Quantum Envy

Hans Halvorson and Adam Neder

For some years now John Polkinghorne has made the argument that quantum physics and Christian theology are complementary rather than contrastive disciplines, since both are concerned with the search for truth. Whereas physicists pursue truthful knowledge of the physical world, theologians pursue truthful knowledge of God; thus the two disciplines are best understood as cousins. Attempting to steer a middle course between modernism (with its aspiration for indubitable knowledge) and postmodernism (with its emphasis on perspectivalism and pluralism), Polkinghorne argues that knowledge of God and the physical world, while neither direct nor unproblematic, are both objective in that they involve "verisimilitudinous" approximations to reality. This long-standing argument continues in Polkinghorne's latest volume, *Quantum Physics and Theology: An Unexpected Kinship*.[1]

The new book unfolds as a catalogue of parallels between the two disciplines. Polkinghorne begins, however, by acknowledging a number of differences. For example, unlike theology, science advances cumulatively and therefore need not remain in vital conversation with its great figures of the past. Also, hard-won scientific conclusions elicit near universal acceptance, yet the same is not the case in theology. Nevertheless, Polkinghorne's concern throughout the work is with what unites rather than divides the two disciplines.

The four main chapters are organized in roughly the same way. Methodological parallels are drawn between quantum physics and Christian theology, and those parallels are supported and illustrated through a pair of examples, one from each discipline. For example, to support the claim that in both disciplines unexpected experience can lead to radical adjustments in understanding, Polkinghorne appeals, on the one hand, to perplexity about the nature of light that led to the development of quantum mechanics and, on the other, to the way the New Testament writers found themselves describing the human Jesus in divine-sounding language. Since the primary purpose of the book is to point out these parallels, it seems essential (even if artless) simply to list them.

In the first chapter, Polkinghorne notes similarities between the development of quantum theory and the development of christology. New experience led to moments of radical revision in understanding. These revisions were followed by periods of unresolved confusion, a new synthesis of understanding, continued wrestling with unsolved problems, and a recognition of deeper implications. The dialogue between experience and theory is the subject of the second chapter. Both disciplines focus sharply and critically on decisive issues, allow new experience to enlarge already existing conceptual frameworks, and permit unexpected events to shape present understanding significantly.

Polkinghorne returns to the similarities between the historical development of each discipline in the third chapter. Deeper understanding progresses as the implications of new insights are explored and a variety of concepts is developed to accommodate new experience. Contemporary intellectual and cultural attitudes influence both the kinds of questions addressed as well as the manner of addressing them. Progress in understanding is disproportionately influenced by a handful of geniuses, though unresolved perplexities persist.

Does quantum nonlocality support the existence of multiple persons in the Godhead?

In the fourth chapter, Polkinghorne offers yet more parallels. Progress in understanding occurs incrementally. Concepts are clarified only to the extent that reality permits. New avenues of thought are explored through the experimental use of simplified conceptual structures. Established convictions remain open to radical revision. Fresh and profound thinking is inspired through attempts to construct unified theories that account for the whole of reality.

So what is one to make of all of this? There is much to praise in this book. Polkinghorne is an excellent writer. His style is elegant and economical, and his presentation of the material is lucid and organized. While few would rank him in the top-tier of either philosophers of science

or theologians, there is only a handful of people in the world who know as much about *both* disciplines as he does. While those acquainted with either the history of quantum mechanics or the history of doctrine won't learn anything new here, they certainly will learn something about the development of the other discipline.

Moreover, Polkinghorne achieves his primary goal. He demonstrates that formal parallels do exist between the two disciplines. Of course, the significance of these parallels is another matter, but he certainly proves that they exist. And his is a timely response to the rash of atheistic books by writers like Richard Dawkins who refuse to treat theology as an intellectually rigorous discipline, caricaturing it as nothing more than a perverse and nefarious catalogue of illusions and inanities—as though the sorts of "Christian" arguments that Dawkins sets forth and rejects wouldn't be rejected just as quickly by, say, Augustine, Thomas, or Barth. So there is much that is good about this book. But it contains serious problems as well.

