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A Response to Stefano Bigliardi's Assessment of "Science" in Andreas Tzortzis's *The Divine Reality*

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This article responds to Stefano Bigliardi's critique of my book *The Divine Reality*. I address his concern regarding "scientific miracles" (*al-i'jāz al-'ilmī*) and his argument that my book undermines science, clarifying the distinction between critiquing science and critiquing scientism. I elaborate on how science can support theism and counter his assessment of my epistemological position on scientific conclusions by demonstrating consistency with established academic discourse. I also address his claim that I misinterpret David Hume's work and highlight his failure to engage with my discussion on the tension between rationality and evolutionary theory. Furthermore, I defend my view of instrumentalism in science, particularly in biology, responding to Bigliardi's concerns about accepting scientific theories as best working models without epistemic commitment. This article concludes that, while Bigliardi's critique is appreciated, he misrepresents *The Divine Reality*, misinterprets established views in the philosophy of science, displays a lack of analytical rigor, and inadvertently introduces confusion into the field of Islam and science.

Introduction

In 2016, my book *The Divine Reality: God, Islam, and The Mirage of Atheism* was published. In 2024, Stefano Bigliardi published his article "The Half-Baked Loaf: Examining Hamza Andreas Tzortzis's discussion of Science in *The Divine Reality*" (henceforth *The Half-Baked Loaf*) in *Zygon: Journal of Religion and Science*. Bigliardi identifies and discusses six key problems regarding my conception of science and its relationship to Islam. The present article aims to address and respond to Bigliardi's assertions.

Like many academic fields, Islamic studies is marked by long-running debates that have not yet been conclusively settled. Engaging in these debates is worthwhile; however, one critically important intellectual virtue—clarity—should never be compromised (Cooper, 1994, 465). Contemporary research on the intersection of science and Islam has moved beyond simplistic debates over science versus religion (e.g., Burney, 2023, 699–701). However, the need for clarity persists, as demonstrated by the confusion in Bigliardi's analysis of *The Divine Reality*.

The six problems Bigliardi raises will be addressed in turn in the following sections. I hope this discussion will contribute to a better understanding of *The Divine Reality*, how Islam and science should be conceived of, and how they relate.

Scientific Miracles of Qur'ān (*al-I'jāz al-'Ilmī*)

The Divine Reality discusses science. The term *scientific* is used in various contexts and formulations. However, the term *scientific miracles* is not mentioned, as the book did not aim to discuss scientific miracles. Chapter 13 exclusively addresses the miracle of the Qur'ān, focusing on its linguistic inimitability (Tzortzis 2019, 215–47). Scientific miracles, as embodied in *al-i'jāz al-'ilmī*, are not discussed.

Bigliardi points out that I did not discuss this topic in *The Divine Reality*. From this, he concludes that "Tzortzis seems to have given up on the mission" to critically deal with the subject of scientific miracles (Bigliardi 2024, 480). Bigliardi (2024, 481) speculates on my motivations for this by claiming that "Tzortzis sensed a dreadful philosophico-exegetical challenge and chose to gingerly backtrack or suspend the discussion." A more matter-of-fact reason can be found: the topic is outside the intended scope of my book.

I had already published an essay distancing myself from the "scientific miracles" position (Tzortzis 2013). Bigliardi (2024, 481) acknowledges I "accurately" discuss the matter in that essay. I have been conducting doctoral research on *al-i'jāz al-'ilmī* for over three years, a fact publicly available through the official university website and relevant online platforms. Additionally, I communicated directly with Bigliardi regarding the focus of this research approximately one year prior to the publication of his article. Nevertheless, in his 2024 publication in this journal, Bigliardi states that I have abandoned

engagement with *al-iʿjāz al-ʿilmī*—a claim that does not reflect my academic or popular profile.

Bigliardi (2024, 481) proceeds to claim that I did imply my support for the "scientific miraculousness" in my discussion of the Big Bang and the Qur'ān. My intent was otherwise. The Qur'ān deals with natural phenomena in so much as the Qur'ān can elicit awareness in its readers of metaphysical truths as mediated through their everyday experience of the natural world. The truths alluded to relate to God and are therefore timeless. Science, on the other hand, is an ever-developing field and typically employs specialized, technical language intended for scientifically literate audiences. Although scientific conclusions may inform metaphysical reflection, as a domain of knowledge, it does not usually adjudicate metaphysical truths. As such, science's relationship with natural phenomena is drastically different from the Qur'ān's. This makes clear that the Qur'ān and science cannot be collapsed into a similar category, as both espouse very different discourses on nature. None of this is to say that a Muslim must choose the Qur'ān over science, or that science must be denied for religious-based reasons. Rather, it is to maintain awareness of the distinction between the Qur'ān and science and the rationale behind this distinction: to reduce room for confusion (Tzortzis 2019, 211). This view contrasts starkly with the "scientific miracles" position, with the latter enmeshing the Qur'ānic and scientific discourses together and the former putting a distance between them. Bigliardi fails to acknowledge this and other key concepts in my book that directly address his concerns. Unreasonably, Bigliardi demands I pronounce a few sentences dismissing the issue of scientific miracles. He writes:

> I contend that the 2019 book, which is otherwise concerned with scientism, does not sufficiently emphasize that the so-called "scientific miraculousness" of the Qur'ān is irremediably flawed . . . I think it would have been helpful if Tzortzis had added a statement or two such as "but even a possible/future alignment with science should not be taken as a demonstration of the Qur'ān's divine origin but rather an example of how science and the Qur'ān sometimes seem to coincide and sometimes do not, a fact whose importance should not be overemphasized." He did not. (Bigliardi 2024, 481)

I maintain the position that *al-iʿjāz al-ʿilmī* is an important topic of academic interest that deserves a detailed and thorough analysis. Hence, my doctoral research focusing on this topic.

