

Divine Action and Divine Transcendence

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DIVINE AGENCY AND THE PRINCIPLE OF THE CONSERVATION OF ENERGY

by Robert Larmer

Abstract. Many contemporary thinkers seeking to integrate theistic belief and scientific thought reject what they regard as two extremes. They disavow deism in which God is understood simply to uphold the existence of the physical universe, and they exclude any view of divine influence that suggests the performance of physical work through an immaterial cause. Deism is viewed as theologically inadequate, and acceptance of direct immaterial causation of physical events is viewed as scientifically illegitimate. This desire to avoid both deism and any positing of God as directly intervening in the physical order has led to models of divine agency that seek to defend the reality of divine causal power yet affirm the causal closure of the physical. I argue, negatively, that such models are unsuccessful in their attempts to affirm both the reality of divine causal power acting in the created world and the causal closure of the physical and, positively, that the assumption that underlies these models, namely that any genuine integration of theistic and scientific belief must posit the causal closure of the physical on pain of violating well-established conservation principles, is mistaken.

Keywords: chaos; conservation of energy; divine agency; Nancey Murphy; panentheism; Arthur Peacocke; John Polkinghorne; quantum indeterminacy; supervenience; theism; top-down causality; Thomas Tracy.

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One of the most vexing tasks for those concerned to integrate theistic belief and scientific thought is to offer an account of the causal relation between the Creator and creation. How, to adopt Austin Farrer's phrase (1967, 142), is the "causal joint" at which God influences the world to be conceived? A great many influential writers on this subject take care to avoid what they regard as two extremes. They do not want to accept a deism in which God is understood simply to uphold the existence of the physical universe, and they do not wish to endorse any view of divine influence that suggests the performance of physical work through an immaterial cause. Acceptance of deism is viewed as theologically inadequate, and acceptance of a direct immaterial cause of physical events is viewed as scientifically illegitimate, inasmuch as it implies the violation of physical conservation principles.

This desire to avoid both deism and positing God as directly intervening in the physical order has led to models of divine agency that attempt to defend the reality of divine causal power yet affirm the causal closure of the physical. In what follows I make two basic claims. The first is that such models are unsuccessful in their attempts to affirm both the reality of divine causal power acting in the created world and the causal closure of the physical. The second is that the assumption that underlies these models, namely that genuine integration of theistic and scientific belief must posit the causal closure of the physical on pain of violating well-established conservation principles, is mistaken and should be abandoned.

PEACOCKE AND TOP-DOWN CAUSALITY

One of the most influential attempts to defend divine causal agency while affirming the causal closure of the physical is Arthur Peacocke's model of top-down or whole-part causation. He argues that "epistemological analyses of many complex systems and situations . . . necessitate the distinguishing of a 'top-down' from a 'bottom-up' process" (Peacocke 1990, 54). Such an analysis suggests that we must recognize higher-level realities, the wholes or "top" of the top-down terminology, which causally interact with the lower-level realities, the parts or "bottom" of the top-down terminology (Peacocke 1990, 55). Recognition of top-down causality in no way rules out standard bottom-up analyses of causation. Bottom-up instances of causality involve energy transfer, but top-down instances involve "a determination of form through *a flow of information*, rather than through a transmission of energy" (1990, 59).

Assuming that we can make sense of downward causation in complex systems as involving the causal influence of higher levels upon lower levels through the transmission of information rather than energy, this provides a model by which God can be conceived as acting within nature. In Peacocke's view, "the continuing action of God with the world-as-a-whole

might best be envisaged . . . as analogous to an input of information, rather than of energy” (1990, 161). Such influence would never, however, involve a divine intervention in the course of nature such that what would otherwise occur does not take place.