Formal parallels do exist between the quantum physics and theology.

To begin with, aside from the fact that they exist, the recognition of these parallels doesn't teach us anything significant about either quantum physics or Christian theology. In other words, there is nothing *epistemically interesting* about these parallels. Upon finishing the book, many readers will likely find themselves thinking: some of the analogies work, others perhaps not, but in the end, what does it really matter? What's the payoff? None of the examples used as an illustration in one discipline is itself illuminated by its counterpart in the other discipline; it simply stands alone as proof of a parallel. But since many, if not most, of the parallels could just as easily be drawn between physics and some other field, one suspects that the underlying purpose of the book is simply to boost theology's credibility by pointing out its similarity to quantum physics—to rehabilitate theology's reputation by capitalizing on the prestige of quantum physics.

Of course, few people are better equipped to make this kind of argument than Polkinghorne, himself both a priest and, as he never tires of reminding the reader, once a practicing scientist. But careful readers will be wary of this rhetorical strategy. Time and again Polkinghorne comes dangerously close to claiming that since he was a scientist, we should trust his account of the nature of science, which is a fallacious invocation of his own authority. This becomes especially problematic when one realizes that Polkinghorne glaringly omits reference to any serious work in the philosophy of science, except for Michael Polanyi, who has had very little influence on contemporary discussions in Anglo-American philosophy. In particular, the book does not even discuss seriously the question of the scope of scientific knowledge—for example, whether science itself has the power to tell us anything about creation, about why we are here, or about the "purpose" of life.

Since the origins of modern science, the question of science's scope has been discussed widely by philosophers—from Immanuel Kant in the eighteenth century through the logical positivists in the twentieth. One central question they raise is: can science provide reliable knowledge about things that are themselves not directly observable? Polkinghorne seems to think that this question has an obvious answer. He says, for example, that "the pursuit of truthful knowledge is a widely accepted goal in the scientific community."[2] But again, this purported fact is beside the point. The issue is not whether scientists aim to achieve truthful knowledge; the issue is whether they can hope to succeed in this aim.

Now it may seem obvious that science succeeds in its aim to achieve truthful knowledge. But a number of historians and philosophers have argued that a careful examination of the data yields a more reserved conclusion. In fact, two important philosophers of science, Pierre Duhem and Bastiaan van Fraassen (incidentally, both Roman Catholic), have argued that the aim of science should be only to gain truthful knowledge about those things that are in principle observable, and that science is impotent when it comes to explaining the purpose of events. Such a view of science is quite radical, but Duhem marshals extensive historical evidence for this claim, and van Fraassen provides powerful philosophical arguments in favor of this "antirealism" about science. Polkinghorne might think that these arguments—and others of their kind—are of poor quality or unhelpful; but if that is the case, then instead of ignoring them, he should criticize them.

Serious questions must also be raised about a number of the substantive comparisons he draws between the two disciplines. Let us mention just two among many examples.

First, Polkinghorne draws an analogy between wave-particle duality in quantum physics and God-man duality in the person of Christ.[3] This analogy is weak and highly misleading. It is correct that quantum objects display wavelike and particlelike features, and some scientists (such as Niels Bohr) have seen these "dual aspects" as paradoxical. But the analogy to Christ's two natures ends there. According to quantum theory, nothing is ever particlelike and wavelike at the same time. Rather, each subatomic particle can sometimes be particlelike and sometimes be wavelike. Moreover, there is a precise mathematical theory that predicts when something will be particlelike and conversely when it will be wavelike. In other words, these two sets of physical properties—the wavelike properties and the particlelike properties—are not freely combinable.

But the duality of God and human in the person of Jesus Christ is of a

completely different order, one for which there are, in principle, no analogies at all. Indeed, since in the one person of Jesus Christ the two natures are *always* combined, albeit never confused, it is exactly the *opposite* sort of duality from wave-particle duality. Polkinghorne claims that the "acceptance of a degree of mysterious indefiniteness is a stance that does not seem totally foreign to a quantum physicist,"[4] but the only reason quantum physicists do not object to loose talk about wave-particle duality is because in actuality quantum objects are *neither* waves *nor* particles. Both of those terms are approximations of their true nature which, as it turns out, is hardly mysterious: after all, we have a mathematically precise theory of their behavior!