Downplaying Science for the Sake of God

Bigliardi's second problem takes aim at the use of science, in relation to theism, in *The Divine Reality*. Bigliardi (2024, 481) characterizes my discussion as "the

downplaying of science that permeates Tzortzis's book." This is inaccurate. Scientism, not science, is downplayed.

John Dupré (2002, 1–2) defines scientism as: "An exaggerated and often distorted conception of what science can be expected to do or explain for us. One aspect of scientism is the idea that any question can be answered by science. This, in turn, is very often combined with a quite narrow conception of what it is for an answer, or a method of investigation, to be scientific." This distinction is important to keep in mind.

Bigliardi recognizes that my book deals with critiquing scientism. He writes: "I contend that the 2019 book, which is otherwise concerned with scientism . . ." (Bigliardi 2024, 481). Yet, he proceeds to overlook this distinction by claiming I downplay science. My approach to scientism is not unconventional. In 2023, René van Woudenberg (2023, 411–27) published a paper providing an overview of five strategies commonly used by critics against scientism.

One of these strategies van Woudenberg labels the "limits of science strategy." This strategy "pinpoints cognitive limitations to science" (van Woudenberg 2023, 420). Van Woudenberg (2023, 420–1) provides a way to "concretize the strategy" via the posing of questions that science cannot answer. One of these questions is "when is a life lived well?" In summarizing *The Divine Reality*, Bigliardi (2024, 478) acknowledges that I discuss how "science cannot answer 'why' questions" and that "science cannot answer multiple metaphysical questions." The context of my discussion was the "main limitations" of science (Tzortzis 2019, 198).

van Woudenberg details what he terms "the presupposition strategy." The strategy is to show that science presupposes certain things and that those presuppositions cannot be denied on pain of incoherence. One of these presuppositions is reasoning. van Woudenberg (2023, 420) writes:

> The strategy here, then, is that this, or any other, norm for good reasonhood is a pre-supposition of science, not something that has been established by science. It is not an a- or a b- but a d-presupposition. For it is incoherent to engage in scientific research and yet deny simplicity or any other norm for good reasonhood. Science is impossible without views on good reasonhood. This strategy targets both Strong and Weak Scientism, as science figures in both of them, and science, so the strategy argues, cannot come off the ground without making certain assumptions.

I argued something similar in *The Divine Reality*. Regardless of how logic is conceived, some form of reasoning is required for science to proceed. Such reasoning cannot be equated identically to scientific results because such reasoning is used in the very formulation and evaluation of scientific results. While science as a subject matter does indeed influence how such reasoning operates, science can neither fully explain nor fully justify it. The assumption that

the material universe is partially, if not fully, open to rational inquiry provides a foundation, albeit one out of many, for the scientific enterprise to function (Tzortzis 2019, 51). To point this out is only to make obvious that science, both in theory and in practice, is not a self-enclosed enterprise hermetically sealed or siloed from other intellectual domains.

In the same way it cannot be said that van Woudenberg is "downplaying science," it cannot be said that my argument is "downplaying science." Scientism is the target. The three other strategies van Woudenberg mentions can easily be identified in *The Divine Reality*. For the sake of brevity, they will not be explicated here.

Critiquing scientism is well-traversed ground in academia. For instance, *Scientism: The New Orthodoxy* provides a collection of scholarly contributions to this area (Williams and Robinson 2015). *The Divine Reality* mirrors such criticisms and debates over scientism. Such an endeavor cannot be equated with devaluing science.

Related to this, Bigliardi suggests that science cannot be used to support theism. He writes: "[C]onsidering the downplaying of science that permeates Tzortzis's book, one is automatically led to ask why he relies on science when it seemingly supports his views" (Bigliardi 2024, 481). This confuses the distinction between scientific arguments and metaphysical arguments. A metaphysical argument can be made that includes premises or data from the sciences without the argument itself being scientific.

In Chapter 8 of my book, I advance the "fine-tuning" argument. Notwithstanding references to scientific facts, the chapter clarifies that the argument presented is metaphysical. The universe can be plausibly described as having features that are fine-tuned. This plausibility is supported by a concatenation of scientific discoveries. The best explanation for this physical description is that specific features of the universe were designed. This explanation is metaphysical because it goes beyond merely acknowledging the existence of fine-tuned aspects of the physical universe (Tzortzis 2019, 154). When Bigliardi asks "why he relies on science," the word "relies" is imprecise. My arguments are related to metaphysics, and it is commonplace to include scientific information when discussing such subjects, as many contemporary theistic philosophers do. I do not rely on science as the primary means of establishing theistic conclusions.

Bigliardi (2024, 481–82) further contends, "If one genuinely and consistently subscribes to the idea that science does not have solid answers, that it is essentially different from revealed knowledge, then it would perhaps be fairer to also abstain from any science-based defense of religious concepts." The contention here is formulated without considering the Islamic epistemology espoused in *The Divine Reality*, especially the notion of *fiṭrah* (Tzortzis 2019, 76–79), commonly referred to as innate or natural disposition. Explaining and defending this notion is beyond the scope of this article. However, it is pertinent

to remember that in order to fairly evaluate an author's stance on a particular epistemological matter, one needs to consider the author's epistemology in full before passing judgement. If Bigliardi took into consideration how Islamic epistemology was conceptualized in my book, the quandaries he identifies in my position would seem less problematic. In Islamic epistemology, different categories of evidence—philosophical, scientific, etc.—are not, practically and theo-anthropologically speaking, in themselves persuasive of theism; rather, the plethora and plentitude of evidence function by answering unresolved doubts and providing a sufficient level of intellectual arguments, thereby allowing a person's *fiṭrah* to assert itself unhindered. It is here, when a person has no obstacle between himself and his innate nature, that the conviction of theism is found (Tzortzis 2019, 77). Accordingly, the arguments presented for Islamic theism are not necessarily ends but rather means or instruments that can awaken the *fiṭrah* (Tzortzis 2019, 76–77).

