ex nihilo and *Theosis* (the divinization or transformative process of sharing the divine nature of the godhead), with quantum mechanics. Kopeikin argues that subjective knowledge, the very act of knowing, can alter reality itself, suggesting a panentheistic understanding of the world in which the divine is deeply intertwined with material existence. His theological engagement with quantum theory is one of the most explicit examples of Orthodox theology in the volume, drawing on the concept of the *Logos* to argue that consciousness and the cosmos are fundamentally interconnected.

Chapter 7 offers a brief but intriguing detour from the main thrust of the volume. Kobozev's exploration of the neglected work of chemist Sergey Krivovichev challenges methodological naturalism by offering a fresh voice from outside the usual academic authorities. This chapter adds diversity to the volume's interdisciplinary dialogue, though it remains somewhat disconnected from the broader theological concerns of the book.

The final chapters, including a lengthy essay by Walker Trimble, bring the conversation back to ethical and theological concerns. Trimble draws on an impressive array of classical, patristic, and modern sources to argue for a premodern understanding of the person as an agent shaped by the incarnational theology of the *Logos*. In doing so, he critiques Cartesian dualism and the metaphysical categories of modern philosophy, suggesting that a hypostatic model of human flourishing better accounts for the ethical and spiritual dimensions of human life. This final chapter offers a fitting conclusion to a volume that is deeply concerned with the ethical implications of its theological and scientific inquiry.

The volume is a wide-ranging and ambitious work that succeeds in placing Orthodox theology in dialogue with contemporary scientific debates about consciousness. The interdisciplinary nature of the volume is one of its greatest strengths, as it brings together insights from neuroscience, quantum mechanics, cosmology, and theology in a manner that is both rigorous and imaginative. The book's critique of materialistic reductionism is particularly valuable, as it highlights the limitations of purely scientific approaches to the study of consciousness and opens up new possibilities for theological engagement.

Nonetheless, the book is not without its limitations. The theological reflections, while often insightful, can at times feel speculative or overly reliant on scientific theories that are themselves still in development. The quantum-based approaches in particular run the risk of overextending theological claims based on emerging scientific data. Furthermore, while the volume brings together a diverse range of disciplines, it is less diverse in its theological perspectives, with most of the contributors adhering to a broadly dualistic framework. This can make the volume feel somewhat monolithic in its approach to the mindbody problem, despite its interdisciplinary aspirations.

Consciousness and Matter offers a rich and provocative contribution to the dialogue between science and theology. For those interested in the intersection of science and theology, particularly from an Eastern Orthodox perspective, this book is a significant and worthwhile contribution.

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Physics

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ON THE ORIGIN OF TIME: Stephen Hawking's Final Theory by Thomas Hertog. Bantam Books, 2023. 313 pages. Hardcover; \$28.99. ISBN: 9780593128442.

The two most vexing problems for naturalistic cosmologies are the beginning of time and the exquisite fine tuning of numerous physical parameters that make life possible. The late theoretical physicist and cosmologist Stephen Hawking, a professed atheist, wrote: "It would be very difficult to explain why the universe should have begun in just this way, except as the act of a God who intended to create beings like us."1 On the Origin of Time is the culmination of Hawking's quest for a theory of everything that aims to explain the universe without reference to a transcendent deity. In language accessible to a scientifically educated reader, Hawking's close collaborator, theoretical physicist Thomas Hertog, charts Hawking's abstract journey toward a final theory by use of analogies and thought experiments. The reader unfamiliar with advanced mathematics will be grateful not to find pages filled with exotic calculations but, rather, an engaging science lesson enriched by personal anecdotes of a poignant friendship. Hawking's final theory is brilliant and, if true, would be quite elegant. There are reasons, however, to doubt whether his theory accurately models reality.

The first challenge for any naturalistic ultimate theory is the metaphysical implication of a beginning in time. Astronomical observations of the red shift of distant starlight provide strong evidence that the universe is expanding, and that the cosmic microwave background radiation confirms a beginning. Hawking's theory abolishes the notion of time zero by folding the first moment of time into a perpendicular dimension of space, as the indeterminacy principle renders time and space indistinguishable within the initial Planck interval. Hawking presents his "no boundary hypothesis" geometrically as a rounded (rather than pointed) origin on the time chart of the universe, and mathematically with equations written in imaginary time notation. His conclusion that the quantum fuzziness of time zero, rendering initial Planck time indistinguishable

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from initial Planck scale, follows logically from Heisenberg's uncertainty principle.

