

AHEAD BY A CENTURY

JOHN PERRY and D.T. EVERHART

Paul Tyson's *A Christian Theology of Science* has convinced me that David Hume would not be able to affirm the Nicene Creed, though admittedly I didn't need much convincing. In fact, Tyson persuaded me of nearly all his claims about matters before, say, 1922. It is not as though I disagree with the rest, but that in telling the sweeping story of theology's fate in modernity—on which I agree with Tyson—he cuts off his story too soon: a hundred years ago, just when things were about to get exciting in theology again. If he had continued telling the story until today, his book would likely come to very different conclusions; my own conclusions, not coincidentally.¹ My plan here is first, to summarize the book, second, to continue Tyson's own story but filling in the missing last century, and finally, to consider a few examples to show how Tyson's Christian theology of science could cash out in scientific practice.

Summary

Tyson's thesis belongs to a broader category of models which conceive of theology and science in terms of conflict. Note, however, how terrifically narrow is Tyson's conflict: Christians need only have problems with a science that is *a priori* empiricist, rationalist, and reductionist. How far we have come since the view of the late nineteenth century that science and religion are perpetually and inevitably at war!

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¹ "My" conclusions? That requires explanation. I have been working in the field of theology and science only for the last seven years or so. My appointment, my real job so to speak, is in theological ethics. In the humanities, we mostly write solo. Not so in the sciences. I begin this way because I feel like I am writing on behalf of many others, and one of the odd things about collaboration is you lose track, in a mystical way, of whose ideas are whose. The present essay could be considered the product of our St Andrews 'lab' and of my partners in it, first Sarah Lane Ritchie, and more recently Joanna Leidenhag, not that they should be blamed for any of what follows. I begin this way for a second reason: D.T. Everhart, who works with me now, was able to speak up on behalf of Paul Tyson, to ensure—I hope—that we gave him the most generous possible reading, which Everhart contributed to specifically in the latter sections below. See John Perry and Sarah Lane Ritchie, "Magnets, Magic, and Other Anomalies: In Defense of Methodological Naturalism," *Zygon* 53, no. 4 (December 2018): 1064-1093, and John Perry and Joanna Leidenhag, *Science-Engaged Theology* (Cambridge: Cambridge University Press, 2023).

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Andrew Dickson White, who was one of the founders (or rather inventors) of that earliest incarnation, bears a strange similarity to Tyson. In 1869, White argued that science and *religion* are at war. Then again, he reflected later, Protestants can be good scientists. So maybe the war is only between science and *ecclesiasticism*, which was how he restated his thesis in 1876. But even that was too broad. He later supposed that the real conflict must be between science and *dogmatic theology*.² Eventually he settled on calling his magnum opus, which was narrower still, *A History of the Warfare of Science with Theology in Christendom*.

This is a mirror image to Tyson. Whereas White treated science as one thing and theology as the problem child, Tyson here treats theology as *mostly* one thing—the affirmations of the ancient creeds—and science as needing further nuance. Here is Tyson's story. The first scientists had little reason for conflict with theology; why would they? They were mostly Christians themselves. But along came Hume (empiricism), Kant (rationalism), and later reductivists who left no room for the beliefs of creedal Christians. If this is Tyson's magnum opus, maybe it should be called, *A History of the Warfare of Theology with Empirico-Ratio-Reductionist Science in Modernity*—which is indeed admirably narrow.

The root of the conflict, for Tyson, is competing 'first truth discourses', a term that was new to me. Before modernity, Christian theologians were theocentric ontological foundationalists (TOF). By this, Tyson means that theology was built on top of a "Platonically inflected Christian epistemology."³ If Christians must adopt a rival first truth discourse, Christians cannot do real theology and speak faithfully of some (or maybe all?) scientific matters. Tyson names the rival first truth discourse 'egocentric epistemological foundationalism' (EEF). This, Tyson claims, lies at the heart of all modern science and controls the research culture of universities. How bad is the war? Sometimes, according to Tyson, it's quite bad: 'perhaps it is time for at least a serious minority of Christian philosophical theologians to depart from the academic cities and build monasteries in the desert again.'⁴ Other times, it is not so bad, as when Tyson speaks only of friction: 'a theological engagement with science that retains the integrity of Christian epistemology is going to be characterized by first-order friction. This friction should not be feared.'⁵

What Came Next...

There is another strange similarity between White and Tyson here: their surveys of theology end in the late nineteenth century. We know why White's story ends here (he died), but why does Tyson's? He was just about to get to the exciting part of the story! My next section aims to continue Tyson's story, not to challenge his presuppositions, but to show that if we include theologians after, say, 1922, the very same story that Tyson wants to tell looks very different.

² *God and Nature: Historical Essays on the Encounter Between Christianity and Science*, edited by David C. Lindberg and Ronald L. Numbers (Berkeley, CA: University of California Press, 1986), 140.