In my book, I clearly qualify my use of scientific data as neither definitive nor conclusive. For instance, I acknowledge that the science cited is not yet sufficient to provide a complete picture (Tzortzis 2019, 73). This contradicts the claim that I overly rely on science; rather, I admit the science I refer to is tentative. In a footnote, Bigliardi (2024, 489n8) recognizes my acknowledgment only to dismiss it.

Furthermore, Bigliardi (2024, 482) wrote, "[T]he 'theistic' inclinations verified by the scientists Tzortzis discusses are far from lending support to a specific religious worldview or theology, let alone Islam." Bigliardi's contention would be correct if I narrowed, limited, and restricted the notion of theism to a strictly Islamic perspective when discussing the views of scientists. Contrary to this, however, I explicitly mention that the notion of theism I discuss is not particular to any religion per se; instead, "God" can be taken as the basic concept of a creator without the frills of religious garb (Tzortzis 2019, 69). I explicitly express qualifications to my discussion. Fairness requires that these qualifications be recognized as part of the view I espouse. *The Divine Reality* relates science to theism with nuance. Neglecting this nuance may lead to misunderstandings.

Scientific Change over Time

Bigliardi identifies my view on scientific theories possibly changing over time as the third problem in my discussion of Islam and science. Bigliardi (2024, 482) claims my view is "potentially misleading." He claims I characterize scientific theories as "obsolete" and say they change due to "imitation on behalf of consumers (as happens in the world of fashion)" (Bigliardi 2024, 482). He further adds that I portray them as having the qualities of "capriciousness and evanescence" (Bigliardi 2024, 483). To be clear, none of his words quoted here can be found in *The Divine Reality*.

Bigliardi grounds the third problem by referencing pages 209–10 of my book (Bigliardi 2024, 482). He does not inform his readers that on page 209 I directly

quote Samir Okasha (Tzortzis 2019, 209). Bigliardi does not demonstrate how I misrepresent Okasha's view of scientific change.

Bigliardi is troubled by my admission that history shows that scientific theories that were acceptable in one era need not be acceptable in another era (Tzortzis 2019, 209). There is nothing untoward about this. It is a fact if not a truism in the philosophy of science. For instance, Alex Rosenberg and Lee McIntyre (2020, 144) write: "What is more, the history of science teaches us that many successful scientific theories have completely failed to substantiate the scientific realist's picture of why theories succeed. Well before Kepler, and certainly since his time, scientific theories have not only been false (and improvable), but if current science is any guide, they have sometimes been radically false in their claims about what exists and what the properties of things are, even as their predictive power has persistently increased." The history of science demonstrates that scientific theories have been held as correct only to later turn out to be incorrect. My discussion of the changes scientific theories undergo is in line with accepted academic views in the philosophy of science.

Bigliardi (2024, 482) objects to my use of the innocuous phrase "the science of the day." It must be clarified that academics use this phrase when discussing the philosophy of science. For instance, Ronald N. Giere (2000, 527) writes: "Fundamentalism, in this context, amounts to generalizing the dominant science of the day to cover literally everything."

Furthermore, one need not be antithetical towards evolution, for instance, to accept that the science recognized today may not last. Richard Dawkins (2004, 81) wrote quite candidly, "Darwin may be triumphant at the end of the twentieth century, but we must acknowledge the possibility that new facts may come to light which will force our successors of the twenty-first century to abandon Darwinism or modify it beyond recognition."

There is nothing untoward about recognizing the possibility that what is scientifically accepted in the present may be superseded scientifically in the future. This is a standard view in the philosophy of science.

Humean Concerns

The fourth problem Bigliardi identifies in *The Divine Reality* concerns the discussion on David Hume. Bigliardi (2024, 483) suggests that "Tzortzis does not seem to fully take into account the challenge historically posed by Hume to theism," which is why "Tzortzis engages with Hume's *Enquiry Concerning Human Understanding* . . . rather than his *Dialogues on Natural Religion* . . . which offers a sharp criticism of theistic views."

There are three reasons Bigliardi's contention is incorrect. First, he does not mention that Hume's *Enquiry* is widely recognized as containing sharp criticism of theism. Several academics identify the work with atheism (see, for example, Flew 1986, 134; Davies and Ruse 2021, 43; Baggini 2003, 113;

Smart 2009, 48–49). Thus, it is incorrect to suggest I chose to discuss *Enquiry* to avoid Hume's critique of theism. Second, Bigliardi demonstrates his lack of analytical rigor by not quoting me in full when I mention Hume's arguments against theism:

> David Hume wrote a corpus of material on the issue of God and religion. He argued that the idea of God was incomprehensible. He also contended the idea of God's necessary existence, and attempted to expose the weakness and limitations of the argument from design . . . Hume argued that the existence of evil and suffering in the world proved to be intellectually challenging . . . Hume's attack on the religious idea of miracles had significant influence. He maintained that belief in miracles would only be rational if the probability of the eyewitnesses to be mistaken is less than the probability of them occurring. (Tzortzis 2019, 27–28)

It is clear from this quote that I did recognize Hume's challenge to theism.

