e.g., memes, pp. 87–90) seriously and, if so, how? In light of Ruse's important views regarding consilience, these are relevant matters. The notion of biological progress is explored in Chapter 4 (*Progress*), from Darwin through Ernst Haeckel and Herbert Spencer, to S. J. Gould and R. Dawkins. In Chapter 5 (*Knowledge*), the application of evolutionary theory to the problem of scientific change (e.g., Thomas Kuhn's “revolutionary” and Stephen Toulmin's “evolutionary” conceptions of scientific theory development, pp. 129–36) is reviewed. Conversely, the explanation of knowledge structures via evolutionary theory is also addressed, and Ruse critiques Friedrich Nietzsche's and Alvin Plantinga's arguments against evolutionary explanations of mind and knowledge (pp. 146–51). Chapter 6

(*Morality*) deals with a wide array of tricky ethical matters. Discussion of the old chestnut of the evolution of altruism is balanced by a welcome dose of actual philosophy—the trolley problem, evolutionary accounts of the rise and maintenance of conventional moral principles, and moral “objectification” (a reference to John Mackie, p. 183). Chapter 7 (*Sex, Orientation, and Race*) shows that there is a religious apparatus operating in the historical and contemporary discourses and hypotheses surrounding race and sex, gender, and sexual orientation. Ruse carefully maps how evolutionary theory is trying to ground the discourses about these themes. In so doing, he also touches on the humanities and social sciences. Chapter 7 (*From eugenics to medicine*) explores evolutionary medicine, arguing that “the whole point of evolutionary medicine is that we are looking at the body as a product of natural selection, and we expect to see adaptive advantage” (p. 235).

One role the philosopher and historian of science can have is to identify, negotiate, and potentially integrate multiple theoretical perspectives. In discussing human evolution, we would do well to provide fair, informative, and evenhanded glosses of a plurality of perspectives beyond the single gene’s-eye Dawkins-style view. For instance, multilevel and hierarchical selection theory à la M. W. Feldman, J. N. Thompson, M. J. Wade, and D. S. Wilson merits attention. Although population subdivision is widely believed to be essential in explaining language diversity, and language learning so crucial to the transmission of human culture, Ruse’s discussion of the “levels of selection” is brief, and limited primarily to recounting Darwin’s famous example of sterile castes in social insects (pp. 159–165). Other topics relevant to human evolution are also omitted, including important historical antecedents in human genetics (e.g., James V. Neel’s work on sickle-cell anemia, the physiological and mutation effects of radiation, and human diversity, as well as Frank B. Livingstone’s *Abnormal Hemoglobin*

*in Human Populations*), epigenetics (e.g., Barry Barnes and John Dupré’s *Genomes and What to Make of Them*, and Eva Jablonka and Marion Lamb’s *Epigenetic Inheritance and Evolution*), feminism and feminist science (e.g., Anne Fausto-Sterling’s *Myths of Gender*, and Elisabeth Lloyd’s *The Case of the Female Orgasm*), and complexity, developmental systems, and niche construction theories (e.g., Terrence Deacon’s *The Symbolic Species*, F. John Odling-Smee, Kevin N. Laland, and Marcus W. Feldman’s *Niche Construction*, and Susan Oyama’s *The Ontogeny of Information*). Now, the Cambridge historian and philosopher of science Hasok Chang usefully comments on the role of history and philosophy of science in *Inventing Temperature: Measurement and Scientific Progress* (2004; Oxford University Press). For Chang, history and philosophy of science is a *complementary science*. Historians and philosophers of science can engage in “recovery” (pp. 241–243), both by dredging the theoretical historical record and by highlighting contemporary nonstandard and marginalized, yet useful, theories. Moreover, they can manifest a “critical awareness” (pp. 243–245) of the promises and limits intrinsic to every scientific theory. Finally, complementary scientists can produce “new developments” (pp. 245–247), for instance by reproducing, varying, and extending classic experiments and experimental protocols. Because Ruse has not given full justice to a plurality of theoretical frameworks on human evolution, historians and philosophers of science—and, importantly, evolutionary biologists—may be able to take the project outlined in his thought-provoking book one step further. Complementary science may conceivably have something to add to actual science.

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