³ Paul Tyson, *A Christian Theology of Science: Reimagining a Theological Vision of Natural Knowledge* (Grand Rapids, MI: Baker Academic, 2022), 16n4.

⁴ *Ibid.*, 127.

⁵ *Ibid.*, 201.

Among Christian Theologians?

'The passage from Hermann Reimarus, to Friedrich Schleiermacher, to David Strauss, to Ludwig Feuerbach, and to Karl Marx is a complex yet bold line of conceptual influence', Tyson writes. After them, who came next? Whatever it was, Tyson continues, 'it seems to me that the dominant intellectual currents of nineteenth-century European Protestant theology did not—in general—have the theological or philosophical resources to resist the infatuating pull of scientific compromise with their most foundational truth commitments.'⁶ So, who *did* come next in theology? Tyson never says, but readers of this journal know. A young Swiss theologian who refused to play the game under these conditions.

Karl Barth proclaimed a pox on both sides, both those too ready to culturally accommodate (like Schleiermacher) and those too ready to culturally repudiate (like Charles Hodge). Then Hans Frei, who was the premier interpreter of Barth for the American audience, published *The Eclipse of Biblical Narrative* which deconstructed all members of Tyson's 'bold line' of influence from Reimarus to Schleiermacher to Strauss. George Lindbeck then published *The Nature of Doctrine* which named, in a theoretical way that Barth never managed, the theological cul-de-sacs of modernity by labelling the liberal view as experiential-expressive and the conservative position as cognitive-propositional. This in turn birthed the narrative theology of Stanley Hauerwas and, later, the Radical Orthodoxy of John Milbank. And the rest is history, especially known to this audience because this leads directly to the founding of *Modern Theology*.⁷

Among Christian Philosophers?

What followed among Christian philosophers after the influence of Descartes, Locke, Hume, and Kant? Much the same as what we saw in post-Barthian theology, though with a reading of Barth that was perhaps less inflected by Wittgenstein. Choosing just two examples, Nicholas Wolterstorff's *Reason within the Bounds of Religion* deconstructed the Kantian rationalist tradition and (joined by Alvin Plantinga) his *Reformed Epistemology* deconstructed much of the post-Cartesian foundationalist tradition.⁸ Like Barth, Reformed epistemology proclaimed a pox on two houses: on the one hand, secular foundationalism, and on the other, the biblical foundationalism of Hodge, which had resulted in the doctrines of inerrancy and a new modern biblical creationism. From these Reformed thinkers, and similar movements among neo-Thomists, this renaissance of Christian philosophy was immediately followed by the virtue revivals of Anscombe and MacIntyre, as well as various forms of analytic theology.

Among Philosophers of Science?

Throughout this section we have seen that because Tyson's story ends so abruptly, his perspective sometimes gets stuck around the turn of the twentieth century, as though nothing happened after. Nowhere is that more evident than what he says, or doesn't

⁶ Ibid., 142.

⁷ See the twenty-fifth anniversary issue of *Modern Theology* 26, no. 1 (January 2010).

⁸ Nicholas Wolterstorff, *Reason: Within the Bounds of Religion*, second edition (Grand Rapids, MI: William B. Eerdmans Publishing Company, 1988). Alvin Plantinga and Nicholas Wolterstorff, *Faith and Rationality* (Notre Dame, IN: University of Notre Dame Press, 1983).

say, about the history of the philosophy of science. Indeed, this is the full extent of attention to the topic in the book:

the *of* in the ‘philosophy of science’ is not a genuine *of*. Actually, science and philosophy (which we tend to call ‘philosophy of science’) is much the same enterprise as science and religion. The first truth discourse of naturalistic materialism defines both philosophy and science in most of what passes for the philosophy of science today. Put another way, the empiricist, rationalist, and materialist understandings of modern philosophy that have raised science itself to the status of a functional first philosophy mean that contemporary science and philosophy are already harmonized; secular philosophy and naturalistic science have long since combined to form the first truth discourse of Western modernity.⁹

It feels strange to ask, ‘what came next?’ because in this quote, Tyson sounds like he is denying that much of anything has happened in the field for the past one hundred years.

At one point, Tyson alludes to A.J. Ayer, so let’s start there. Tyson writes, ‘Christian theology has its own TOF-framed rational understanding of nature, but such an understanding is not the religiously anti-religious analytical rationality of, for example, logical positivism.’ But logical positivism no longer holds the near-absolute control over the discipline which it once enjoyed. More than *fifty* years ago, *The Encyclopaedia of Philosophy* entry pronounced it ‘dead, or as dead as a philosophical movement ever becomes.’ And even if a neo-positivist remnant remains, so what? Yes, logical positivism held that the non-empirical disciplines—theology, ethics, and metaphysics—were meaningless pseudo-statements, not even capable of being wrong or right. That makes it ‘anti-religious’ in a sense (I suppose?), but twentieth-century philosophy of science is a big tent. Everyone will be at odds with someone at one time or another. Yes, a ‘Christian theologian, then, *has good reason to dismiss contemporary empiricism as a truth stance ...*’ but so do, for nuanced and diverse reasons, Quine, Kuhn, Hesse, Popper, Cartwright, Dupré, proponents of emergence, and many others.¹⁰ Tyson’s perhaps well-placed quibbles with logical positivism are not unique, nor are they sufficient to ignore the last hundred years of developments in the philosophy of science. This is all the more troubling because, while his narrative has many villains, he has failed to consider who in the philosophy of science (and even elsewhere) might be his allies.