Third, Bigliardi fails to mention that I responded to Humean-inspired critiques of theism in various chapters. Chapter 11 addresses the problem of evil (Tzortzis 2019, 179–92), Chapter 5 addresses Hume's view that causality is derived from our experiences (Tzortzis 2019, 88–89), and Chapter 13 analyzes Hume's rejection of miracles and his approach to the epistemology of testimony by expounding on C. A. J. Coady's critique of Hume (Tzortzis 2019, 218–19). Hume is mentioned over twenty times in *The Divine Reality*, all of which are related to criticism of theism or articulating positions that can undermine a theistic worldview.

The Divine Reality contains a section entitled "The problem of induction" (Tzortzis 2019, 208–9). Bigliardi (2024, 483) claims my discussion is a "selective interpretation" because it ignores that Hume had already solved this problem. Bigliardi (2024, 484) charges me with providing a "partial reading of Hume" that incorrectly portrays Hume's position as "hyperbolic skepticism." However, in the academic literature, the majority position disagrees with Bigliardi here.

It is not wrong to hold that Hume's view on induction is "very radical scepticism" (Law 2020, 103), or a "harsh . . . skeptical challenge" (Schurz 2019, 7), and that according to Hume "there is no sound justification for induction" (Cozic 2018, 84), or that "most philosophers have despaired of finding a satisfactory answer to Hume's arguments" (Okasha 2001, 309), and that "the present-day consensus" is that Hume's problem of induction cannot be solved (Williamson 2017, 167).

While Bigliardi may believe that Hume's position on induction was neither radically skeptical nor left unsolved by Hume, most academics hold otherwise. My presentation of Hume in *The Divine Reality* followed what is accepted by most academics.

Evolution and Rationality

Bigliardi (2024, 484–86) designates my discussion of evolution as the fifth problem. He characterizes it as "typical, for instance, of some forms of creationism" (Bigliardi 2024, 485). To justify lumping me with creationists, Bigliardi cites one instance from my book that does not deal with creationism at all. He refers to my citation of the private letters of Darwin (Bigliardi 2024, 485). The subsection this citation is taken from, and the subsequent subsection, refer not to creationism, or even to biological change, but rather to the justification of human "rational faculties" (Tzortzis 2019, 54–59). The entirety of Chapter 3, in fact, is devoted to demonstrating that a naturalistic explanation is insufficient to account for human reason (Tzortzis 2019, 66). This should be identified as falling within the ambit of an epistemological critique of materialism (cf. Koons 2010, 284, 289, 295–97) and naturalism (cf. Lemos 2002, 790–1). One need not be a creationist to recognize that evolution strains to adequately explain and justify human rationality. Hilary Putnam (1990, 285–86), for instance, famously contended:

> In fact, if rationality were measured by survival-value, then the proto-beliefs of the cockroach, who has been around for tens of millions of years longer than we, would have a far higher claim to rationality than the sum total of human knowledge. But such a measure would be cockeyed; there is no contradiction in imagining a world in which people have utterly irrational beliefs which for some reason enable them to survive, or a world in which the most rational beliefs quickly lead to extinction.

Nowhere in Chapter 3, nor in the entirety of my book, do I reject biological change in preference to, say, intelligent design. Bigliardi could not identify any section in my book that argues for intelligent design. The only mention of intelligent design in my book is in a quote I include from Michael Ruse (Tzortzis 2019, 30).

Bigliardi (2024, 490n16) writes in a footnote: "Also, evolution should be discussed on its own scientific merits rather than in reference to Darwin's statements." He is referring to my citation of Darwin (Bigliardi 2024, 485). He elides the fact that after my citation of Darwin, in the same subsection, I cite Anthony O'Hear, John Gray, Francis Crick, and Steven Pinker, all of whom have expressed qualms about how to fit rationality into an evolutionary framework (Tzortzis 2019, 54–57). In summary, O'Hear (1997, 60) elucidates that evolutionary processes can produce false rather than true beliefs, demonstrating that nonrational beliefs may nonetheless enhance survival. Gray (2014) argues that a strictly naturalistic explanation of the human mind implies a far more skeptical stance toward human knowledge than is typically recognized. Crick (1994, 262) posits that the human mind did not evolve for the purpose

of discovering truths through the scientific method. Similarly, Steven Pinker (1997, 305) contends that the human brain developed primarily for survival and reproduction, not for the acquisition of truth.

My citation of Darwin was not the central premise of my argument; rather, it was an introductory quote to a much more sustained discussion.

The Divine Reality has little to do with intelligent design (or "creationism"). Chapter 8 of my book deals with the design argument for the existence of God. Instead of focusing on design in biological organisms as popularized by William Paley, this chapter focuses on the fine-tuning of the universe. The physical laws are discussed (Tzortzis 2019, 142–44), including cosmic order (Tzortzis 2019, 144–47). The chapter concludes as follows: there are four explanations for why the physical laws of the universe are as they are. These explanations are chance, necessity, the multiverse, or design. Given how prominent cosmic order is in the universe, design is the best explanation. The other three explanations are found wanting (Tzortzis 2019, 151).

It is inaccurate to confuse the fine-tuning argument with a rejection of terrestrial biological evolution. Chapter 8 can be appreciated by comparing it to Erkki Vesa Rope Kojonen's elegant put-down of Richard Dawkins. Dawkins starts with the fact that evolution is not designed and then extends this to encompass the universe. This is hardly satisfactory, since theists could start with the fact that the universe is designed and extend it to evolution. The starting points for both choices are philosophical (Kojonen 2016, 181–82). Regarding Chapter 8, I specifically chose to bypass discussion of biological design and instead focus on cosmic design. This effectively renders the issue of evolution irrelevant to the question of God's existence.