Less convincing is Hawking's slide from mathematics into metaphysics, as he then reasons that the question of what preceded the universe is therefore meaningless. And yet, meaningful questions remain. Although he succeeds in arguing that the temporal beginning of the universe was quantifiably indistinct, his model overlooks the separate category of a discrete ontological beginning. His theory leaves unanswered what initiated the expansion and why there exists something rather than nothing.

The second challenge is to explain the precise specificity of the many physical constants and parameters that make possible galaxies, stars, planets, and living creatures. Hawking recognizes that if any one of these values had been even slightly different, life could not have appeared anywhere at any time in the history of the universe. Hertog writes that "the fundamental laws of physics appear to be specifically engineered to facilitate the emergence of life" (p. 9). Aware of its theological implications, he calls this anthropic principle "the most contentious issue in theoretical physics" (p. 28). Whereas many theists consider these finely tuned parameters of the cosmos to be compelling evidence for purposeful design by a transcendent intelligence, Hawking looks elsewhere for an explanation. His ambitious final theory rests on the claim that the laws of physics were not imprinted onto the universe from the beginning but emerged through a cosmic natural selection process.

In the journey toward Hawking's final theory, Hertog guides the reader through a breathtaking series of mathematical explorations of the history and concealed geometries of the universe. One suspects that the intricacies of quantum entanglement, gravitational time dilation, string theory, black hole entropy, and infinity paradoxes are just ordinary conversation for a genius such as Hawking. Putting it all together, he speculates that the universe is a hologram, and all that we experience is a projection arising from a hidden thin slice of spacetime (p. 212).

Hawking's answer to the anthropic principle may be summarized conceptually in the following way. If, as quantum mechanics predicts, every particle and packet of energy in the universe behaves as a quantum wave function, then the universe may be described as the complete set of quantum states that, when combined, compose a universal wave function. Furthermore, wave functions are defined mathematically by the Schrödinger equation as probability distributions that collapse into definite values or eigenstates only when an observer performs a measurement. Prior to a measurement, wave functions may be thought of in terms of Feynman's "sum-over-histories" scheme, by which a quantum system is described as a path integral containing all possible paths. Applying this mathematical approach to the physical parameters of the universe, then every specific physical constant, parameter, and event that might have been different can be thought of as a collapsed probabilistic wave function. For Hawking, what brings about this collapse of indeterminacy to specificity, such that the parameters of the universe happen to align in such a way as to be finely tuned for life, is the act of measurement.

Hawking envisions a series of such measurements in a natural selection process intrinsic to the universe. He posits a retroactive selection process for biofriendly parameters, a process performed by life that emerged billions of years after the big bang. For Hawking, whose mathematical finesse had erased zero from the cosmic timeline, such a time paradox was not an insurmountable challenge. Once life emerged, he reasoned, its existence and awareness of the universe somehow constituted a measurement or observation that caused all alternative hypothetical past histories to melt away. "This," wrote Hawking in an earlier volume, "leads to a radically different view of cosmology, and the relation between cause and effect ... We create history by our observation, rather than history creating us."2 Note that Hawking is not saying that the history of the universe can be understood only in retrospect; he is claiming that our observation of the universe has retroactive force. According to his theory, the existence of humanity and our measurement of the behavior of the universe, rather than God, are the creative influences that made it as it is and not otherwise.

Hawking supports his principle of retrocausality by appealing to the delayed-choice quantum experiment of John Wheeler. In this experiment, a photon passing through a series of two beam-splitters seems to "choose" its behavior after a change has been made in the detection apparatus. Wheeler himself rejected the inference of retrocausality but maintained, consistent with Hawking's perspective, that "no phenomenon is a phenomenon until – by observation, or some proper combination of theory and observation-it is an observed phenomenon." Further, "The universe does not 'exist, out there,' independent of all acts of observation. Instead, it is in some strange sense a participatory universe."3 Thus, Hawking would have us believe that the finely tuned parameters of the universe, though they must have been what they are from its beginning for us to exist, are merely an artifact of our observation.

Holographic cosmology, explains Hertog, "envisions that physical reality isn't just made up of real things, like particles of matter and radiation or even the field of spacetime," but rather, mathematics "brings about physical reality" and even the laws of physics (pp. 244-45, 258). Holographic theory catapults cosmology into an abstract realm of elaborate speculation. It succeeds in dispelling theories of multiverses but at the expense of reducing reality to an artifact of mental abstraction.