Peacocke links his model of divine agency to recent developments in philosophy of mind. He rejects dualist accounts of human nature as inherently unscientific, insisting that “‘mental events’ in human beings are the internal descriptions we offer of an actual total state of the brain itself and are not events in some entity called the ‘mind’ which exists in some other non-physical mode that is ontologically distinct from matter and ‘interacts’ (mysteriously, one would have to say) with the brain as a physical entity” (1990, 60). Relying on the concept of supervenience, he holds that there are various levels of description of brain events and processes and no bridge laws by which higher levels of description can be reduced to lower levels. Thus we can describe a particular event in the brain at a lower level of description as a series of neuron firings and also at a higher level of description as a conscious decision to perform an action. This means that “the language we use concerning the connections between our mental experiences—the language of reasons, intentions, and so forth—really does . . . refer to actual causal linkages” (p. 61). The spectre of reductionism is avoided without having to abandon the causal closure of the physical. Analogously, God’s agency within creation can be seen as operating at a supervenient level that does not necessitate abandoning the principle that the physical realm is causally closed (p. 159).

There are a number of fundamental problems with Peacocke’s position. One of the least noticed is the inadequacy of his account of divine agency as regards the occurrence of miracles. On the one hand, the clear thrust of his thinking is to deny divine interventions in the course of nature that change what would otherwise occur. For instance, he contends that

the very notion of God as the faithful source of rationality and regularity in the created order appears to be undermined if one simultaneously wishes to depict his action as *both* sustaining the “laws of nature” that express his divine will for creation *and* at the same time intervening to act in ways abrogating these very laws—almost as if he had second thoughts about whether he can achieve his purposes in what he has created. Even if one conceives of these “interventions” as rare, as made only for significant purposes such as, say, the education of humanity in God’s ways or for the revelation of his purposes, one still faces the question of whether it is a coherent way to think of God’s action in the world. (p. 142)

Further, he insists that “divine causative influence would never be observed by us as a divine ‘intervention,’ that is, as an interference with the course of nature and as a setting aside of its observed relationships” (p. 163).

On the other hand, he somewhat reluctantly admits that the occurrence of miracles implies the type of intervention he is inclined to dismiss as theologically inadequate. He writes, “given that ultimately God *is* the Creator

of the world . . . we cannot rule out the possibility that God might ‘intervene,’ in the popular sense of that word, to bring about events for which there can never be a naturalistic interpretation” (p. 183). He immediately attempts to minimize the force of this admission by claiming that such direct interventions upon the course of nature must be rare, because there are good reasons for questioning whether they are “normally compatible with and coherent with other well-founded affirmations concerning the nature of God and of God’s relation to the world,” and insisting that the historical evidence for such events must be especially strong (p. 183). Nevertheless, this implies that unless he is willing to deny the occurrence of miracles altogether, his top-down model provides at best only a partial account of how God is to be conceived as active in creation.

More worrisome still is that the concept of miracle seems inconsistent with the pantheism that underpins Peacocke’s account of divine agency. Miracles are conceived as God acting as the direct efficient cause of certain extraordinary physical events that would not otherwise occur. The possibility of God acting in this manner finds a natural home in classical theism’s monarchial view of the relation between God and the world, but it is far from clear that pantheism’s organic view of the relation between God and the world allows for such a possibility (Peacocke 1990, 166). Unlike classical theism, pantheism views God as the formal or final, rather than efficient, cause of the world. Given that if miracles occur they constitute paradigmatic examples of God acting as a direct efficient cause in the world, pantheism is committed to denying that such events take place.¹ In the final analysis Peacocke cannot have it both ways. If he wishes to maintain pantheism he must give up the claim that miracles, however rare, have occurred. If he wishes to maintain that miracles occasionally take place, he must abandon pantheism. His brief treatment of the topic of miracle and his evident unease with endorsing historical claims regarding the occurrence of miracles suggest that he is aware of this tension and strongly hints that he is inclined to resolve it by abandoning traditional Christian claims that miracles have occurred.²