Tyson does concede in one footnote, ‘of course, nothing sits still in philosophy, and many highly brilliant contemporary thinkers and many shades of approaches are present in contemporary epistemology.’¹¹ Amen! So, what *did* happen next? Well, first, W.V.O. Quine published ‘Two Dogmas of Empiricism’, which fell like a bomb on the playground of the reductionists. And while Quine was focused on semantic reductionism, his work became the basis for later challenges to the sort of ontological

⁹ Tyson, *A Christian Theology of Science*, 23. Emphasis added. Feyerabend is mentioned in a later paragraph (169). Kuhn and Ayer are cited in later footnotes (160 fn. 7; 119 fn. 25; 205 fn. 25).

¹⁰ Many of these would consider themselves empiricists but would quibble with calling it a ‘first truth discourse.’ Others may simply reject empiricism outright. My point is that empiricism does not hold the absolute sway over the discipline as Tyson seems to think that it does.

¹¹ Tyson, *A Christian Theology of Science*, 205n25.

reductionism which Tyson treats as ubiquitous in science and philosophy. Next, Mary Hesse and Thomas Kuhn showed that standards of justification, the reasons we give for thinking something to be true or false, are influenced by the larger historical, psychological, religious, and sociological contexts in which an idea is produced.¹² Others, under the heading of Science and Technology Studies or Sociology of Science, started to focus on how non-cognitive factors impact scientific enquiry.¹³ Still others, the so-called Stanford School, now offer a daringly metaphysical version of scientific disunity.¹⁴ The pluralist stance of Stephen Kellert, Helen Longino and C. Kenneth Waters has further challenged reductionism and Ronald Giere's scientific perspectivism used colour vision to show that scientific findings arise out of an *interaction* between the object and the observer.¹⁵ So much for empiricism (at least of the foundationalist variety), reductionism, and the alleged view from nowhere.

Are there still too few philosophers of science with expertise in theology, like the excellent Nancey Murphy and Meghan Page? Yes. Are there still scientists around who hold to naïve reductionism and foundationalism. Sure, there are plenty. There are even loud and hot-headed ones like Richard Dawkins and Neil deGrasse Tyson. I suppose we could investigate how Dawkins and deGrasse Tyson are judged by serious philosophers, but I think we already know. It is enough for our purposes that their voices aren't the only ones in the room. The point of these three 'What Came Next?' sections has been to show that theology, epistemology, and philosophy of science have developed enormously over the last century, especially with the emergence of various postliberal and postmodern perspectives. After Barth, the landscape looks different.

The Missing Century

How, if at all, does filling in the theology of the last one hundred years help Christians better engage science? If the postliberal theologians like Lindbeck, Hauerwas, and Milbank are right, there is no view from nowhere. Theological knowledge is locally situated in the Christian narrative because all knowledge is situated in—take your pick—paradigms, traditions, practices, language games, cultures, etc. Not only was the foundationalist quest for certainty a sham and always bound to fail, but theology is now on par with other sciences in this respect. The sciences, similarly, are embedded within their own paradigms. Add Wolterstorff and MacIntyre to the mix and we see that this move isn't only a theologian's trick. And if Popper, Kuhn, and Quine agree on even a *quarter* of all this, continuing Tyson's story until today makes his conclusion start to look very different. When theologians argue *for* foundationalism,

¹² Mary Hesse, *The Structure of Scientific Inference* (Berkeley, CA: University of California Press, 1974). Thomas S. Kuhn, *The Structure of Scientific Revolutions*, second edition (Chicago, IL: University of Chicago Press, 1970). Even Popper, as far back as the 1930s, had challenged the alleged neutrality of science, showing that it is always theory laden. Published in English as Karl Popper, *The Logic of Scientific Discovery* (London: Hutchinson, 1959).

¹³ For an overview, see Helen Longino, 'The Social Dimensions of Scientific Knowledge' in Edward N. Zalta, ed., *The Stanford Encyclopedia of Philosophy* <<https://plato.stanford.edu/archives/sum2019/entries/scientific-knowledge-social>>.

¹⁴ John Dupré, *The Disorder of Things: Metaphysical Foundations of the Disunity of Science* (Cambridge, MA: Harvard University Press, 1993).