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The suggestion that we, as observers, create reality for ourselves is an exhilarating idea, but spectacular mathematics does not make it true. Hawking's hypothesis that the laws of physics originated from a natural selection process and "not in a structure of absolutes beyond it" (p. 258) overlooks the logical prerequisite that laws and mathematics to govern such a selection process would have had to originate from somewhere. His final theory, it turns out, is less than final, for it leads to a paradox of endless regress that fails to explain fine tuning but only defers the explanation to other levels.

Furthermore, Hawking's romance with subjectivism invalidates reason itself, including mathematics, on which his cosmology is based, for if physical brain events and their corresponding thoughts are nothing more than artifacts of our subjective observation, then there can be no basis for believing any theory to be a true model of the cosmos. The mathematics of quantum cosmology has not rendered the idea of God unnecessary. Rather, it leads to further questions, such as why quantitative mental models can effectively represent spacetime and make scientific predictions. Why is the universe humanly comprehensible?

Hertog writes that Hawking considered his final theory "to mark the end of my battles with God" (p. 208). Although his purpose in wrestling with God differed from that of Jacob, who sought God's blessing (Gen. 32:22–32), this reviewer wishes for God's blessing on Stephen Hawking and his colleagues, whose scholarship challenges us all to continue to pursue the challenging and ultimately meaningful questions about the universe and our place in it.

Notes

¹Stephen W. Hawking, A Brief History of Time: From the Big Bang to Black Holes (Bantam Books, 1988), 127.

²Stephen W. Hawking and Leonard Mlodinow, *The Grand Design* (Bantam Books, 2010), 140.

³John Archibald Wheeler, "John Archibald Wheeler," in *The Tests of Time: Readings in the Development of Physical Theory*, ed. Lisa M. Dolling, Arthur F. Gianelli, and Glenn N. Statile (Princeton University Press, 2003), 490–91.

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PSYCHOLOGY/NEUROSCIENCE

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THE INTEGRATION JOURNEY: A Student's Guide to Faith, Culture, and Psychology by William B. Whitney and Carissa Dwiwardani. InterVarsity Press, 2024. 227 pages. Paperback; \$30.00. ISBN: 9781514000564.

There is a plethora of books regarding the integration of Christianity and psychology. It is no wonder, then, that one could get either overwhelmed or frankly bored by the repetition of very similar ideas told in seemingly infinitely different ways. But I was pleasantly surprised by this work by Whitney and Dwiwardani. It contrasts with most earlier works on integration by extending the discussion beyond the theoretical and challenging the reader to consider the process of integration in a more dynamic and expansive way that emphasizes the vital role of cultural context. Though the authors neglect to mention a few others (e.g., David I. Smith¹) who have likewise written about the integral role of culture for Christians' understanding of the world, this book is nevertheless engaging and challenging. It is also understandable despite discussions of the complex interplay between personal, cultural, spiritual, and emotional variables involved in the integration process. The authors intersperse biblical texts throughout the book in a way that flows smoothly with the discussion, treating the relevance of scripture in substantive ways rather than "forcing" a fit. Reflection exercises and questions in each chapter add interest and interactivity. This eight-chapter book is written for students, but I have no doubt that professionals from across different disciplines would also benefit from reading it.

The authors begin by clearly stating that the views they present are meant as a guide, not as a definitive work on integration. This is a refreshing demonstration of intellectual humility, and encouraged me to approach the book with a non-defensive stance. They also make no assumptions about the readers' knowledge of key terms, and thus briefly explain all relevant concepts before moving forward. Importantly, integration involves not only the obvious factors of Christian theology and psychology, but also culture. The interplay of these topics is the main focus of this work. The authors' challenge to the reader to consider the powerful role of one's own cultural identity in professional and everyday life is the most impactful aspect of this book. They note that this cultural self- and other-awareness is not only important, but is required of all believers if we seek to love others in our work and personal lives. This is one of the main reasons why I highly recommend this book.

Whitney and Dwiwardani then proceed to discuss how ideas of integration are embedded in the stories we have heard while growing up and those that we inhabit. They emphasize this point throughout the book by seamlessly interweaving their own stories where relevant. One main point is that these stories bias the ways we interpret the world, and thus considering them can help us challenge ourselves to broaden our understanding of the way our Christian faith interacts with our understanding of others and our approaches to integration. While respecting the multitude of stories represented by humans, the authors nevertheless emphasize that the ultimate narrative that should guide our approach to life is that of the Bible. This delicate balancing of respect for others' traditions alongside the universal mandates of scripture to love and seek justice for all is handled well throughout the book. As the authors note repeatedly, it is that love of Christ and others