

## **On God and Physics:**

### **The Contemporary Dialogue Between Religion and Science in the West**

**Philip Clayton**

#### **Abstract**

In much of modern Western philosophy the assumption has been that science is incompatible with belief in God. This belief became more widespread of the first half of the twentieth century for reasons that included the epistemology of positivism, the prestige accorded to scientists and their work, and the inability to distinguish between metaphysical and methodological naturalism.

The older "warfare" model for characterizing religion-science relations has given way to an intense interaction between these two areas during the last thirty years. Although many cultural factors have also contributed to this change, this paper focuses on transformations within the philosophy of science. It argues that new insights in the philosophy of science have led to a recent renaissance of efforts to integrate science and belief in God. Major changes in the understanding of science are summarized and defended, and their implications for assessing the epistemic status of theistic claims are explored.

In this paper I briefly summarize what has been referred to as "the worldview of science": the assumptions that (allegedly) lead to metaphysical naturalism. I then summarize some of the responses that Western philosophers of religion have made to this challenge, including my own defense of the compatibility of theism with scientific methods and results. In the final section I explore the possibility that contemporary philosophy of science may actually open the door to a new style of metaphysics, one that leaves room for theism as one among several hypotheses that philosophers can discuss productively in international discussions.

**On God and Physics:**

**The Contemporary Dialogue Between Religion and Science in the West**

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The discussion between science and religious belief has played a crucial role in the development of both Western science and culture in the approximately 400 years since the birth of modern science. During the modern period many philosophers have assumed that science is incompatible with belief in God. This belief became more widespread among philosophers during the first half of the twentieth century for reasons that included the epistemology of positivism, the prestige accorded to scientists and their work, and an unfortunate inability to distinguish between metaphysical and methodological naturalism.

In recent years things have changed radically, however. The older “warfare” model for characterizing religion-science relations has given way to an intense and constructive dialogue between these two areas during the last thirty years in the West. Part of the reason for the change lies in developments in the philosophy of science. The school of logical positivism, dominant in the early 1930’s and for several decades thereafter, left no room for rational discussion of beliefs about God; ultimately, it even questioned whether religious language could be cognitively meaningful. But a major transformation in the philosophy of science began to take place in the 1950’s as positivist doctrines were replaced by contextualist (coherence-based) theories of scientific rationality.<sup>1</sup> Consider just one example: if Thomas Kuhn’s position in *The Structure of Scientific Revolutions*<sup>2</sup> is correct, then the movement to a new scientific paradigm is not an

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<sup>1</sup> I have summarized this debate in more detail in *Explanation from Physics to Theology: An Essay in Rationality and Religion* (New Haven: Yale University Press, 1989).

<sup>2</sup> See Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: Univ. of Chicago Press, 1962).

inference from a set of evidence to the theory that it entails; instead, it is a sort of “conversion.” But if this is true, then it is possible that metaphysical assertions could be defended in a manner analogous to the way in which scientific assertions are defended.

It is this rediscovery of epistemological similarities between science and religion that has led to the recent renaissance of philosophical reflection on the connections between science and theism. The last ten years have seen an explosion of conferences and publications on (for example) God and the Big Bang, evolution and creation, theories of the God-world relation, and the problem of divine action in a world dominated by physical law. Dozens of new centers devoted to the study of science and religion have been formed and about 100 new courses are offered on this topic each year. I have the privilege of working with a four-year project entitled “Science and the Spiritual Quest” (SSQ<sup>3</sup>) that brings together leading scientists from around the world to talk about connections between their scientific work and their various religious traditions. It is significant that in the first round of SSQ some years ago we were able to find only medium-level scientists to participate, whereas now scientists at the very highest levels of science, including a number of Nobel-prize winners, are willing to speak publically about their religious beliefs.

In this paper I briefly summarize what has been referred to as “the worldview of science”: the assumptions that (allegedly) lead to metaphysical naturalism. I will then summarize some of the responses that Western philosophers of religion have made to this challenge, including my own defense of the compatibility of theism with scientific methods and results. In the final pages I conclude by exploring the possibility that contemporary philosophy of science may actually open the door to a new style of metaphysics, one that leaves room for theism as one among several hypotheses that philosophers can discuss productively at the international level.

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<sup>3</sup> For more information on this project please visit <[www.ssq.net](http://www.ssq.net)>.

## The Worldview of Science

No time needs to be wasted trying to convince the reader of the overwhelming worldwide influence of science and of technology, its offspring. But it *is* important to reflect on the worldview — the epistemology and metaphysics — that has often been associated with science, albeit often implicitly. What is this worldview? Why has it created problems for the world's monotheistic religions: Judaism, Christianity and Islam? And could it be, as I will argue, that the practice of science does not in the end entail the truth of this worldview after all?