In discussing evolution and rationality, I take aim at "evolutionary reliabilism," which claims it was more likely that natural selection selected traits that formed cognitive faculties that produced true, reliable beliefs over traits that formed cognitive faculties that produced false beliefs (Tzortzis 2019, 57–59). Bigliardi never mentioned this is his article. Those familiar with the academic debates surrounding evolution will know that Stephen P. Stich (1990, 55–74) famously argued that evolution cannot explain how rationality reaches true beliefs. In fact, Donald Hoffman (2019) recently argued that evolution provides grounds to think that most of our beliefs are false not true. Since Hoffman is an ardent evolutionist, this indicates that evolutionary reliabilism is highly contentious. The closest Bigliardi (2024, 486) comes to grappling with this issue is referring readers to what he previously said about me regarding Hume.

Bigliardi takes me to task for quoting Darwin. He attempts a close reading of Darwin to show that Darwin's "doubt" had little to do with rationality per se and more to do with "religious-sounding conviction" (Bigliardi 2024, 485). This is not the whole picture. John Hedley Brooke (2009, 210) points out that "there were prominent scientists who doubted whether the development of the

human mind could be reduced to the action of natural selection" even during Darwin's own time. These include Charles Lyell, who was both Darwin's mentor and an ardent evolutionist. Lyell regarded the uniqueness of the human mind as something evolution could not fully explain. Another is Alfred Wallace, the cofounder of the theory of natural selection. Wallace held that the human mind had attributes that "defied explanation by natural selection" (Brooke 2009, 211). Historically, Darwin's doubt was a matter of the difficulty perceived in providing a satisfactory evolutionary explanation of human cognitive faculties. Coming to our times, Greg Littmann has argued how evolution entails skepticism of our cognitive faculties. He correctly points out that Darwin himself was worried that evolution led to skepticism. Littmann (2011, 82) cites Darwin's "horrid doubt" quote just as I did. The conclusion of Littmann's (2011, 101) article is worth quoting in full:

> It seems that Charles Darwin was right, then, to fear that his theory of evolution provides grounds for skepticism. The nature of both animal and human life suggests that we should expect to have only an incomplete capacity to comprehend the universe, while the potential simplicity and sheer number of possible correlative models of the universe suggest that we should expect our phenomenal world to have no more than a relationship of correlation to the universe as it is.

I urge readers to compare this quote to Bigliardi's (2024, 485) criticism of me, where he attempts to limit Darwin's "horrid doubt" to a matter of downplaying Darwin's intuition that "may sound supportive of a religious worldview."

Bigliardi cites page 206 of my book, where I talk about how "secular academics" dispute evolution. He then cites page 212, where I accept that evolution is "the current best working model" for understanding biological change. Juxtaposing both references, Bigliardi (2024, 485) concludes that my approach is "confused and confusing." What gets lost in Bigliardi's assessment is the argument I presented. Scientific theories are neither considered nor claimed to be absolute. Scientists recognize that theories will always be in a state or condition that is not final. Theories can be improved, modified, expanded. Progress in scientific understanding may force scientists to rethink cherished theories. Despite this, scientists have found a pragmatic way to handle theories while keeping aware of their yet-to-be finalized state. By taking theories as models that approximate truth, scientists can utilize these in a bid to advance scientific knowledge. This practice is most obvious in the case of quantum mechanics and general relativity. Neither can be reconciled with the other. Regardless of this incompatibility, scientists find it useful to accept both as working models. Thus, it is not contradictory to hold that a theory should be utilized while acknowledging that it is not finalized (Tzortzis 2019, 206–7).

My approach to evolution is like the approach many scientists have to scientific theories in general. They recognize these theories as the best working models while also acknowledging that they still contain deep problems yet to be solved and weaknesses yet to be overcome. This is the opposite of sending "mixed signals" (Bigliardi 2024, 484).

Ultimately, Chapter 3 of *The Divine Reality* is about atheism more than it is about evolution. The concluding paragraph begins with this sentence: "Atheism does not—and cannot—have a monopoly on reason" (Tzortzis 2019, 66).

Faith in Science

The final problem Bigliardi identifies relates to how I view science as a working model. He refers to the following quote of mine:

> We can accept scientific conclusions practically and as working models, but if anything contradicts revelation (after attempting to reconcile the two), you do not have to accept the scientific conclusion into your belief system. This is why Muslims should not need to deny Darwinian evolution; they can accept it practically as the current best-working model, but understand that some aspects of it cannot be reconciled with orthodoxy. Remember, just because something is the current best-working model, it is not the absolute truth. It is also important to note that scientific knowledge and Divine revelation have two different sources. One is from the human limited mind, the other is from God. (Bigliardi 2024, 479; cf. Tzortzis 2019, 212)

Bigliardi (2024, 486–87) characterizes this as "accepting without believing" and claims it is an incoherent position to take regarding scientific theories.

In Bigliardi's (2024, 487) sixth problem, he imagines a fictional scenario in which a "Tzortzisian" (his term, not mine) schoolteacher is struggling to explain religious and scientific concepts. He proceeds to castigate this fictional individual (Bigliardi 2024, 486–87). To justify his scenario, Bigliardi writes (2024, 491n20), "Here, I am inspired by Ian Barbour's (1923–2013) criticism of the suggestion to treat religion and science as separate (cf. Barbour 2000, 17–22, 36–37)."