An additional difficulty facing Peacocke’s model is that in order to maintain the principle of the causal closure of the physical he insists that top-down causality be conceived exclusively in terms of information, as opposed to energy, transfer. All flows of information, however, have energetic implications, that is, require some input of matter or energy. In the analogy he provides of a program controlling the electronic changes in a computer, it is clear that the writing and storing of the program have energetic implications (1990, 59). Also, it is evident that the program will function only in conjunction with a computer, an intelligently designed artifact that itself is a product of the imposition of structure on physical components. Further, even if we ignore the fact that the intelligent structuring of the program and the computer has energetic implications, it is clear that the

desired output is produced by the program and computer together constituting the initial boundary conditions under which energy flows take place. This suggests a deistic rather than theistic model of God's relation to the world. On Peacocke's analogy, God, conceived as the master programmer, achieves God's purposes through setting the initial boundary conditions under which physical processes occur. Only if we think of the programmer as continuing to interact with the created program and computer can the analogy accommodate a theistic model of God's relation to creation—and this seems to imply the type of intervention that Peacocke views as theologically inadequate.

Peacocke is aware of the problem that flows of information have energetic implications. Acknowledging this, he writes,

So we still have a problem of the "causal joint", now in the form of: How can God exert his influence on, make an input of information into, the world-as-a-whole without an input of matter/energy? This seems to me to be the ultimate level of the "causal joint" conundrum, for it involves the very nature of the divine being in relation to that of matter/energy and seems to me to be the right place in which to locate the problem, rather than at some lower levels in the created order at which divine "intervention" would then have to be postulated with all of its difficulties. (1990, 164)

This passage is more an acknowledgment of the problem than any kind of resolution. One suggestion that seems to fit its general thrust is that God determines the initial conditions of the universe in such a manner that without any subsequent intervention God's purposes will be achieved through the outworking of natural processes. Such a suggestion implies, however, the concept of *ex nihilo* (out of nothing) creation in which God creates the mass/energy of the universe in a certain initial state and seems impossible to square with pantheism's denial that God is the efficient cause of the universe.³ It is difficult to see how Peacocke's claim that top-down causality has no energetic implications can be defended.

Another problem is that Peacocke's account of top-down causation appears incoherent. On the basis of a critical-realist view of the epistemology of the sciences, he holds that (1) analysis of complex systems reveals the ontological reality of higher-level properties that exert genuine irreducible causal influence upon lower-level properties and (2) higher-level properties are generated by virtue of their realization in a particular configuration of lower-level properties, that is, higher-level properties are supervenient upon lower-level properties (1990, 54–55). Peacocke's difficulty is that although the concept of supervenience may allow us to distinguish between higher- and lower-level properties, it does not warrant ascribing irreducible causal power to higher-level properties. To say that higher-level properties supervene on lower-level properties is to say that higher-level properties can exist only through being realized in a particular configuration of lower-level properties. The relation is one of dependency with no

new causal powers being created.⁴ There seems to be no way Peacocke can coherently maintain the reality of top-down causality.

POLKINGHORNE AND CHAOTIC SYSTEMS

Another influential attempt to provide a model whereby God can be conceived as acting in creation without threatening the causal closure of the physical is provided by John Polkinghorne. Polkinghorne's approach differs from Peacocke's in a number of important respects. He is less inclined than Peacocke to stress God's immanence and thus resists any slide from theism to pantheism. His willingness to acknowledge not only God's immanence but also God's transcendence explains Polkinghorne's openness to the possibility of particular divine interventions in nature. Whereas Peacocke is manifestly uncomfortable with the concept of miracle and is little disposed to accept as historical events such as the virgin birth or the empty tomb of Jesus, Polkinghorne feels no theological embarrassment over the claim that God sometimes intervenes in the course of nature and accepts both the virgin birth and the empty tomb of Jesus.

Polkinghorne's commitment to the transcendence of God explains, I think, why he is more inclined than Peacocke to locate the causal joint of divine agency at least partially within creation. Whereas Peacocke is inclined to think that God achieves God's purposes by acting on the "world-as-a-whole" (Peacocke 1990, 164), Polkinghorne tends to hold that God achieves God's purposes by acting upon chaotic dynamic systems within the world (Polkinghorne 1998, 63). On Polkinghorne's view, God brings about particular events that would not otherwise occur by nonenergetically influencing chaotic systems.