It is a complex and multi-faceted worldview; today there is time only to summarize it under three headings. (1) *Empiricism*. We might define empiricism in simple terms as the belief that all things that are known are known through sensory experience from the physical world. If you can see or otherwise sense something, can measure its size or momentum, can record its features and behaviors, then you can know it. Of course, the “seeing” can be enhanced in numerous ways — through microscopes, telescopes, CAT scans, electron microscopes — as long as it remains a means of perceiving the natural world. It can also be focused by creating specialized disciplines that limit themselves to particular regions of the natural world. Thus it is often said that the specialized scientific disciplines — quantum physics, physical chemistry, biochemistry, genetics — represent the most rigorous forms of knowledge that we have. In the end, however, empiricists assume that sensory input from the natural world is the only source of knowledge.

(2) *Methodological naturalism*. The scientist seeks to give explanations of phenomena in the natural world. He does so by retracing the causal process that produced these phenomena as effects. Two conditions obtain: the entire causal history to be studied must be located within the natural world, and the cause-effect relations must be lawlike. That is, they must evidence strong patterns or regularities such that (ideally) one could predict the effect if he knew the relevant laws and all the initial conditions.

(3) Conditions (1) and (2) were generally taken to imply metaphysical agnosticism or naturalism. *Metaphysical agnosticism* is the belief that it is impossible to know any meta-physical or super-natural beings or causes. *Metaphysical naturalism* is the belief that no such beings or causes exist (or: could exist). Put simply, the argument is: the success of the natural sciences provides evidence that empiricism and methodological naturalism are true. If they are true, we should either become metaphysical naturalists or at least be agnostic about all religious truth claims. Therefore belief in God is incompatible with the success of science.

Although I will in a minute criticize the line of argument used to support the conclusion of metaphysical naturalism, it is hard to overemphasize the influence of this particular argument within modern thought over the last few centuries (and not only in the West!). Many famous positions in the history of Western thought presuppose it in one form or another: David Hume's rejection of God and miracles, Laplace's famous proclamation that "I have no need of that [theistic] hypothesis," Thomas Huxley's use of Darwinism to falsify Christianity, the attitude toward religion taken by "philosophers of suspicion" such as Marx, Nietzsche and Freud, and A. J. Ayer's claim that all religious statements are literally meaningless.

### **Theistic Responses to Metaphysical Naturalism**

Theistic philosophers and theologians have made numerous responses to the challenges of scientific naturalism. It is interesting to consider the full range of these responses before moving to my constructive proposal. (Although certain responses can be developed by all theists, there are also particular arguments that are more (or less!) consistent with the specific beliefs of Judaism, Christianity or Islam. For the sake of clarity I focus on Christianity in the following discussion.)

(1) *The Separation Model*. Some believers have ignored the problem, of course, continuing

to hold Christian beliefs and engage in Christian practice as if science had never become a dominant force in Western culture. (2) *The Warfare Model*. Others have retreated from the perceived threat of science, constructing higher and higher walls around the enclave of Christian belief and practice in order to protect it. Thus some have argued that the pronouncements of faith have nothing to do with the products of scientific reason, citing the classic text from Tertullian, “What has Jerusalem to do with Athens, the Church with the Academy?” Still others have argued more aggressively that certain allegedly false metaphysical assumptions which underlie the practice of science invalidate its conclusions about the natural world. Thus Cornelius Van Til and his followers hold that one cannot obtain accurate knowledge about human persons if he does not first acknowledge that persons are created in the image of God.

(3) *The Dialogue Model*. More moderate theists have entered into dialogue with science in order to carefully formulate areas of overlap and areas of difference between science and Christian faith. For example, science might have to do with *how* things work in the natural world, whereas religion explains *why* they are as they are. Science might explain natural events using specific assumptions about the natural world, whereas religion supplies the reasons for accepting those underlying assumptions. Or science might explain phenomena in the natural world, whereas faith provides knowledge of the “before” and the “after”: before the Big Bang and after the “Big Crunch” (if there is one, which now looks unlikely). Or (as E.O. Wilson has recently argued in *Consilience*<sup>4</sup>) science might have authority in all matters of knowledge of the natural world, whereas religion speaks exclusively to matters of values, morals, or aesthetics (e.g., our sense of beauty).