¹⁵ *Scientific Pluralism*, edited by Stephen Kellert, Helen Longino, and C. Kenneth Walters (Minneapolis, MN: University of Minnesota Press, 2006), x-xiii; Ronald Giere, *Scientific Perspectivism* (Chicago, IL: University of Chicago Press, 2006), 32-33. See also Carl Gillet, *Reduction and Emergence in Science* (Cambridge: Cambridge University Press, 2016).

they shoot themselves in the foot. This is to play into Descartes' game, the game that Barth refused to play. Another notable difference is that Marx turns out to be a good guy; why else would Marx be such a crucial interlocutor in *Theology and Social Theory*? What philosopher or theologian doesn't already know that we see everything through our own cultural and historical perspectives? Now we can all understand what Quine meant in 'Two Dogmas' when he called reductionism a 'metaphysical article of faith.'¹⁶ He meant that reductionism could be true, but then again, so could the Nicene Creed.

Throughout it has been my goal to tell Tyson's *own* story, not to undermine his telling. It should be possible for us to agree more than disagree because Tyson and I know each other's perspectives and share so many of the same starting points. Let's remind ourselves of his thesis. Tyson's narrative of the history of science and theology paints a picture of the sciences as we know them today being committed to an egocentric epistemological foundationalism as the first truth of all scientific discourse. Instead, he argues, scientists should commit themselves to theocentric ontological foundationalism as their first truth. This would save the sciences from being unable to engage meaningfully with theology and would return science to a firmer ground on which it may stand.

My thesis, by contrast, is that when Tyson's story is extended by one hundred years, his conclusions change dramatically. Could he rebut this claim? I can think of two possible ways for him to say the last century need not alter the central claims of the book. First, Tyson might play what I will call the Carl Henry card. That is, he could say that, *theologically*-speaking, the entire post-Barthian tradition is itself a version of EEF because anything other than Tyson's own Platonic-Christian foundationalism is dodgy. Second, he could say, 'all you say here might be true of academic philosophers and theologians, but it doesn't reach scientific practice. Actual on-the-ground science is exactly how it was a century ago.'

I will take these two possible rebuttals in order. Carl Henry was the founding editor of *Christianity Today* and was seen by many as *the* keeper of faith among American evangelical scholars for much of the twentieth century. Famously, he disputed whether Hans Frei's doctrine of the resurrection was orthodox enough given Frei's non-foundationalist epistemology.¹⁷ Henry wondered, can Frei *really* affirm that Jesus died and rose again? Indeed, can Frei only say that the resurrection happened *in the story of the Bible*, but not in history? These are fair questions to ask precisely because, for postliberal theologians like Frei, there is no access to 'real' history, if by that we mean history seen independently of a first truth discourse—to borrow Tyson's phrase. So, Tyson might play the Carl Henry card: all theologians working in the post-Barthian tradition are little better than Schleiermacher. I don't think Tyson will go this route, not least because I doubt that Tyson is really a foundationalist anyway.¹⁸

What about the second possible rebuttal? This one I consider far more likely. Whatever Lindbeck or Milbank or Kuhn say in their ivory towers, Tyson could argue,

¹⁶ W.V.O. Quine, 'Two Dogmas of Empiricism', *The Philosophical Review* 60, no. 1 (1951): 20-43.

¹⁷ George Hunsinger, 'What Can Evangelicals and Postliberals Learn from Each Other? The Carl Henry-Hans Frei Exchange Reconsidered', in *The Nature of Confession: Evangelicals and Postliberals in Conversation* (Downers Grove, IL: IVP Academic, 1996).

¹⁸ Was even Aquinas? I doubt it. See A.N. Williams, 'Is Aquinas a Foundationalist?' *New Blackfriars* 91, no. 1031 (January 2010): 20-45.

it hasn't affected scientific practice in actual labs. If you are inclined to doubt Tyson on this point, he has a challenge for you: 'try arguing that the physical resurrection of Jesus of Nazareth should be understood as a credible public knowledge claim within, say, the biology fraternity of the Royal Society.'¹⁹ On this point, Tyson is confident that 2022 is no different than 1922. Let's accept this challenge and see where it goes.

What If Nothing Had Come Next?

Suppose then that we take Tyson's narrative at face value: the end of the history of science was achieved a century ago, and science can only be saved by a self-conscious turn to Christianity as a first truth discourse. How does this change what scientists do in their labs, their field work, their society meetings, and their research? Let's imagine that the entire Royal Society joined the two Marys on Easter morning. They would confirm that Jesus was in fact dead on Friday, that Jesus met them all on Sunday, and that they cannot explain it. This is what biologists call an anomaly, and every working biologist is accustomed to encountering such findings, ones that our current models of the empirical evidence cannot explain. Since Tyson's TOF scientist *and* EEF scientist would likely agree about this, it is unclear what Tyson *wants* biologists to do. Should biologists investigate biological models of animal 'resurrection', starting perhaps with anomalies in cellular atrophy such as the *Turritopsis dohrnii* jellyfish? Or does he have in mind that the resurrection should appear as a footnote in textbooks and research papers as the one exception to biological rules? It is not obvious, on this particular case, how TOF does anything to change scientific practices.