However, this fictional scenario Bigliardi describes was not mentioned in *The Divine Reality* and does not represent my approach or thinking on the topic. Bigliardi's (2024, 487) scenario involves the plight of a "Muslim science teacher." He attacks a "Tzortzisian instructor" for providing "religion-based criticism of evolution while teaching it, or teaching evolution along with creationism" (Bigliardi 2024, 487). He then claims this instructor would become confused, because "which theology will our teacher pick?" (Bigliardi 2024, 487). A "Tzortzisian biologist," he claims, would be unable to be "proficient in biology while ignoring evolution" (Bigliardi 2024, 487). He wonders how "Muslim teachers, schoolers, students, and public" can possibly accept a model

as a working model while being aware that the whole of it, or aspects of it, may be proven untrue later (Bigliardi 2024, 487). Nowhere in *The Divine Reality* do I claim that the book is a syllabus for natural sciences taught at higher education institutions. As for Bigliardi's repeated worries that I advocate for creationism to be taught in biology classrooms, he cannot point to a single instance in *The Divine Reality* where I make such a proposal.

The Divine Reality was written as a popular book. Not surprisingly, many technical terms were not included. However, anyone familiar with the philosophy of science will recognize that the position I describe in my book is not creationism or a rejection of science but rather instrumentalism. Kyle Stanford (2006, 400), the American philosopher, describes instrumentalism as follows: "Unifying all these positions is the insistence that one can and should make full pragmatic use of scientific theories either without believing the claims they seem to make about nature (or some parts of nature) or without regarding them as actually making such claims in the first place." He further explains: "[M]ore recently influential forms of instrumentalism grant both the assertoric force and the ineliminability of theoretical claims but insist that such theories should simply be used for prediction of experimental outcomes and other practical goals without a requirement of belief in the claims they in fact make about nature itself (or some parts thereof)" (Stanford 2006, 403). He adds: "As these influential formulations of the view illustrate, epistemic instrumentalism seems committed to some distinction between believing a theory to be true and accepting or using it without believing what it says" (Stanford 2006, 404).

How can someone accept a scientific theory without believing it? Or more broadly, can one accept a proposition without believing it? In his refutation of Paul Horwich, Andre Kulka provides a sturdy elucidation of this point. A distinction needs to be drawn between the "folk-psychological concept" of belief and the notion of "epistemic belief." On the former, belief is a mixture of epistemic and pragmatic grounds for evaluating a view. On the latter, belief is exclusively a matter of epistemic grounds. Acceptance and belief can only be regarded as identical, or entailing one another, in the folk-psychological view of belief. Epistemic belief, however, is distinct enough to make acceptance and belief different (Kulka 1992, 493–94).

Kulka provides a useful illustration of this. Believing and accepting can be "different mental states even if they are associated with exactly the same behavioural disposition." For instance, take two people living in the same society. One person adheres to social norms and customs, not because they believes they are true, correct, or even good but rather because of the social pressure involved. Another person adheres to these same social norms and customs while believing they are true, correct, and even good. Observationally, both people behave in a similar manner; yet, in terms of their mental states, one accepts without believing the social norms, whereas the other accepts and

believes in those social norms. Hence, acceptance and belief are not identical. The first person lacks epistemic reasons to believe yet has pragmatic reasons to accept. The second person believes due to a mixture of epistemic and pragmatic reasons (Kulka 1992, 495).

The matter is not convoluted. As Kulka (1992, 495) put it: "The instrumentalist is simply one who maintains that theories may properly be judged to have high pragmatic value, but never high epistemic value."

There are several good reasons for adopting an instrumentalist approach to scientific theories. Given the limitations of space and the aims of this response, an extended discussion of this cannot be had. However, it will not be amiss to briefly point to a recent defense of instrumentalism propounded by Darrell P. Rowbottom.

The third chapter of Rowbottom's (2019, 62–81) book is dedicated to the argument from "unconceived alternatives." When evaluating theories, we must keep aware of "unconceived observations." These are observations scientists have not even conceived of, let alone sought out. How is it possible for scientists to not conceive of observations relevant to their research? Rowbottom (2019, 65) answers: "The observations in question are theory-laden, and the theory (or set of theories) necessary to conceive of them is unconceived." That is, observations make sense within a theory, and it is possible that if scientists have not conceived of a theory, they will also not conceive of the observations related to that theory.

Models are essential for predictions in science. Rowbottom makes the neat point that there could be unconceived models, which would mean there are predictions no scientist has yet conceived of. As he puts it: "Why does this matter for confirmation? In essence, unconceived models may be responsible for unconceived predictions, and the resources of a theory may fail to be apparent—and be underestimated (or even overestimated)—as a result" (Rowbottom 2019, 68).

The explanatory power of a theory is based partly on true statements made regarding initial conditions. There have been cases where "we may simply fail to conceive of the initial conditions" (Rowbottom 2019, 72). Rowbottom sees an example of this in Newton's gravitational theory of tides, which was popular with British scientists in the eighteenth century. The superficial explanatory power this theory had was due to "the unconceived initial conditions in (and concerning) our seas and oceans, which are highly complex" (Rowbottom 2019, 72). The gravitational theory of tides failed to take into consideration that the oceans are not as simple as previously thought.

Unconceived experiments pose a challenge to how certain one can be in regarding a theory as ultimately true. Rowbottom (2019, 73) astutely observes: "Scientists' assessments of their theories depend on the evidence at their disposal . . . And the available experiments delimit the available evidence. Hence, which theories are more confirmed/corroborated, and therefore whether progress

towards truth occurs, is (sometimes) contingent on which experiments are conceived of." The judgments made on scientific theories are highly contingent. And unconceived alternatives easily affect this contingency.

Scientific theories are judged on "theoretical virtues" such as simplicity. However, it is plausible that how these virtues are understood changes across time. There can be legitimate disputes over what the virtues even mean (Rowbottom 2019, 76). The argument from "unconceived alternatives" concludes that "*agnosticism* about the truthlikeness of contemporary theories (and the future direction of science with regard to truth) is prudent" (Rowbottom 2019, 77).

