

Science and Providence

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GOD'S INTERACTION WITH
THE WORLD



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*To the Master, Fellows and Scholars
of Trinity Hall, Cambridge*

A man's mind plans his way, but the Lord directs his steps.

—Proverbs 16:9

Alleluia; for the Lord God omnipotent reigneth.

—Revelation 19:6 (AV)

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Preface to the 2005 edition

In 1988 when I began to write *Science and Providence*, I did so because I expected that the next development in the active dialogue between science and religion would center on the discussion of how one could take with equal seriousness the scientific account of the causal structure of the world, together with the widespread religious belief that God is providentially active within that world's unfolding history. That expectation certainly proved to be correct, for the 1990s saw a decade of vigorous engagement in the science and religion community with the issue of divine action.

The approach to that discussion contained in this book essentially falls into two parts. The first part is concerned with the general question of whether a careful analysis of the causal account given by science actually reveals there indeed to be room to accommodate a religious belief in the exercise of divine providential agency. In what follows, this topic is the concern of chapters 1 and 2. The remainder of the book constitutes the second part of the discussion, whose subject is how the general picture given in part one relates to specific topics of importance to religious belief, such as general providence, miracle, prayer, evil and so on. In this second part it also proved necessary to discuss the question of the nature of time and God's relationship to it, and to consider briefly the question mark that is put on claims of creation's significance by our knowledge of the inevitability of death, both for human individuals and for the universe itself. I also gave a brief discussion of Christianity's account of the particular forms of

divine action that correspond to its incarnational and sacramental beliefs.

My current position in relation to this second part of the book's project may be summarized by saying that I have not significantly changed my opinions in relation to the material of chapters three to six, but I have subsequently enlarged my treatment of the material of chapter seven (Polkinghorne 2000, chap. 7); given much further attention to the issues sketched in chapter eight (Polkinghorne 2004, chap. 4 and 5; Polkinghorne 2005, chap. 4 and 5); and considerably expanded the discussion concerning eschatological issues that was started in chapter nine (Polkinghorne 2002). A theological concept that is of overarching significance for the whole of this second part is the recognition that the act of creation is a kenotic act of divine self-limitation on the part of the Creator in allowing the creaturely other to be itself and to make itself. God's action is not divine tyranny, but it respects the independence granted to creatures. This theme of divine kenosis is present in a great deal of twentieth-century theological writing, stemming from a variety of different traditions. I have had the opportunity to edit a symposium made up of contributions from both scientists and theologians, working together on this kenotic insight (Polkinghorne 2001).

It is in relation to the theme of the first part of this book that the greatest amount of further work has taken place in the science and religion community since the original publication of *Science and Providence*. The general question of the degree of openness of the physical universe to the influence of divine providential action was the dominant issue for discussion by that community in the 1990s. An important arena in which much of this conversation took place was a series of international conferences organized jointly by the Center for Theology and the Natural Sciences at Berkeley and the Vatican Observatory at Castel Gandolfo (Russell et al. 1993; 1995; 1998; 1999; 2001).

The twentieth-century discovery of *intrinsic* unpredictabilities

present in physical process, both at the microscopic level of quantum theory and at the macroscopic level of chaos theory, had brought about the demise of a merely mechanical picture of the physical world, whose workings were no longer seen as being wholly tame and controllable. Yet, unpredictability is an epistemological property, concerned with what can or cannot be known, and it carries no logical entailment of a necessary ontological conclusion concerning what is actually the case. Inability to predict might be due either to ignorance of hidden causal detail of a conventional kind, or it might be the sign of a true openness to the operation of new forms of causal principle. It is a matter for *metaphysical* decision which of these alternatives is to be chosen, a point made clearly enough by the existence of both an indeterministic interpretation (Niels Bohr) and a deterministic interpretation (David Bohm) of quantum theory, each having the same empirical adequacy in relation to experimental results, so that physics by itself cannot settle the issue between them. Those of a realist cast of mind in philosophy will incline to align epistemology and ontology as closely as possible with each other, and so they will opt for the openness interpretation. The issue of the necessity of making a metaphysical decision is referred to in this book (p. 35), but I realize with hindsight that I did so too briefly and in so condensed a manner that some readers may well have found the remarks insufficiently clear. In subsequent writing on divine action I have sought to improve and clarify the discussion (see especially, Polkinghorne 1998, chap.3).

The 1990s discussions of divine action centered precisely on this question of what to make of intrinsic unpredictabilities. A number of authors placed particular reliance on proposed quantum indeterminacy as affording room for divine providential maneuver. On the other hand, I have remained of the opinion expressed in the present book (pp. 33–36), that the better initial starting point for the discussion is provided by the macroscopic unpredictabilities of chaos theory, of course interpreted in an ontologically realist way. Those who have re-

sisted this suggestion have, I believe, been unduly influenced by two considerations. One is the recognition that the (metaphysical) idea of the openness of quantum process is very widely accepted in the physics community, which might have seemed to imply that appealing to it was the safer option to take. The second consideration arose, I think, from an undue bewitchment by the Newtonian equations from which chaos theory originally sprang. Of course, as they stand, these equations are deterministic in their character, but we know that they are only approximations to reality, since Newtonian thinking is not adequate at the scale of atomic phenomena. Dismissive talk of ‘deterministic chaos’ is, therefore, a highly challengeable metaphysical decision, rather than an established conclusion of physics. It might be thought that understanding could be advanced by a fusion of quantum theory and chaos theory, since the behavior of chaotic systems soon comes ostensibly to depend upon fine detail at a level of accuracy that is rendered inaccessible by Heisenberg’s uncertainty principle. Unfortunately, however, the development of a ‘quantum chaology’ has been frustrated by the fact that quantum mechanics (which has a scale set by Planck’s constant) and classical chaotic dynamics (whose fractal character means that it is scale-free) are mutually incompatible, so that they cannot simply be combined in an unproblematic way.