Tyson spends more time on Adam and Eve than he does on the resurrection; perhaps this example will be more enlightening. At various points in the book, Tyson claims an agnosticism about whether Adam and Eve are historical figures in light of natural and evolutionary history, but also claims that a disbelief in their historicity is incompatible with Christian orthodoxy. He writes, 'while I do not know about the natural history of Adam and Eve one way or another, I believe in the Edenic fall, as a category of divinely revealed high understanding. The fall of humanity is a revealed high truth. As such, it always has greater epistemic authority than any passing theory of natural knowledge can generate for the Christian who treats the first truth commitments of their faith as genuinely true.'²⁰ So it seems that only the Fall is essential to a Christian worldview, and not the historicity of Adam and Eve. Except that Tyson later claims that both 'Adam and Eve and the fall in the garden of Eden are mythic truths for Christian theological epistemology. These are truths we cannot discard or render as primitive fantasies so as to make Christian faith compatible with a functionally materialist and inherently agnostic and amoral view of natural reality and human origins.'²¹

This ends up being rather confusing. Tyson sometimes claims we can be agnostic or apophatic about the historicity of the original couple while at others he seems to think that denying their historicity is unorthodox. This is especially odd as Tyson never argues that the original couple is essential to an Edenic fall. And even if they were, that

¹⁹ Tyson, *A Christian Theology of Science*, 84.

²⁰ *Ibid.*, 154.

²¹ *Ibid.*, 155.

would not explain why a TOF scientist could be agnostic about the original couple but unable to deny their existence outright without stepping outside of orthodoxy. It is unclear what Christians (especially Christians who are scientists) are supposed to do with something like the historicity of the original couple when it conflicts with scientific findings. I see two ways of interpreting Tyson's construal of the relationship between theological beliefs and the findings of scientists. I will call them *friction* and *veto* respectively.

The first way of interpreting Tyson sees the relationship as one of *friction*. Tyson seems to desire that we hold in tension the findings of geologists, geneticists, biologists, and natural historians with Christian belief. He does not seem to want to say that Christian orthodoxy can override the findings of scientists, but it can limit their findings. This is not friction in the sense of the conflict thesis, in which science and theology must necessarily be at odds. Rather, when science pays its due respects to theology, tension points such as that of the historicity of Adam and Eve become friction points that can generate dialogue between scientists and theologians; friction generates heat and heat is good. Scientists present geological, natural historical, or genetic narratives of human origin and theologians present biblical-theological ones. Where these narratives appear to clash, Tyson would have us adopt an apophaticism about who (if anyone) is correct and allow the conversation between the two to generate new discoveries, methodologies, or ideas.

The second way to interpret Tyson's construal of the relationship is to take the prevention of denial in the case of the historical Adam and Eve as a model for the relationship in general. Where the frictional interpretation sees scientific findings and theological dogmas as starting points for new conversations, this interpretation sees Tyson as advocating a vetoing power for theology. Theologians and scientists can be apophatic about certain dogmas and doctrines that are in tension with scientific findings, but scientists cannot outright deny a theological claim such as the historicity of the original couple if they are to maintain their TOF. It is interesting that Tyson never claims science to have any parallel powers of veto in such tensions. Theologians could veto scientific claims, at least in theory, but scientists cannot veto dogmas which Tyson has dubbed 'orthodox' or even theological rejections of particular scientific narratives such as an evolutionary history *sans* Edenic fall. Where friction may grant a parallel sort of power to science (perhaps theologians can be apophatic about the evolution of non-human species but they cannot veto it), this interpretation places theology into a clear hierarchy over science.

Whether we interpret Tyson's construal of the relationship as one of friction or veto, this ends up being of little consequence. This is because Tyson never gets rid of the problem he sees as arising in EEF scientific practice: methodological naturalism. Methodological naturalism (MN) is the approach to explanation that offers only empirical causes and evidence, even if other causes may be operative. To put it in Tyson's terms, MN *reduces* explanatory claims to those causes that we can *empirically* verify and *rationalize* without appeal to the supernatural. But this approach, which Tyson claims is nearly ubiquitous in science due to EEF, remains in both interpretations of scientific practice under TOF. Tyson is not asking scientists to change how they practice, only how scientific claims interact with theological ones. If the relationship is meant to be frictional, scientists would offer only empirical causes to explain the origins of the human species, which would generate helpful friction with theological

narratives about humanity's origin. If the relationship is one of veto, scientists would make the same claims and submit them for review to orthodox theologians and their dogmas. Nowhere in these two interpretations of Tyson's vision for practicing scientists do scientists change how they approach questions or form explanations, only what happens to the explanatory claims *once they are made*. In his quest to slay the dragon of empirico-ratio-reductive methodological naturalism, Tyson has smuggled back to his home an egg that will one day hatch and grow large enough to swallow his proposal whole.

