Evolutionary Science

THINKING ABOUT EVOLUTION: 25 Questions Christians Want Answered by Anjeanette Roberts, Fazale Rana, Sue Dykes, and Mark Perez. Covina, CA: Reasons to Believe Press, 2020. 343 pages, index. Paperback; $21.95. ISBN: 9781886653979.

As I accompanied a family member to a recent medical appointment, a nurse noticed I was reading a book on evolution, whereupon she immediately proclaimed that she did not believe such "fake news." When politely and gently asked to explain why she felt that way, she admitted she did not really know anything about evolution, but remained sure it was both wrong and dangerous. As an evolutionary biologist, I have, sadly, come to expect such interactions, which crystallize the urgent need for, yet at the same time the primary problem with, this dense, detail-packed book written by four diverse scholars.

Many bright, curious people like this nurse have heard little reliable information (and perhaps much misinformation) about evolution; many are people of strong faith, who understandably wish to avoid books written by scientists displaying outright hostility toward believers. The authors of *Thinking about Evolution* direct their writing to believers, but I expect most readers will not come away with a clearer grasp of what modern science says, and does not say, about evolution.

With 25 chapters covering a broad selection of topics from molecular genetics to archaeology, this book has lofty aims that are occasionally but not uniformly fulfilled. I found myself nodding in agreement almost as much as I vigorously shook my head in dissent or stunned disbelief, and I presume the book will likewise prove equally enjoyable yet frustrating to most readers. There is much to admire here, from the focus on evidence and the authors' humble admission that they may be wrong (they pledge to "follow the evidence wherever it leads"). The commendably wide array of topics befittingly emphasizes philosophy, and the authors wisely stress not just scientific findings but the importance of defining terms, abductive reasoning, and rhetorical language in the acceptance or rejection of evolution.

The authors are candidly up front about "outing our bias" as progressive/old-earth creationists: the fundamental standpoint of Reason to Believe (RTB). According to this scheme, "material stuff in the universe" was created either directly via divine fiat, or, as in the case of "galaxies, stars, and planetary systems," through "secondary causal events [via] physical laws established in the initial creation." RTB's position limits the role of "secondary" unfolding on living systems. Throughout the book, the authors emphasize that they oppose, and sharply criticize, theistic evolution/evolutionary creation (TE/EC).

Scores of references and helpful figures reflect thorough research, with 25 chapters posed as questions, some highly specific (Did Neanderthals create art?), others weakly generic (What's philosophy got to do with evolution?). Authors display familiarity and in many respects mastery of material, but they seldom do justice to all topics or fairly represent science; their prejudice shows in such statements as an "evolutionary view … encourages many injustices and social ills we see in our world today."

Chapters on molecular genetics and biochemistry (by Roberts and Rana, respectively) are remarkably comprehensive and fact-filled, perhaps too much so, given that the depth of detail (on epigenetics, horizontal gene transfer, tandem repeats) will likely overwhelm casual readers. Chapters on macroevolution and paleontology are much weaker and less objective, betraying strong biases and employing stale creationist tropes about "irreducible complexity" and indemonstrable phenomena. There is notable fretting, demonstrating infuriating lack of understanding, about "large-scale" evolution, as authors insistently hawk weak claims about progressive stages and driving forces of evolution. Notions equating evolution with progress are common outside science but demonstrate startling ignorance of scientific consensus, as do ideas about Platonic essentialism and straight-line advancement. There are many false claims about a supposed lack of transitional forms, plus confusion about what might constitute a transitional form: in short, every species! By analogy, we all agree that children descend from, and sometimes closely resemble, their parents, but where are the transitional intermediates?!

The authors seem not to have considered the basic, widely accepted view of biodiversity as bush-like rather than ladder-like, nor that many diverse species of hominins, early tetrapods, and early whales existed concurrently, or that some species persisted as new ones appeared. As George Williams pointed out, there are good reasons why many ancient plant and animal descriptions still apply. Millennia are a mere drop in the bucket of geological deep time

(admittedly incomprehensible on a human scale); second, natural selection generally culls outliers and preserves the status quo, at least in the absence of environmental change. This explains an apparent stasis of many species, and cladogenic speciation explains why older species can persist over long spans even as new species arise.