The fact is that our actual knowledge of the causal structure of the physical world is still patchy and incomplete (Polkinghorne 2005, chap. 2). Expectations of progress in understanding the exercise of agency, whether human or divine, must, therefore, be correspondingly modest. What the lengthy discussions in the 1990s on divine action did achieve was the important gain of making it clear that science had not established the causal closure of the world, as if what happens could be fully understood simply in physicalist terms. Thus there is no more reason to doubt the coherence of belief in divine providential agency than there is to doubt our experience of human intentional agency. Therefore the broad conclusion of the first part of this book

still stands, and thus it continues to permit entry into the theological-oriented discussion of its second part. In this connection I would particularly like to reiterate the point made on p. 34, that appeal to intrinsic unpredictability, of whatever form, is not recourse to a 'God of the gaps' kind of argument of an unacceptable kind, but it is a recognition of the intrinsic incompleteness of a scientific causal account that is based solely on the traditional physical idea of the exchange of energy between constituents.

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April 2005

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Science and Providence

Introduction

This is the third volume of a trilogy concerned with questions arising at the interface between science and theology. The first volume (*One World*) surveyed the scene. The second (*Science and Creation*) dealt mainly with the impact upon the doctrine of creation of twentieth-century discoveries about the universe and its history, and also had something to say about natural theology. Both were necessarily concerned with the generalities of physical process. In consequence the God of whom they spoke could as well have been the God of deism as the God of Christianity. The latter differs from the former in his personal and particular concern for the unfolding histories of his creatures. Though above all he is to be encountered in the individual disclosures which Scripture records and to which the Church testifies—for he is the God of Abraham, Isaac and Jacob; the God and Father of our Lord Jesus Christ—he is also a God believed to be in continual interaction with all his creation. He is to be addressed in prayer, for he exercises a providential care. The purpose of this book is to consider whether such a personal, interacting God is a credible concept in this scientific age.

It would not be so if we lived in a universe which was merely mechanical. If the future were a rigorous consequence of the past, simply the making explicit of what was already inexorably implicit, then the best that theology could manage with intellectual integrity would be the God of deism, who had set it all a-spinning with carefully calculated care. In fact, of course, we have always known that we do not live

in such a clockwork universe, for we know, as surely as we know anything, that we are not ourselves automata. If we have a certain room for maneuver in the way things are, it would not be altogether surprising if God, who is the sustainer of the way things are, had left for himself some such opportunity also. Advances in our scientific understanding of the world's process have now enabled us to go beyond the simple assertion of the inadequacy of mere mechanism. We begin to discern the origins of our experience of open process. We are no longer scientifically condemned to a universe of frozen being, but we can start to describe a universe endowed with becoming. There is genuine novelty possible in cosmic process, and consequently genuine freedom for ourselves, and for God, is not ruled out.

This twentieth-century demise of the nineteenth-century mechanical view is due to two insights of modern physics. One is quantum theory, which revealed the apparently reliable world of everyday to be fitful and probabilistic at its constituent roots. The other insight—more important for our present purpose because it deals with phenomena at levels which are significant for events in the everyday world—is the realization that the predictable systems, studied by Newton and his successors, are exceptional in their simplicity. Once we consider complex dynamical systems, they exhibit a delicate sensitivity to circumstance which makes them intrinsically unpredictable. The future is no longer contained in the past; there is scope for real becoming. Extended to “super-systems” like ourselves (or cosmic process) this insight offers the prospect of describing a world in which we (and God) have freedom to act. I have previously suggested (Chapter 5 of *Science and Creation*) that this resulting flexibility opens up the possibility of a complementary metaphysic in which the mental and the material are related as poles of the world-stuff in varying degrees of indeterminate/determinate organization.

These ideas are set out in Chapters 1 and 2. In the course of the discussion I suggest that the modern scientific worldview in no way

makes incoherent the possibility of God's providential action within his creation. The location of his action in the flexibility of process makes it clear why it is conceivable to pray for healing, or even perhaps for rain, but inconceivable to pray for the sun to stand still or for winter to become summer. In the course of the argument I deny that we are limited solely to Wiles's deistic view of God's action as the single act of Creatorly letting-be. I also reject any degree of divine embodiment as the manner of God's relation to the world.

Within the picture thus established, one can go on to consider the nature of divine providence and some of the perplexities about it (Chapter 3). If God's relation to his creation is always consistent, then miracle will be an unexpected providence, made possible by an unprecedented regime, rather than a divine *tour de force* (Chapter 4). The moral and physical evils of the world result from the freedom granted by God to humankind, and to the whole developing physical process, respectively. Theodicy's free will defense, relating to moral evil, needs augmentation by a free-process defense, relating to physical evil (Chapter 5). Prayer is to be understood as the aligning of our wills with God's (the reinforcing association of our freedom for maneuver within cosmic process with his freedom) and the assignment of value (Chapter 6). The God who interacts with the history of the universe must be a dipolar God, possessing a temporal pole as well as an eternal pole (Chapter 7). The consequences of that for the incarnation, and the necessity from our point of view of considering sacrament as the total action of the gathered Christian community with its gifts, are briefly explored in Chapter 8. Lastly, the Final Anthropoc Principle, with its attempt at a "physical eschatology," is shown to be an inadequate basis for hope. Real hope can reside only with God, both within history and beyond it (Chapter 9).