

other publications, yet the interested reader will have to search elsewhere for an answer on this topic.

But perhaps the most generous critique is one that asks for more. Brimming with Loke's customary brilliance and eloquence, it is difficult to deny this title's place among the best to emerge from the debate about Eden's infamous couple. By no means has the dispute ended, but contributions by Loke and others have helped to stabilize the ground so fiercely shaken just a few years ago.

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PHILOSOPHY OF SCIENCE

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NATURAL PHILOSOPHY: On Retrieving a Lost Disciplinary Imaginary by Alister McGrath. Oxford, UK: Oxford University Press, 2023. 256 pages. Hardcover; \$39.95. ISBN: 9780192865731.

In this book, Alister McGrath provides an intellectual history and critique of what is now referred to as natural science, as well as a proposed re-conception of science going forward. The modern conception of science has its roots in something much older, referred to in the premodern world as "natural philosophy," and this older conception—McGrath argues—is one which was both richer and much more integrated with the rest of knowledge than is natural philosophy's contemporary stepchild, "science." The book has two parts. In Part 1, McGrath successfully labors to give an accessible introduction to the historical conception and development of natural philosophy and its trajectory/transformation towards contemporary "science," followed in Part 2 by a proposed direction *out* of the predicament which he and others see modern/postmodern science to be in.

In Part 1, over the course of five chapters, McGrath first lays out this history. In chapter one, he starts with natural philosophy as an intellectual enterprise finding its origins in the pre-Christian Greeks via Aristotle. In chapter 2, McGrath outlines how natural philosophy then underwent significant development and enrichment through what McGrath calls the "consolidation" of natural philosophy up through the high Middle Ages. On this scheme, a study of the natural world was guided first and foremost by a reverence for God, and an impulse to find the operations of the natural world as understood and explained by principles which were consistent with what God has revealed through both scripture and the church. Natural philosophy was therefore seen as but one chapter of a much larger story,

in which understanding this story could be had only if one's heart were grounded in religious piety and one's intellect governed by proper theology (as handed down by church hierarchs).

Chapters 3 through 5 outline the ways through which natural philosophy underwent fundamental metamorphosis for the worse. In stages brought about by the sociological effects of the Copernican revolution, the Protestant Reformation, the scientific revolution, the Enlightenment, and finally the Darwinian revolution, natural philosophy became disenchanted and dis-integrated from the cohesive place it once held as part of a totalizing theological-cosmological worldview of the premoderns; it devolved into a dis-integrated, compartmentalized, and fragmented version of itself, as evidenced by the ever increasing creation of new "sub-disciplines" of modern science, which are all largely closed off from one another and which do not enjoy any kind of real synthesis as the premodern intellectual enterprises once did. This modern endeavor, furthermore, seems to be more concerned about extending human's domination over nature (*technē*) than it is about truly understanding (*episteme*) the world that God created. Thus, devoid of a "disciplinary imaginary" which serves as an organizing principle, the study of natural philosophy has become a shell of what it once was. This shell is the "science" that we speak of and study today.

In Part 2, McGrath spends the last five chapters of the book offering scientists and philosophers of science a proposed way forward, a way which might recover at least some of the integration and richness that natural philosophy once enjoyed. He does this by employing a heuristic that comes from Karl Popper's conception of what Popper called the "three worlds," which Popper saw as distinct but related "realms" that encompass the scope of what can be known. On this scheme, the first world is that of objectivity or mind-independent objects, the world of "physical objects or physical states." The second world is that of person or mind-dependent entities—the world of subjectivity, such as emotion, affect, and aesthetic value. The third world is one that acts as a sort of bridge between the first two, one which contains "human intellectual constructions and artefacts" such as scientific theories, moral values, and social constructions. McGrath points out that Popper's own development of this idea is not "entirely satisfactory" (p. 129), and McGrath proceeds to build his own conception using this framework of the "three worlds" as a heuristic tool, borrowing from Popper little else other than the basic idea itself.

