

Book Reviews

emergence, therefore, stands in stark contrast to what reductionists had led us to expect.

Insofar as reductionism is incompatible with theism, this is the main takeaway for Christian academics. Science still tends to operate under a reductionist narrative that can deal with religious belief only in terms of psychological predispositions and sociological pressures. But if this narrative is false even in the physical sciences, then religious beliefs need not be restricted to such cramped corners. One might even wonder whether some of those beliefs are true.

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PHYSICS

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THE PRIMACY OF DOUBT: From Quantum Physics to Climate Change, How the Science of Uncertainty Can Help Us Understand Our Chaotic World by Tim Palmer. New York: Basic Books, 2022. 297 pages. Hardcover; \$30.00. ISBN: 9781541619715.

Tim Palmer, a distinguished physics professor at the University of Oxford, has authored a captivating popular science book exploring chaos in complex systems. Early in his career, he switched fields from mathematical physics to weather forecasting and made significant developments in ensemble weather prediction, revolutionizing our understanding of weather patterns. The author discusses how delving into this realm reveals a chaos geometry, describing difficult-to-understand real-world phenomena. He takes the reader through various complex systems that exhibit a marked sensitivity to initial conditions, like the renowned “butterfly effect.” Chaos geometry describes a system that is predictable and stable for a long time, but occasionally veers into new directions. The study of chaotic complex systems challenges traditional notions of predictability.

The book is divided into three parts. Part I: The Science of Uncertainty explores the concept of chaos geometry. Palmer captivates readers from the start by sharing a true story about a renowned BBC weather forecaster. In 1987 this forecaster infamously failed to predict the most severe storm in 300 years, striking England. This incident highlighted the unsettling truth that complex systems can deviate significantly from historically stable patterns. As a polymath, Palmer generously shares captivating examples and illustrations from fields such as history, philosophy, and art. Part I is solid science and mathematics, but without equations.

Part II: Predicting Our Chaotic World explores Palmer’s influential technique to forecast inherently uncertain systems, running models multiple times with slightly different initial conditions. Chaos geometry offers a powerful description of the behavior of these systems. The author focuses on Lorenz’s idea that even with infinitesimally small uncertainty, we cannot predict beyond a finite horizon in time. The author extends the concepts from Part I from well-established domains such as climate, to emerging areas such as disease, economics, and conflict.

Part III: Exploring the Chaotic Universe and Our Place in It delves into speculative realms and may appeal to readers of *PSCF* as it engages with metaphysical inquiries regarding Christian theism. Palmer grapples with perplexing intellectual dilemmas, including free will, consciousness, and the nature of God. In his pursuit to unravel nature’s workings, he confronts philosophical and theological quandaries. At its essence, he posits that the universe operates under determinism and challenges the notion that uncertainty in nature is primarily ontological as Bohr espoused, rather than epistemic as advocated by Einstein. Raising a thought-provoking query, the author asks, “Could there be something fundamentally flawed with quantum mechanics itself?” He asserts we must face the fact that the violation of Bell’s inequality can be explained only by either abandoning the concept of definite reality or considering the equally dreadful notion of quantum action-at-a-distance. Subsequently, Palmer presents a naturalistic explanation involving counterfactual worlds and puts forth two conjectures.

Conjecture A suggests that the universe operates as a nonlinear dynamical system, unfolding within a cosmological state space defined by a fractal attractor. In simpler terms, a fractal invariant set is a mathematical idea in which a set demonstrates self-resemblance at various magnitudes, containing miniature replicas of itself through a repetitive pattern. Meanwhile, Conjecture B suggests that the deepest laws of physics describe the geometric properties of a fractal invariant set within the cosmological state space.

Palmer’s abstract and subtle perspective challenges the prevailing view in physics, which embraces Bohr’s interpretation of inherent uncertainty in quantum mechanics. Instead, Palmer aligns himself with Einstein and Schrödinger, rejecting the idea of God playing dice and the concept of a cat being both alive and dead. According to Palmer, the laws of physics are deterministic, devoid of randomness. He suggests conceptualizing our world as a specific solution set within a space of permissible solutions, influenced by a

fractal attractor. This space includes neighboring solutions that represent counterfactual worlds similar to our own, some permissible and some not. This perspective resembles the multiverse hypothesis, suggesting the existence of separate realities that impact our own. Analogously, imagine a Mandelbrot fractal set with the gaps indicating prohibited solution sets. Palmer openly acknowledges that he has not fully developed the specifics of his hypothesis.