Second, Polkinghorne repeatedly engages in dubious efforts at natural theology. For example, he claims that the "remarkable human capacity for scientific discovery ultimately requires the insight that our power in this respect is the gift of the universe's Creator."[5] Really? We can do science, therefore God exists?

Or to take another example, at the end of the fourth chapter, Polkinghorne moves from a discussion of the "EPR effect" in quantum theory to the claim that "the physical world looks more and more like a universe that would be the fitting creation of a Trinitarian God, the One whose deepest reality is relational."[6] This claim stretches credulity. In 1935 Einstein, Podolsky, and Rosen (hence EPR) showed that there are very strong correlations between events that occur in distant locations. In 1965 the physicist John Bell decisively showed that these EPR correlations are not the ordinary sort that can be explained in terms of some common cause in the past. For example, I am a Green Bay Packers fan, and so is my brother. But the correlation is the ordinary sort that can be explained by a common cause in the past: namely, that our father was a Green Bay Packers fan.

Polkinghorne then appears to be claiming that EPR correlations are a sort of physical relationality that we would expect a trinitarian God to build into reality. But again, once we look behind the suggestive words, there seems to be no interesting connection between the relationality in the Trinity and the "relationality" (if it should be called such) predicted by the EPR effect. The EPR effect is really nothing more than statistical correlation. Such correlations could either be a pre-established harmony (i.e., there is no cause, they just happen to be perfectly coordinated), or they could be the result of some faster-than-light causal process between the distant events.

He rehabilitates theology's reputation by capitalizing on the prestige of quantum physics.

But in either case, it's not clear that the two events have an interesting (read: "trinitarian") relation. In the former case, the two events might be like Gottfried Leibniz's monads that have no relations at all to each other and yet are perfectly coordinated. In the latter case, the physical relation between the two events would be no different than the relation between the sun and the earth according to Newton's universal gravitation theory. Would we have said that Newtonian gravity "looks more and more like… the fitting creation of a Trinitarian God"? Does Polkinghorne really intend to say that a trinitarian God would be expected to make a world with such nonlocal correlations? Is he saying that the probability of the EPR effect is higher if one posits a Trinity than if one posits deism? Does this mean experiments that confirm quantum nonlocality therefore support the existence of multiple persons in the Godhead?

Toward the end of the book, Polkinghorne claims twice that trinitarian theology is "the true Theory of Everything."[7] For this claim to make any sense at all—for it even to be evaluated as a claim—Polkinghorne would have to describe what he means by it. But he gives no hint, not a single sentence of illumination. It seems that he just wants readers to take his word for it. But even if readers did want to agree, it's hardly clear what they'd be agreeing *with*.

There is no question that Polkinghorne's *Quantum Physics and Theology* is a provocative book that fills a gaping hole in the literature, a hole left by the Christian community's failure to engage in a critical yet respectful way with contemporary scientific culture. It is a good example of how to take both theology and natural science seriously in working toward a unified conceptual framework. And yet there are some serious shortcomings—in logical rigor, in amateurish attempts at natural theology, and in a pervasive failure to engage with competing philosophies (e.g., van Fraassen's arguments against scientific realism) that undermine the core of Polkinghorne's position.

After reading Polkinghorne's book, we are left wanting to see more along these lines—but mainly wanting to see something better. LF

HANS HALVORSON is a member of Abiding Presence Lutheran Church in Ewing, New Jersey, and Associate Professor of Philosophy at Princeton University.

ADAM NEDER is a member of Colbert Presbyterian Church in Colbert, Washington, and Assistant Professor of Theology at Whitworth University.

Notes

1. John Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship* (New Haven: Yale University Press, 2007).
2. Ibid., 1–2.
3. Ibid., 92.
4. Ibid., 93.
5. Ibid., 8.
6. Ibid., 104.
7. Ibid., 104, 110.