How Should Science Treat the Unobservable?

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March 18, 2020

Many segments of 21st century western society have bought into the position that science can explain everything. Even the gaps formed by things we don't know will, given sufficient time and effort, eventually be filled in via scientific investigation. Vince Vitale, in describing his younger years when he first heard the Christian message, says he "jumped from science to scientism – from the fact that science can explain a lot to the assumption that it can explain everything."[1] His words could equally describe the movement of much of our culture. However, scientism is a naïve worldview. It fails to reflect on the necessary limitations of science. In short, while there certainly are many valuable things science can tell us, there are also many things it cannot.

For example, Del Ratzsch observes that science cannot validate its own exploratory mechanism, the scientific method, nor can it justify its necessary presuppositions.[2] The scientific method must merely assume that nature is uniform, it cannot prove such a claim. Vince Vitale noted how science presupposes regularity as well.

> We just assume that when we wake up tomorrow the universe is going to carry on in the regular, stable way that it always has, without pausing to consider what an astonishing assumption that is. … Why do we assume that the universe is going to continue to operate with regularity? We might respond, "Well, that's how it's always operated in the past." But that's not an answer; that's precisely the question! *Why?* Why has it always done so, and why should we think it will continue to do so tomorrow?[3]

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[1] Ravi Zacharias and Vince Vitale, *Jesus Among Secular Gods: The Countercultural Claims of Christ* (New York: Faith Words, 2017), 64.

[2] Del Ratzsch, *Science & Its Limits: The Natural Sciences in Christian Perspective* (Downers Grove, IL: Intervarsity Press, 2000), 93.

[3] Zacharias and Vitale, *Jesus Among Secular Gods*, 78.

Similarly, science cannot answer questions of the ultimate explanation for the existence of the universe or matters of purpose.[4]

While there are many categories of knowledge to which science cannot speak, its problems go even deeper. Ultimately, science is incapable of telling us definitively whether its own theories are true or false. Take the example of scientific theories about unobservable entities, such as quarks. Because we cannot observe them, all theories must be based upon what we can observe. We then employ certain principles to "bridge the gap" between the observable and the unobservable. Ratszch identifies the problems this causes, however.

> If we had no principles telling us how events on the unobservable theoretical level affected events on the observable empirical level, we could make no empirical predictions on the basis of a theory, and we thus could not test the theory observationally at all. But that raises a sticky problem. How do we arrive at the correct principles for bridging the gap between the unobservable and the observable?[5]

Similar problems arise when trying to claim a theory is false. Even when a test fails to validate a theory, it is impossible to definitively state that the failure lies solely in the hands of the theory. There are a number of assumptions a scientist must make, for example, about the equipment used during their investigation, not just in regard to its functioning but also in some cases concerning the scientific theories underlying the equipment. Ratzsch gives the example of a cyclotron. The use of such a device necessarily includes scientific theories about what is occurring inside the cyclotron. Even if an experiment fails to validate the primary theory under

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[4] Ratzsch, *Science & Its Limits*, 94-95.

[5] Ibid., 76.

investigation, the problem may actually be in the background theories which the scientist employs.[6]

However, this does not mean science cannot yield valuable information thereby increasing our knowledge. We make certain projections from what we do see to what we do not. While we cannot definitively prove that these projections are true, the belief that they are may still hold strong warrant. After all, it is impossible to definitively prove all our beliefs. Inevitably we must make certain starting assumptions about the universe. The question, then, is whether our worldview can successfully ground those assumptions and whether we are warranted in holding them.

Alvin Plantinga defines warranted beliefs as follows.

> …a belief B has warrant for you if and only if (1) the cognitive faculties involved in the production of B are functioning properly…; (2) your cognitive environment is sufficiently similar to the one for which your cognitive faculties are designed; (3) … the design plan governing the production of the belief in question involves, as purpose or function, the production of true beliefs…; and (4) the design plan is a good one: that is, there is a high statistical or objective probability that a belief produced in accordance with the relevant segment of the design plan in that sort of environment is true.[7]

Certain types of projections would certainly seem to be sufficiently warranted for us to hold. For example, Ratzsch points out that when we make simple generalizations (such as assuming that because water boils at 100° everywhere we observe, then it likely boils at 100° everywhere in the universe), all we are doing is projecting patterns from areas in the universe which we have observed to areas in that same universe which we have not. Given our necessary (and warranted)

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[6] Ibid., 77.

[7] Alvin Plantinga, *Warrant and Proper Function* (New York: Oxford University Press, 1993), 194.

assumption as to uniformity, this is a reasonable projection to make. However, the case is arguably different when we speak of making projections from the observable to unobserved, theoretical entities that we cannot even know exist. Now we are not merely making observations about the unobserved, but the by definition unobservable.[8]

The question then arises as to how science should treat theoretical, unobserved entities. Responses to this question fall under two general categories: realism and antirealism. Antirealists contend either that there are no unobservable structures, entities or processes, or if there are, either we create them, or we have no hope of knowing truth about them. For example, ontological antirealists claim that hidden entities do not exist or if they do, "we humans somehow produce them."[9] Linguistic antirealists argue that the terms we use to refer to hidden entities (such as "electron") do not refer to an actual entity, but rather merely to a category of observations made or operations employed by scientists.[10] Finally, epistemological antirealists acknowledge that our theories about these unobservable entities may be either true or false, but we humans are likely incapable of discovering the truth.[11]

Realism, on the other hand, according to Del Ratzsch, "is the view that theories can be true and accurate descriptions of objective reality, that theoretical terms can actually refer to real entities having (at least some of) the properties we think they do, that we can know that certain theories are true and can know that the entities and processes they purport to refer to are indeed

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[8] Ratzsch, *Science & Its Limits*, 78.