Methodological Naturalism: Tyson's Real Villain?

Tyson's TOF can only make a difference to scientific practice if he can show that TOF undermines MN. Tyson *almost* realizes this at one point, but never cashes it out:

We come now to the complex knot of the relation of methodological to metaphysical physical reductionism. Early modern physical reductionism, as an experimental and conceptually limited methodology, was invented by Christians. But things readily get blurred over time because, while a functional methodological materialism ... need not imply metaphysical materialism, there is a clear sociological relationship between practice and belief. What can start out as a methodologically reductionist interest in 'merely' physical things easily (perhaps inevitably) evolves into a tacit, culturally situated metaphysical materialism over time.²²

Tyson gets one thing right: he is here asserting a 'sociological relationship.' Unfortunately, it is not clear how, if at all, this would help him. To make a sociological claim about how the slippery slope of MN leads down to the sharp crags of ontological naturalism (ON), Tyson would need to show us sociological evidence, which he doesn't.²³ More importantly, a sociological relation can only demonstrate correlation and not causation. Even if Tyson has such sociological evidence, he needs to be clearer about the relationship between MN and ON in order to claim that MN must be thrown out. There are three possible ways that Tyson could helpfully clarify his argument: he could argue that the relationship between MN and ON is correlative, habitual, or entailed.

In the first place, he could simply present the relationship as a *correlative* one, arguing that theologians and scientists could be justified in treating MN as ON because, statistically, the vast majority of MN scientists maintain ON (assuming he could present sufficient evidence to this effect). But it does not follow from this correlation that MN needs to be ruled out. Secondly, Tyson could argue for a *habitual* relationship by showing how a commitment to methodological practices enculturates metaphysical presuppositions. Given his language in the above quote, this seems like the direction that Tyson himself is most likely to approve. This would require an even higher burden of proof than the correlative one, because he would need to show the correlation *plus* a causal direction

²² Tyson, *A Christian Theology of Science*, 56-57. Tyson rightly prefers the term methodological *materialism* over methodological *naturalism*, but I will stick with MN because it is ubiquitous in the literature. For the history of the term, see Perry and Ritchie, "Magic, Magnets, and Other Anomalies," 1067-1071.

²³ The most comprehensive study I know of, by Elaine Howard Ecklund, concluded the exact opposite of Tyson's claim. See Elaine Howard Ecklund and Christopher P. Scheitle, *Religion vs. Science: What Religious People Really Think* (Oxford: Oxford University Press, 2017).

from MN to ON. But even this does not get him what he needs. For one can imagine a scientist who actively resists the temptation to become ON while still exclusively utilizing empirical explanations and causes in their work. While certainly more difficult than simply rejecting MN, this does not provide us sufficient reasons to eliminate MN wholesale. It only tells us that scientists committed to TOF need to be more careful in their use of MN. And if scientists are still able to utilize MN, it is not clear that TOF actually changes the practice of science in any significant way. This leaves Tyson with the third way forward: entailment. If MN *entails* ON, then they cannot come apart as in the first two options and thus Tyson's accusation sticks. Not only would he require the correlation and the direction of causation, but he would require significant arguments to show that one cannot be MN without also being (or becoming) ON. This is a much higher bar. That having been said, an entailment construal of the relationship could achieve Tyson's goal of condemning MN. What is not clear is how any of these construals result in concrete changes in the research, lab work, field work, and presentations by scientists.

Glossolalia: A Case Study in the Implications of Tyson's Theological Science

The resurrection and the Fall, Tyson's examples in the book, don't say enough—or really anything—about how TOF changes scientific practice. To give Tyson the most positive possible reading, let's devise a case where the findings *do* differ and work backward to the method. In many congregations, the practice of speaking in tongues—*glossolalia*—is a way to experience God's presence and hear from the Holy Spirit. The gift of tongues is an empowerment of individuals to pray in unknown languages, whereby a prophetic message can be offered and interpreted, utterances can be given to God which are too complex or overwhelming to form into words, or God can speak through an individual to a congregation. Here we have a phenomenon that would have clear overlap with various scientific disciplines, including psychology, neurobiology, and systems biology. This is something that these various disciplines could study alongside theology, as human speech and the cognitive capacities that undergird it are certainly at work in such a phenomenon. But theologically we might want to say that something else is also going on in this phenomenon other than common linguistic capacities, attributing at least some explanatory power to the work of the Holy Spirit.

Under the current model of scientific practice, at least as Tyson reads it, scientists might study *glossolalia* by offering empirical explanations of the phenomenon of speaking in tongues, such as brain-mapping and the presence of various chemicals in the brain as well as the various psychological states at work in the activity. They might even offer sociological explanations, demonstrating the role of the individual's participation in a group activity in bringing about such psychological-neurobiological states. But under the correlative MN-ON relationship, Tyson's proposal would make little difference to scientific practice. Because scientists (both EEF and TOF) are utilizing empirical tools, it still seems that explanatory claims about the Holy Spirit would be outside of their disciplinary purview. Such claims would not become relevant *until and unless* we had a separate interdisciplinary conversation following scientific and theological studies. Theologians would make their claims and scientists would make their own and these claims could be added together in some sense to offer a multi-disciplinary explanation of speaking in tongues. But scientists

themselves are not changing how they practice science. This, I take it, is Tyson's status quo.