As is often the case with evolution critiques, some criticisms hit the mark. I daresay crucial points could chasten agnostic or even atheistic scientists. Expert educators will enjoy the trove of technical details. Discussion of whether biochemical data are analog or digital is fascinating, but the obsession with life's origins (not strictly a topic of evolution) is tiring. Yes, evo-devo is still in its infancy, but it readily explains how tiny molecular tweaks produce huge phenotypic changes, and how convergence is predictable.

More troubling than any answers the authors provide are obvious questions they omit, including key queries at the heart of current evolutionary exploration, including rates and levels of evolution. What is a species? Can we recognize them over time? How rapidly does evolution occur? What about group selection?

The authors admit evolution is a paradigm consistent with countless observations, yet send mixed signals concerning its reliability. They affirm microevolution as factual while seemingly disavowing that science has facts. They provide a solid primer on philosophy and the nature of science, but fail to recognize key distinctions between methodological and ontological naturalism. They explain that falsification is a key to science, yet fail to show how simple findings could falsify evolution (organisms with non-nucleic acid genetic codes, problematic chronology, discordance of genes and phenotype). We "learn" that Neanderthals were nothing like modern humans and they could not have created art, which apparently would threaten human uniqueness, even though dozens of previous claims of exceptionality (e.g., humans as sole tool makers or users) have quietly disappeared without consequence.

I found much to like in this volume, but it is perhaps fitting that my feelings were ultimately mixed. The alternatingly detailed and vague explanations, and blend of modern and stunningly out-of-date findings, contribute to an overall feeling of mixed messaging, as do specific claims made throughout the book. The authors frequently argue that evolution is not goal-driven, then (in other passages) state that evolution must have a driving purpose. Their treatment of macroevolution reveals a strong teleological bias, despite a notably good section on why science avoids teleology. In places, there appears to be a steadfast denial of any role for evolution in generating biodiversity; nonetheless, there are occasional bold statements such as "Does microbial evolution occur? You bet it does!" Together, these contribute to an uneven hodgepodge of chapters and eventually to an unbalanced if unsurprising assortment of conclusions (microevolution good, macroevolution impossible).

The upshot is that it is ultimately difficult to know just whom the book is pitched at. It is hard to imagine the target audience, except perhaps for the nurse I encountered: smart, literate, curious people who (I imagine cynically) seek scientific "reasons" to validate their gut rejection of evolution. The authors appear to give the game away a quarter of the way through the book: "Does evolution stand as a threat to Christianity? It depends on your beliefs." Truer words were never written, and that admission distills the main issue, and shortcoming, of this jampacked tome, stuffed with an array of overpowering detail that nonetheless seems aimed at minds already made up. If you are unlikely or unwilling to accept the truth of evolution, as is occasionally the case for devout followers of any religious faith, then no amount of scientific elaboration will change your mind. Conversely, if you are comfortable with evolution, then you might (as I did) find much to ponder here but little to alter your view.

Sadly, the book readily exhibits typical creationist flaws. Given their scientific training, it is unfortunate that the authors do not accept (or at least admit) that science is a work in progress which does not claim to hold immediate answers to all current questions, or that disagreements among scholars and revised ideas based on new evidence demonstrate healthy potential. I applaud the authors' bluntly stated insistence on approaching this fraught topic with open minds—a refreshing and truly admirable admission, although, I regrettably fear, not an honest one. The authors are welcome to embrace creationism, but I worry that it precludes them from giving evolution an honest accounting. Readers will have to judge if the authors present a good faith effort to accurately reflect modern science, or if their preconceptions limit their judgment of current evolutionary thinking. Alas, I vote for the latter.

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