[9] Ibid., 79.

[10] Ibid.

[11] Ibid., 80.

real, and that such descriptions and knowledge are at least aims of science."[12] Like antirealism, it also has variations under this broad heading. Hard realists claim that scientific theories are literally true in exactly the way we understand them and refer to real entities. Limited realism agrees that scientific theories are true but allows that not every aspect of a theory must be taken literally. Metaphoric realism holds that theoretical truths are metaphorical truths, such that when we described an unobserved reality as a "particle" or "wave" we are not describing it literally, but yet are still conveying truth about it in the same way that a metaphor enlightens us to some truth about its subject.[13] Finally, some scientists define theoretical progress in terms of the movement of scientific knowledge toward truth, getting closer and closer to truth as science progresses. Because this view acknowledges the reality of a "truth" toward which science moves, it falls under the category of realism.[14]

Antirealism suffers from both scientific and theological problems. At their core, all antirealist variations claim that theories cannot get past the observational. But as Ratzsch points out, if this were true, "it is difficult to account for the success science has had in predicting entirely new phenomena, phenomena often observationally unrelated to either the phenomena for which the theory was originally proposed or to anything else previously known."[15] Sometimes theories about unobserved reality carry with them unexpected implications about observed reality, and oftentimes those implications have been demonstrated to be correct.

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[12] Ibid., 82.

[13] Ibid., 82-84.

[14] Ibid., 85-86.

[15] Ibid., 81.

Theologically, the Bible describes many entities that we do not observe. Whether it be the immaterial God Himself, angels, demons, etc., Scripture describes a spiritual reality that exists beyond the physical realm which we are capable of observing and subjecting to scientific testing. While it certainly is true that the spiritual realm may affect the physical realm, such as when God performs a miracle, what we observe are the effects of God's action, not God Himself. A methodological analogy could be made between observing the effects of a miracle and observing the effects of a light wave, in the sense that in both instances what we are capable of observing is the result, not the causal agent itself. As such, antirealism is inconsistent with a biblical view of reality.

This does not mean that realism is not without its issues as well. All variations of realism will inevitably struggle with the problem of confirmation. How are we to confirm our theories if they are in connection with unobservable entities and we are limited to that which we can observe? Again, Ratzsch points out, "If we are to obtain positive instances of theoretical principles, it will have to be through correspondence rules. Correspondence rules are principles stating connections between the observable and the theoretical…"[16] However, "what reason do we have for thinking that unobservable things somehow parallel specific things with which we are familiar?"[17]

One way in which Ratzsch argues that realists can lessen this concern is through comparing multiple theories. If we take the correspondence rules supposed in one theory, and the observational implications that accompany them, and compare them with the rules and

[16] Ibid., 87.

[17] Ibid., 88.

implications of another, oftentimes the two theories' correspondence rules can be used to check each other. While it is still no guarantee of truth, the more rules that cohere, the less likely they are to be incorrect (coherence is not a sufficient test for truth, but it is a necessary one).[18]

Thus, despite its limitations, so long as we appreciate the necessity of scientific presuppositions and adopt a worldview that sufficiently grounds them, an approach to science based in realism is capable of discovering truth about real matters, even those beyond our observation, and to develop theories about which it is rational for us to believe.

Despite the clear limitations of science and the failure of scientism as a worldview, this has not stopped many people from claiming science has disproven or at least done away with the role once played by religion. Perhaps the least compelling of these arguments is the claim that religious belief is not scientific. First, as should be clear from the discussion above, this is not even a relevant objection. Even assuming religion is not scientific, one could turn the claim around and say science is not religious. Neither claim in itself proves anything in regard to whether a system is capable of yielding truth. As argued above, scientism (i.e., the claim that science is the ultimate arbiter of all truth claims) fails as a worldview. There are clear categories of truth toward which scientific inquiry is incapable and/or ill-equipped to speak. In fact, science cannot even justify the foundational definition of scientism, so scientism fails its own test.

The claim that "religion is not scientific" fails in the same way. It also fails its own test. That claim itself is not scientific. It is a philosophical conclusion, not one arrived at through observation derived via sensory data. Thus, if something must be scientific in order to be true, then we must judge the claim that "religion is not scientific" to be unworthy of belief.

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[18] Ibid., 89-90.

The fact that science operates through sensory data illustrates a further problem with this objection. Ratzsch asks, "Is the belief that I exist scientific? … [I]f that belief depended on what I could sense, I would have to assume my own existence at the outset in order to believe that I was having the relevant sensory experience, which would make the whole process hopelessly circular."[19] Thus, there are plenty of beliefs we must hold, including the belief in our own existence, that we do not and cannot hold on scientific grounds.

What makes this objection so uncompelling is that we do not need to go past the claim itself to see its failures. In other words, when a skeptic argues, for example, that religious belief is not supported by evidence, in responding to their claim, we move past the claim itself and into inquiries about the quantity or quality of the evidence, or even what types of things people should accept as evidence in the first place. But in the case of the claim that religion is not scientific, we do not need to engage on whether the statement is true or false. The statement itself fails on several logical levels regardless of whether it is true. Thus, it is uncompelling at its core.

[19] Ibid., 101.