Second, a marginal difference could emerge from Tyson's claim that MN habitually, unconsciously leads to ON. Suppose that claim could be substantiated. Perhaps the only difference between this and the status quo is that we might imagine that scientists become more guarded about rejecting ON. So, for data gathering, it could be business as usual: collect psychological and brain-mapping data from congregations speaking in tongues and build empirically explanatory models. In describing their findings, scientists would include a caveat, perhaps in a footnote or something like an imprimatur, about the possibility of non-empirical explanations, such as the Holy Spirit that can function in addition to empirical ones. These scientists are more proactive at the level of explanation, but they have not changed how they gather data and build models. This solution goes a step further than the first but seems to be no more than an authority structure for scientific and theological claims. Within the lab, it's no different than the status quo.

If TOF is going to make a real difference, Tyson would need to come up with reasons (such as from church teaching or the Bible) why scientists *need* to include non-empirical explanations in their foundational assumptions about how we collect data, how we use that data to build models, and so on. This third option, arguing that MN entails ON, seems to be Tyson's only way forward. If MN entails ON, then models and data collection that rely only on empirical explanations would, by definition, be deficient. Such scientists would be obligated to consider the role of theological explanations alongside empirical ones.

So what might it look like for the rejection of MN (and its entailments) to change how a scientist might study a particular phenomenon like *glossolalia*? One brain mapping study found that persons speaking in tongues demonstrated low blood-flow to language centers and a decrease in activity to areas of the brain thought to be responsible for things like racial bias.²⁴ This coheres well with theological claims about the individual not being the one speaking, but God. It also coheres well with testimonials and historical records about the Azusa Street Revival. At this revival, traditionally segregated churches began breaking down many racial barriers and some even began to serve communion to white and black congregants together. While a neurobiologist can draw the correlation between these areas of brain activity and speaking in tongues, a theology-engaged neurobiologist could offer a scientific narrative about a revival leading to desegregation or about the linguistic features of tongues *not* arising from the typical language centers in the frontal lobe. In other words, the theologically-engaged scientist is able to offer more of an explanation than a scientist who limits themselves to empirical-only models can.

The Problem and Power of Half Explanations

Here is where Tyson's proposal to argue that MN entails ON, if developed properly, could demonstrate a salient difference for scientific practice. By scientists being open to (but not necessarily) including non-empirical explanations and models of data collection, they could offer fuller explanations of various phenomena than MN scientists can. Psychologists limiting themselves to only brain mapping data would be akin to explaining complex gravitational data about a particular planet's orbital path with only reference to the star around which it orbits. But what is interesting is that we *commonly*

²⁴ Andrew B. Newberg, Nancy A. Wintering, Donna Morgan and Mark R. Waldman, 'The Measurement of Regional Cerebral Blood Flow During Glossolalia: A Preliminary SPECT Study', *Psychiatry Research: Neuroimaging* 148, no.1 (November 2006): 67-71.

explain orbital paths with reference only to the star at the centre of the system, even when the mass of other planets in that system will play a significant role as well. For example, astronomy taught to children often references only the gravitational pull of the sun to explain earth's orbital path. We would not say that these scientists are deceiving children or derogatorily call them methodological solarists; we would say that they are giving only a part of the picture to help children start to think about the relevant gravitational forces. They are intentionally leaving out certain explanations to highlight one part of the whole model. So there might be good reasons to focus only on parts of the overall explanation even if one is not committed to ruling out certain kinds of explanations.

In the case of scientists studying the phenomenon of speaking in tongues, it seems appropriate that a psychologist would focus on empirical explanations of Christians speaking in tongues. It would be odd to assume that they would rule out other explanations such as neurobiological ones. In fact, within the interdisciplinary field of cognitive science, psychologists and neurobiologists often work together showing how their respective explanatory models might complement one another. So it is no stretch to think that a scientist who rejects MN might nevertheless focus on what we think of as empirical causes in explaining speaking in tongues simply due to their disciplinary expertise.