Palmer argues that reductionism, as an approach, falls short in addressing the profound questions of quantum mechanics. He advocates for unconventional thinking and the exploration of radically different solutions, as our understanding of quantum mechanics and its implications for the universe remains incomplete. In Palmer's view, the deterministic nature of the fractal universe offers an explanation for phenomena such as spooky action at a distance. He proposes a worldview in which elementary entities and the notion of reality possess certainty and definiteness, providing insights into quantum mechanics, gravity, dark matter and energy, and the expanding universe. Palmer expands his hypothesis to free will, consciousness, and the role of God. Ultimately, he applies the Lorenz model of chaos to understand the profound questions surrounding life and reality.

Palmer's speculative arguments from Part III follow from his philosophical naturalism, and seek to explain the grand inquiries within a worldview rooted in staunch physicalism. Consequently, his cosmogony is materialist, drawing from options in a cosmological state space, and he asserts that free will and consciousness are somewhat illusory. According to Palmer, our behavior, emotions, and thoughts can be traced back, through various scales, to the movements of subatomic particles.

Palmer's arguments ultimately rely on a false analogy. By conflating an observation from weather prediction to consciousness, free will, and God, he overlooks the crucial dissimilarities between these scenarios. He incorrectly assumes that what applies to one domain will inevitably apply to the others. A valid analogy requires relevant similarities between the elements being compared, justifying the comparison. Yet it is difficult to see how inanimate subatomic particles involved in weather patterns can be equated with traditional descriptions of God. Without these pertinent similarities, the analogy is flawed and may lead to erroneous conclusions.

Palmer's speculative and logically flawed exploration of options within state space is fundamentally a metaphysical response, substituting a "cosmological invariant set" for god. Nevertheless, I must acknowl-

edge the enjoyment and intellectual stimulation derived from reading his book, and commend Palmer for his innovative naturalistic endeavor to explain reality, even though it ultimately falls short of being the best and most plausible account of reality.

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PSYCHOLOGY

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THEOPSYCH: A Psychological Science Primer for Theologians by Justin L. Barrett. Blueprint 1543, 2022. 176 pages. Paperback; \$19.15. ISBN: 9798985852004. Also, free download at <https://blueprint1543.org/wp-content/uploads/2022/03/TheoPsych-PDF.pdf>.

It is not often that one finds a book about construction written by a psychologist. However, Justin Barrett's *TheoPsych* is just that. The author imagines the theologian as a master palace builder in need of a collection of specialized materials and knowledgeable artisans to do specific modular work for the larger project. *TheoPsych* serves as a "specs sheet" for the potential contributions psychological science can bring to the project. The manuscript is designed not only to serve the interested contemporary theologian who already desires this input, but even more so, it seeks to convince the suspicious or disinterested theologian of the usefulness of the discipline. As such, "bridge builder" seems an equally fitting metaphor. In any event, intellectual efforts which suggest a unity of truth come freighted with hope for this reader because of the potential they hold to generate cross-disciplinary clarity.

Descriptively, the book features five chapters, the first of which argues for the theologian's need of psychological science, distinguishes it from the more general and potentially misleading term "psychology," and seeks to help the inquisitive theologian identify the types of questions in which the psychological sciences will be useful. Here, as in other parts of the text, Barrett gives form to the points being made by posing insightful example questions. For instance, "Why does it often seem so hard for people to grasp and hold onto the idea of Grace?" (p. 13).¹

Chapter 2 further defines the psychological sciences by way of a quick trip through the history of experimental psychology, notes the mindset of the scientific psychologist (i.e., curious and skeptical), describes the demographically relevant features of this community of scholars, and briefly catalogs the various types of materials produced by its professionals. Additional care is taken to delineate the organizational structure