To relate this to evolution, I argue as follows. Evolution is currently the best theory scientists have to explain biological change. This does not entail that evolution is true. It cannot be ruled out that other theories—as yet unconceived—may explain biological change better than Darwinian evolution. A prudent option is to remain uncommitted with regards to the truthfulness of evolution while acknowledging that current scientific practice does indeed work within an evolutionary theory.

This view is not new or unique to me; rather, it is a view endorsed by Alex Rosenberg (2012), an academic known for his staunch defense of atheism. He takes an instrumentalist view of biology. Rosenberg (2001, 745) writes:

> I have argued that biology is best construed as an instrumental science, whose explanatory strategy and comparative predictive weakness reflects limits on what we can rely on in making real-time predictions and explanations intelligible to us. I held further that this is a difference between biology and physical science largely consequent to the operations of natural selection in conferring biological systems here on earth with a complexity beyond our powers to fully assimilate.

Rosenberg defines instrumentalism as: "[T]he view that scientific theories are useful instruments, heuristic devices, tools we employ for organizing our experience, but not literal claims about the world that are either true or false" (Rosenberg and McIntyre 2020, 144). Far from being a strange view, instrumentalism was held by scientists themselves as evident from the history of the physical sciences (Rosenberg and McIntyre 2020, 145). Rosenberg proceeds to argue that Darwin's theory of natural selection is best understood via instrumentalism instead of realism (Rosenberg and McIntyre 2020, 166–67).

Furthermore, Rosenberg has been quite open in acknowledging that biology in particular is more scientifically limited than other areas of science. I include this quote of his:

> I argue that one particular science faces limits that do not confront other sciences, and that these limits reflect a combination of facts about the world and facts about the cognitive and computational limitations of the scientists whose

> business it is to advance the frontiers of this science. The science is biology, and the limitations I claim it faces are those of explanatory and predictive power. In the first part of this chapter I advance a contingent, factual argument about the process of natural selection that consigns the biology in which we humans can take an interest to a kind of explanatory and predictive weakness absent in our physical science. (Rosenberg 2000, 247)

Bigliardi's lack of analytical rigor is demonstrated when a comparison is made regarding the nuances of an instrumentalist approach to biology (and science in general) to Bigliardi's own description of this field: "In such a scenario, 'accepting without believing' may just be used as doublespeak to conceal and embellish deep-seated resistance to, and ignorance of, evolution" (Bigliardi 2024, 487). For the sake of transparency, I must point out that the phrase "accepting without believing" in this quote cannot be found in *The Divine Reality*. Bigliardi coined it.

Conclusion

In *The Half-Baked Loaf*, Bigliardi laudably points out several instances of what he considers problems in my discussion of Islam and science. His identification and articulation of these six problems sets the stage for my response and clarification in this article.

The first problem Bigliardi highlights is that *The Divine Reality* does not discuss the "scientific miracles" (*al-i'jāz al-'ilmi*). He surmises that this omission is due to me having abandoned further engagement with the topic. As I had already informed Bigliardi prior to his publication of the article, I am doing my doctoral research on the topic. The reason the "scientific miracles" are not mentioned in my book is because the book is not aimed at discussing the "scientific miracles." Notwithstanding, the necessary key concepts that address Bigliardi's concerns are mentioned in the book but not cited by him.

The second problem Bigliardi emphasizes is how science is downplayed in *The Divine Reality*. I have clarified that what is downplayed is scientism and not science, which are not identical to one another. Relatedly, Bigliardi considers it inconsistent for me to rely on science in arguments for God's existence. The notion of *relying* is ambiguous. It is common practice for metaphysical arguments to use premises that refer to scientific facts without the arguments themselves being rendered as scientific. This is what I do. I do not, however, rely on scientific arguments to justify the conclusion that God exists.

The third problem Bigliardi finds is how I describe science as changing over time. As was shown, my description of science here is in line with established academic discourse. The fourth problem he finds is my discussion of Hume. He suggests I misconstrue Hume's position. As shown, the view I set out is the majority opinion in the academic literature.

The fifth problem Bigliardi identifies is with my discussion of evolution. Unfortunately, he did not tackle the substantive issue, which was the tension I highlighted between the cognitive faculties and evolutionary theory. This tension has been recognized by several other reputed academics, some of whom are evolutionists themselves.

The sixth and final problem Bigliardi talks about is the notion of "accepting without believing" scientific theories. This phrase is not used by me. Furthermore, I clarified that my discussion is in line with standard academic discourse on instrumentalism in the philosophy of science.

When *The Divine Reality* is read fairly, the arguments it contains overlap in many instances with what is academically recognized in the field of philosophy of science. While a person has the right to disagree with such arguments, he or she should acknowledge that such views are the norm in academic discourse and should not interpret these views as outliers. To do so would be sacrificing clarity for the sake of polemics.

References

Baggini, Julian. 2003. *Atheism: A Very Short Introduction*. Oxford: Oxford University Press.

Bigliardi, Stefano. 2024. "The Half-Baked Loaf: Examining Hamza Andreas Tzortzis's Discussion of Science in *The Divine Reality*." *Zygon: Journal of Religion and Science* 59 (2): 474–92.

Brooke, John Hedley. 2009. "Darwin and Victorian Christianity." In *The Cambridge Companion to Darwin*, edited by Jonathan Hodge and Gregory Radick, 197–218. Cambridge: Cambridge University Press.