(4) *The Integration Model*. Others, finally, have sought to integrate scientific results with traditional Christian beliefs. Predictably, there has been a wide range of proposals under the

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<sup>4</sup> See Edward O. Wilson, *Consilience: The Unity of Knowledge* (New York: Knopf/Random House, 1998).

category of integration. (a) Some of these do not really do justice to science, its methods and results. Thus the Creation Science Institute in California suggests that the opening chapters of Genesis, the first book of the Bible, actually represent a scientific theory of the origin of the universe and the emergence of life on earth *and* that this theory is scientifically superior to physical cosmology and biological evolution. (b) Others offer extremely interesting and productive forms of integration (to which I will return below). (c) Finally, still others have “integrated” science and religion at the cost of removing all the distinctive features of theism, leaving a religious language devoid of all actual content, a series of symbols without substance. Thus the biologist Ursula Goodenough has recently argued in *The Sacred Depths of Nature*<sup>5</sup> that metaphysical naturalism is true while suggesting that the human response of “awe” in the face of nature is all that religion needs.

### **The Compatibility of Science and Theism: A Proposal**

Having covered the difficulties for theism in some detail, it is necessary for me to pause for a moment to state why I continue to believe that it is philosophically coherent to be a theist and at the same time to accept the results of modern science. Again, for the sake of clarity I will limit the discussion to Christian theism, although many parts of the argument would generalize to other forms of theism. Also, although I speak of “Christianity” in general, it should be clear that the following defense presupposes some highly specific — and not always uncontroversial — positions on the nature of Christianity and its integration with science.

How is it possible to be a theist in an age of science? The contemporary theist should, I suggest, accept a certain presumption of naturalism. When presented with an unexplained event in the natural world — for example, why did the monsoon strike the coast of Bangladesh when it

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<sup>5</sup> Ursula Goodenough, *The Sacred Depths of Nature* (New York: Oxford Univ. Press, 1998).

was not forecast to do so? — he will look first for a *natural* explanation, one consistent with the regularities that we call natural laws. When faced with competing explanations of some event in the natural world, he will give most credence to the best attested scientific explanation, and he will apportion the strength of his belief to the strength of the case for this explanation over its competitors. Thus he is likely to accept Big Bang cosmology and evolutionary explanations of the emergence of specific physiological features in reptiles and mammals; he is likely to accept, but with somewhat greater caution, the cosmological theory of Cold Dark Matter or the majority explanation for why the Cambrian Explosion occurred; and he is likely to be agnostic about whether there is life on other planets or whether string theory will be able to unify the four fundamental forces in physics. Where statements in the Bible that might *look like* proto-scientific theories clash with well-attested results in science, he is likely to read these statements metaphorically or religiously rather than advocating them as true explanations of the natural world.

But this modern Christian is also likely to challenge science at certain points. He will resist the empiricist epistemology and the positivist philosophy of science that I summarized above. He will thus challenge those who advance methodological naturalism in the place of specific scientific results. Similarly, he will question scientists when they overstate the strength of current results. For example, degrees of genetic identity between species do provide powerful grounds for accepting one account of the evolutionary tree over another, but current genetic knowledge does not justify the claim of the Oxford biologist Richard Dawkins that we are “nothing but” machines designed by our “selfish genes” as a means of self-perpetuation, nor his claim that Darwinian evolutionary theory is the “blind watchmaker” that fully explains the emergence of intelligent conscious life-forms like ourselves. Likewise, one should accept the detailed influence of brain states on conscious experience, but one need not accept the claim of the philosopher of mind Daniel Dennett that consciousness has been fully explained by physiological processes in the brain



and central nervous system. The reduction of one level of phenomena to law-based explanations given in terms of lower-level phenomena must be established on a case-by-case basis rather than assumed across the board.

If this modern-day Christian is skeptical of extensions of scientific knowledge claims into areas where empirical correlations and laws have not yet been established, he is all the more skeptical of extensions of scientific methods and conclusions into the sphere of religion.

Questions such as “what caused the Big Bang?” are inherently beyond the reach of natural science, since by definition no causal explanations can reach back behind (or beyond) a physical singularity in the technical sense of this term. At the same time, there is reason to think that some rational discussion of questions that are not empirically decidable is still possible (more on this in a moment). It is therefore a mistake to dismiss metaphysical questions as “non-scientific and therefore not rationally discussable.”