McGrath begins his proposed "disciplinary imaginary" with an outline that builds from this third world, the world of *theoria*. This is the world of mental models and

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theories which serve to represent and organize bodies of data and evidence. For example, McGrath cites Dmitri Mendeleev's Periodic Table of the Elements. With this kind of organization in view, a certain "beauty" and "coherency" emerges, a kind of simple elegance that can inspire both (subjective) awe and enable further scientific (objective) investigation. It is in fact through these mentally constructed theories that we "see" and make sense of the external world, and these "imaginaries" should aim to engage *both* the intellect and the affect.

In chapter 8, McGrath visits the "first world" of objectivity, with the primary concern to show that, since humans are part of the very cosmos that objective science seeks to explain, there are inherent limits to the reach of a detached, person-neutral, objectivity. McGrath seeks to safeguard against a totalizing scientific reductionism by pointing out that a new natural philosophy will recognize that there are *several* aspects or layers of meaning to any given object of inquiry, and one needs to consider them all to get behind what's really there. He posits neo-Confucianism as one potential example of this kind of engagement with the external world.

Chapter 9 is about the importance of subjective experience, where McGrath seeks to show how aesthetic value and affective engagement are more than arbitrary states of mind. Instead, they often reflect true and proper responses to a world that *really* is pregnant with "beauty and wonder." McGrath then wraps up the book by surveying what he has done and emphasizing the need for a retrieval of natural philosophy, a retrieval that can be enabled through a newfound imaginary or imaginaries.

I will offer two points of praise and two points of criticism. First, McGrath's keen ability to clearly explicate a very complex subject is on full display in this book. McGrath covers an impressive amount of historical ground in the first half of the book in a surprisingly small space (about a hundred pages), complete with explanatory and exploratory footnotes which enable the reader to delve deeper into subtopics. In this way, and like McGrath's many other monographs, the volume is worthwhile if for no other reason than that it acts as a sort of brief yet rich handbook to the subject at hand. Secondly, McGrath's effort is worth considerable praise because he not only seeks to give an intellectual history and critique of the modern epistemic predicament concerning science, but he also delivers up a thought-provoking proposal on what can be done to begin to *address* the problem. His re-conception of Popper's "three worlds" model is, I think, worthy of serious consideration. The broader point, however, is that McGrath is unafraid to wield both a critical acumen and a hopeful positivity regarding this issue, and such constructive attitude from a mind like his is welcome.

On the other hand, in Part 1, McGrath ends his historical survey and critique of natural science with the nineteenth-century secular Darwinists. It is, in fact quite arguably, the horrors and figures of the twentieth century which serve to hammer home the point concerning the consequences of abandoning the disciplinary imaginary for an elevation of (fragmented) scientific knowledge and scientific goals above most everything else. Thus, the first five chapters could have served as a setup for a polemical slam-dunk, but without this survey of the twentieth-century consequences, Part 1 left me with the feeling that McGrath proceeded a bit too prematurely.

Secondly, in Part 2, the way in which McGrath approaches the problem of modern science and his laying out a potential solution gives the impression that he views the issue, fundamentally, as an intellectual one. Is it perhaps more likely, as C.S. Lewis believed, that the problems which plague the modern scientific establishment (including the epistemological problems that stem from fragmentation) are fundamentally *moral*, not intellectual (see *The Abolition of Man*)? On this idea, civilization requires first and foremost a turn back toward God, in repentance. Only then can our institutions—knowledge producing and otherwise—begin to function properly. Moreover, given that our current state of scientific and technological advancement has far outstripped our moral scruples, one is left wondering what a scientific establishment could be capable of with the *wrong* (morally speaking), yet effective, disciplinary imaginary in place. The lesson from the biblical story of the Tower of Babel comes to mind, where an unprecedented attempt at evil was made possible only *because* corrupt humanity enjoyed a cohesive and integrated knowledge base, and the subsequent fragmentation of knowledge through the dispersion of languages acted not only as a divine judgment, but also as a paternal guardrail.

In all, nevertheless, McGrath's contribution to the topic is a timely and welcome addition, one which is sophisticated while remaining accessible, critical while remaining constructive. It is well worth picking up.

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THE POETRY AND MUSIC OF SCIENCE: Comparing Creativity in Science and Art by Tom McLeish. New York: Oxford University Press, 2022. 414 pages. Paperback; \$16.95. ISBN: 9780192845375.

In this tour-de-force book, British physicist Tom McLeish finally comprehensively argues, in one dense volume, what so many scientists have been claiming