Burney, Saleema F. 2023. "Shoaib Malik's "Islam and Evolution": Sociological Reflections on the Developing Engagement of British Muslim Leadership with Science." *Theology and Science* 21 (4): 696–707.

Cooper, Neil. 1994. "The Intellectual Virtues." *Philosophy* 69:459–69.

Cozic, Mikaël. 2018. "Confirmation and Induction." In *The Philosophy of Science: A Companion*, edited by Anouk Barberousse, Denis Bonnay, and Mikaël Cozic, 53–94. Oxford: Oxford University Press.

Crick, Francis. 1994. *The Astonishing Hypothesis: The Scientific Search for the Soul*. New York: Charles Scribner's Sons.

Davies, Brian, and Michael Ruse. 2021. *Taking God Seriously: Two Different Voices*. Cambridge: Cambridge University Press.

Dawkins, Richard. 2004. *A Devil's Chaplain*. Boston: Mariner Books.

Dupré, John. 2002. *Human Nature and the Limits of Science*. Oxford: Oxford University Press.

Flew, Antony. 1986. "Hume's Philosophy of Religion." *Royal Institute of Philosophy Lecture Series* 20:129–46.

Giere, Ronald N. 2000. "Review of *The Dappled World: A Study of the Boundaries of Science* by Nancy Cartwright." *Philosophy of Science* 67:527–30.

Gray, John. 2014. "The Closed Mind of Richard Dawkins." *New Republic*, October 3. https://newrepublic.com/article/119596/appetite-wonder-review-closed-mind-richard-dawkins.

Hoffman, Donald. 2019. *The Case Against Reality: Why Evolution Hid the Truth from Our Eyes*. New York: W. W. Norton & Company.

Kojonen, Erkki Vesa Rope. 2016. *The Intelligent Design Debate and the Temptation of Scientism*. London: Routledge.

Koons, Robert C. 2010. "Epistemological Objections to Materialism." In *The Waning of Materialism*, edited by Robert C. Koons and George Bealer, 281–306. Oxford: Oxford University Press.

Kulka, Andre. 1992. "Discussion: On the Coherence of Instrumentalism." *Philosophy of Science* 59 (3): 492–97.

Law, Stephen. 2020. "How Can We Tell Science from Pseudoscience?" In *What is Scientific Knowledge? An Introduction to Contemporary Epistemology of Science*, edited by Kevin McCain and Kostas Kampourakis, 100–16. New York: Routledge.

Lemos, John. 2002. "Theism, Evolutionary Epistemology, and Two Theories of Truth." *Zygon: Journal of Religion and Science* 37 (4): 789–801.

Littman, Greg. 2011. "Darwin's Doubt Defended: Why Evolution Supports Skepticism." *Philosophical Papers* 40 (1): 81–103.

O'Hear, Anthony. 1997. *Beyond Evolution: Human Nature and the Limits of Evolutionary Explanation*. New York: Oxford University Press.

Okasha, Samir. 2001. "What Did Hume Really Show About Induction?" *The Philosophical Quarterly* 51:307–27.

Pinker, Steven. 1997. *How the Mind Works*. New York: W. W. Norton.

Putnam, Hilary. 1990. "Why Reason Can't Be Naturalised?" In *Philosophy, Mind, and Cognitive Inquiry: Resources for Understanding Mental Processes*, edited by David J. Cole, James H. Fetzer, and Terry L. Rakin, 283–303. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Rosenberg, Alex. 2000. "Limits to Biological Knowledge." In *Science at Century's End: Philosophical Questions on the Progress and Limits of Science*, edited by Martin Carrier, Gerald J. Massey, and Laura Ruestche, 247–64. Pittsburgh: University Pittsburgh Press.

———. 2001. "How Is Biological Explanation Possible?" *The British Journal of the Philosophy of Science* 52 (4): 735–60.

———. 2012. *The Atheist's Guide to Reality: Enjoying Life Without Illusions*. New York: W. W. Norton & Company.

Rosenberg, Alex, and Lee McIntyre. 2020. *Philosophy of Science: A Contemporary Introduction*. New York: Routledge.

Rowbottom, Darell P. 2019. *The Instrument of Science: Scientific Anti-Realism Revitalised*. New York: Routledge.

Schurz, Gerhard. 2019. *Hume's Problem Solved: The Optimality of Meta-Induction*. Cambridge, MA: MIT Press.

Smart, J. J. C. 2009. "The Coming of Disbelief." In *50 Voices of Disbelief: Why We Are Atheists*, edited by Russell Blackford and Udo Schüklenk, 48–49. Oxford: Wiley-Blackwell.

Stanford, P. Kyle. 2006. "Instrumentalism." In *The Philosophy of Science: An Encyclopedia*, edited by Sahotra Sarkar and Jessica Pfeifer, 400–5. New York: Routledge.

Stich, Stephen P. 1990. *The Fragmentation of Reason: Preface to a Pragmatic Theory of Cognitive Evaluation*. Cambridge, MA: MIT Press.

Tzortzis, Hamza Andreas. 2013. "Does the Quran Contain Scientific Miracles? A New Approach." https://www.hamzatzortzis.com/does-the-quran-contain-scientific-miracles-a-new-approach/.

———. 2019. *The Divine Reality: God, Islam, and the Mirage of Atheism*. Hong Kong: Lion Rock Publishing.

van Woudenberg, René. 2023. "Argumentative Strategies against Scientism: An Overview." *Interdisciplinary Science Reviews* 48 (2): 411–26.

Williams, R. N., and Daniel N. Robinson, eds. 2015. *Scientism: The New Orthodoxy*. London: Bloomsbury.

Williamson, Jon. 2017. *Lectures on Inductive Logic*. Oxford: Oxford University Press.