Note the philosophical project that now emerges; it is in fact the vision that underlies much of the recent religion-science discussion in the West. Science has provided us with a vast reservoir of knowledge: of fundamental natural laws, of the evolution of the universe and of life on earth, and of the connections between physical, chemical, biological and psychological phenomena. But it has not answered all human questions; it has not reduced all areas of knowledge to physics; and it is not (even in principle) a means for resolving every question that the human mind can pose. In fact, the more territory that science has occupied, the more questions are thrown open: about its assumptions, about how to explain its successes, and about the regions that still lie beyond its occupation (and presumably always will). Science has not removed the place for religious faith; rather, it has underscored just how essential that place is. Just as the success of science does not make it unnecessary to ask ethical questions about the *use* of science and technology — indeed, it now becomes even more essential to formulate ethical guidelines for science and technology for the sake of the quality of human life, for the survival of the ecosystem, and for the flourishing of

life on earth — so also the need for religion is not minimized but underscored in an age of science.

### Science as an Invitation to Metaphysics

Some of the comments I have made so far are specific to the context of Western intellectual history; others may also be relevant to Chinese philosophical traditions of the past and present (my Chinese colleagues will have to determine which is which). I would like to conclude, however, with a few general comments about science and metaphysics which, I hope, will bridge our two philosophical traditions.

Science confronts humanity with questions that science cannot answer. It also confronts us with knowledge of a universe that we did not make and whose fate we cannot control. In *The Critique of Judgment*<sup>6</sup> Immanuel Kant described the human reaction to nature using the concept of the “sublime.” We respond with a combination of awe, reverence and fear to that which is very large, very powerful or very beautiful. In *The Idea of the Holy*<sup>7</sup>, Rudolph Otto described a similar state using the concept of the *mysterium tremendum et fascinans*: the human response both of fear and of fascination to the mysteries that confront us. The recent Hubble photographs of nebulae, galaxies and the birth and death of stars, for instance, evoke a sense of awe and wonder. They also confront us with a question that is difficult to escape: is human life significant within this universe? Are our aspirations — our love for our children, our attempts to live an ethical life, our hope that what we have done will continue to have some significance after our death — doomed to pointlessness, or do they have some place? Are we, as the famous phrase puts it, “at home in the universe”?

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<sup>6</sup> Immanuel Kant, *Critique of Judgment* (Indianapolis, IN: Hackett Publishing Co., 1987).

<sup>7</sup> Rudolf Otto, *The Idea of the Holy: An Inquiry into the Non-rational Factor in the Idea of the Divine and its Relation to the Rational*, 2<sup>nd</sup> ed. (London: Oxford Univ. Press, 1950).

Each of these questions is a religious question in the sense in which I am using the term. Religious questions are questions of ultimate significance; they ask whether there is a fit between human existence as we experience it and the ultimate nature of the universe when its origin, history and essential features are fully taken into account. If religion is understood in this broader sense, it is clear that science does not leave religious questions behind but poses them all the more intensely to human thinkers.

It is also clear that religious questions in this broader sense cannot be answered without having recourse to metaphysics. For if the “sense of significance” is to have anything more than affective weight, it must be accompanied by the formulation of propositions. To put it differently: if one’s sense of significance is to reflect anything more than a subjective state, it must be expressed in hypotheses about what the nature and origin of the universe might be *such that* one’s sense of significance is anything more than delusion or projection.

Metaphysics — rational discussion of questions of ultimate reality and significance — is possible as a discipline only if there is a form of reason-based discourse that includes but also moves beyond physics as a whole (as already Aristotle saw). Admittedly, many metaphysical debates reflect concerns specific to one culture or another. Of course, traditional Western metaphysicians did not see their writings as expressions of Western culture; they saw them as culture-transcending discussions of ultimate questions (perhaps this is part of what it means to be a rationalist!). It is clear enough to non-Western readers, however, that many of the questions, and the answers, reflect explicitly Western concerns and assumptions.

I suggest that the debate about the metaphysical implications of modern science has opened a door to a type of metaphysical debate that could well transcend the specific cultural interests of East or West. This claim is one that we can test in our discussions here: is it true that science raises a similar set of metaphysical questions whether one reads it with Chinese or American eyes? Debates about the implications of the Heisenberg Uncertainty Principle or entanglement

phenomena in quantum physics, about the implications of the Human Genome Project, about the relationship of consciousness to neural states — all these, I believe, have common features whatever one's home culture is.

My thesis, in other words, is that the shared context of science now provides a shared opening context for addressing metaphysical questions — as long as one does not arbitrarily exclude such discussions in advance by holding to an empiricist epistemology or a positivist philosophy of science. Of course, some of the specific discussions of “science and ...” questions may vary: discussions of science and Christianity are not the same as discussions of science and Buddhism. But the significant common ground gained from science as a shared context does open the door to an international metaphysical discussion that is responsive to growth in scientific knowledge. It is my hope that Chinese-American collaborations such as the ones contained in this volume can help to advance such discussions, moving us a step closer to a truly international metaphysics for an age of science.