However, where the correlative and habitual models allow for a responsible kind of MN, this kind of scientist has a broader range of tools to draw from. Even if they only happen to be offering an empirical explanation of specific phenomena, they need not limit themselves and could, where appropriate, include theological explanations as well. Under MN, psychologists are free to draw upon the data and findings of systems biologists, neurobiologists, and sociologists to help support their own exploration. Under a rejection of MN, these same psychologists would still have access to these tools, but they could also draw upon theological findings. A psychologist studying group behavior who is looking at speaking in tongues in Pentecostal churches might draw upon brain-mapping studies to relate social behavior to neurological changes in individuals. They might also appeal to the personhood of the Holy Spirit for explaining how this particular group activity arises and how it might be unique among the many ecclesial activities of Christian worship. While such scientists do not have to do this (and so they might look like egocentric epistemological foundationalists after all), this can change how scientists gather data and form their hypotheses and explanations. Especially insofar as we might think of data-gathering as a theory-laden practice,²⁵ data collected under the assumption that there are no supernatural causes would need to be repurposed and reconsidered for bias. This does change the actual practice of scientists because it changes more than the way that they might weigh their claims against those from other disciplines *in the act of gathering the data itself*.

This is important for several reasons. First, explanations that do not include theological dimensions are still readily available to TOF scientists. Such explanations

²⁵ Alisa Bokulich, 'Towards a Taxonomy of the Model-Ladenness of Data', *Philosophy of Science* 87, no. 5 (December 2020). Bokulich presents a view of model-data symbiosis which she develops from the actual practices of scientists in the field. She argues that we collect data under models in a way that makes the idea of raw data untenable. Instead, we should think of data as bearing the marks of the model under which it is collected in a way that requires much more significant work to repurpose data collected for a different purpose. So data collected under MN may be unusable, as is, for theocentric ontological foundationalism—or so Tyson could argue.

may be deficient or they may be limited for pedagogical purposes or for the purpose of highlighting the role of a particular effect in the phenomenon. By way of illustration, while an astronomer might leave out the effects of planetary gravity in explaining Earth's orbit for pedagogical purposes, an astronomer who exclusively collects data on a methodologically solarist model would necessarily miss certain aspects of Earth's orbit and its place in the larger solar system. There might be places where this is appropriate, but there will also be places where a non-methodological solarist model would be better. But any astronomer wishing to weigh the benefits of different models would have to first concede that both solar and extra-planetary evidence should both be available for the astronomer to draw upon. In the same way, a non-MN scientist studying tongues could have an advantage over MN scientists because they have a broader pool of data and evidence to draw from. There may be purposes for which theological evidence is less helpful, such as pedagogical purposes in which a scientist is trying to illustrate how brain-mapping works, but a methodological commitment to empirical evidence only could detract from the explanatory power of the scientist's model of *glossolalia*. The non-MN scientist could have an *explanatory* advantage.

Second, while the non-MN scientist has access to all the same tools and methods as the MN scientist, they can utilize them in different ways. As noted above, the way that scientists collect data relies in some sense on the model they are using to collect it. This means that the methodological solarist will collect solar data in a way that assumes (to some degree) the exclusivity of solar influence on Earth's orbit. By contrast, the non-methodological solarist will collect the data about the same effect, but their model will be able to correct for this bias; where the methodological solarist might attribute all gravitational pull on the Earth to the sun, the non-methodological solarist could carefully analyze the way the data is collected before attributing gravitational force to one source or another. The MN scientist is only working with part of the picture. While this may be appropriate in some circumstances, their methodology rules out their being able to determine when and where such a limited scope is appropriate. This is an important change to scientific practice that could reflect how data is collected and how the study is utilized thereafter. On this proposal, Tyson might achieve what he desires for scientists operating under TOF, if only he could demonstrate how ON is entailed by MN.

The question remains whether this is how Tyson would like to be interpreted, specifically because of the implications of such an interdisciplinary model of a theology of science. If scientists can draw on theology to better explain their claims and frame how their data is collected in the same way that a psychologist might draw upon neurobiology, Tyson may be warranting something that he elsewhere resists. When a psychologist draws upon a neurobiologist, they can also challenge, limit, or otherwise nuance their findings just as they can accept them. There may be cases where one discipline finds data in engagement with another discipline that contradicts the model of the first discipline. But this seems to run directly contrary to how Tyson thinks that theology ought to relate to scientific disciplines, as demonstrated by his apophatic claims in the case of the historical Adam and Eve: we can be apophatic about the existence of the original couple, but we cannot reject their existence outright. This implies that the sciences can draw on theology, but theology cannot draw on the sciences (or at least not in the same sense of 'draw on'). By demanding that scientists deny MN, Tyson has opened the door for scientists to start doing theology in some sense, though it is doubtful that

he desires this. He appears to reserve some distinctive role for theology in the conversation that is not shared by the sciences. If MN does not distinguish the sciences from theology, then what does?

It is not as though I think that Tyson cannot answer this question, but rather that this question needs to be answered to fully understand how TOF scientists change the practice of science without licensing all scientists to start doing theology. Then again, Tyson may have something of just that sort in mind: a blurry line between the theological and scientific disciplines. If this is the case, then it is unclear how theology can limit scientific claims without the sciences being allowed to limit theological claims. However Tyson would wish to proceed, more work would need to be done to get to the heart of how his theology of science would transform and improve the discipline in salient ways that don't compromise theology as a first truth discourse.