Polkinghorne thinks that it is theologically significant that chaotic systems are extremely sensitive and thus inherently unpredictable. In his view, the epistemological uncertainty inherent in attempting to predict the behavior of chaotic systems suggests that such systems are ontologically open. Given their ontological openness, God may causally influence their behavior—not by an input of energy but by a top-down input of information (Polkinghorne 1998, 62–63). Suggesting that God achieves particular purposes through the instrumentality of chaotic systems does not, however, relegate God to acting in the role of an unpredictable quantum event, insists Polkinghorne. He writes that

although the diagnostic indicator of chaotic systems is their sensitivity to small triggers, rather than this implying that we should consider them at the level where these individual small fluctuations occur, it forces on us, in fact, a holistic treatment, since the systems' vulnerability to disturbance means that they can never be isolated from the impact of their total environment. (Polkinghorne 1998, 62)

God is the cause not only of the informational nudges by which chaotic systems are providentially steered but also of the environment that makes

possible such systems. God's providential particular acts are thus situated within theism's broader doctrine of creation.

Attractive though it might initially seem, there are serious problems for Polkinghorne's approach. A major difficulty is that it is far from clear that one can move easily from epistemological indeterminacy to ontological indeterminacy. The equations typically used to model chaotic systems are deterministic, and physicists generally conceive chaotic systems as determined. Wesley Wildman and Robert Russell argue that

chaos in nature gives no evidence of any metaphysical openness in nature. The fact that a natural dynamical system is open to its environment, which is sometimes described in terms of a whole/part causal relationship, does not entail metaphysical openness, for the entire environment may be causally determined. Neither does the butterfly effect imply metaphysical openness, to attack a linkage dear to the popular reception of chaos theory. In fact, sensitive dependence—a feature of chaotic dynamical systems in mathematics—is attributed to natural systems on the basis of the power of mathematical dynamical systems to model them. To the extent that this modeling works . . . the natural presupposition is that the (metaphorical) “determinism” of mathematical chaotic dynamical systems corresponds to the metaphysical determinism of nature. Put bluntly, the butterfly effect testifies to the high degree of causal connectedness in certain natural systems and so is most naturally exploited in support of the thesis of metaphysical determinism. (Wildman and Russell 1995, 82)

Polkinghorne has responded by suggesting that the unwillingness to opt for the ontological indeterminacy of chaotic systems “stems from the fact that a theory of this kind has not yet been formulated in any detail, whilst the alternative interpretation of ‘deterministic chaos’ . . . has the time-honoured equations of classical dynamics as its rigorous articulation” (Polkinghorne 1998, 65). He goes on to argue:

. . . it is, however, mathematically possible to enlarge the class of solutions that will be admitted, in order to include what are called non-integrable solutions. These are not so mathematically “nice” and well-behaved—their introduction corresponds to something like a transition from smooth curves to jagged fractal. It turns out this enlargement of the range of mathematical imagination produces possible behaviours that cannot be reduced to a sum of localized specific trajectories. A holistic account is then necessary and at the same time a rigid determinism is no longer present. (1998, 65–66)

His reply, however, only establishes the possibility that chaotic systems might be modeled nondeterministically. It in no way establishes that this possibility is in fact a superior alternative to the standard view that chaotic systems are deterministic.

A further difficulty is that although chaos is common in nature, it is frequently only a small component of the system in which it occurs and has little effect on that system. Put simply, chaos comes in degrees. If, as is commonly the case, the chaotic component of a system is small, its presence will have little or no effect on the overall behavior of the system in which it occurs.

This presents a problem for Polkinghorne inasmuch as he wants to claim that by manipulating the chaotic component of a system God can effectively alter the large-scale dominant behavior of that system. This will prove possible only if the system has a large chaotic component. If it does not, however much God manipulates the chaotic component there will be little effect on the system's behavior. For this reason Jeffrey Koperski suggests that God's manipulation of chaos "could alter the arrangement of bubbles in the crest of a tsunami but not redirect its course (Koperski 2000, 557). Appealing to chaos as the mode of operation of divine agency in nature seems to place unacceptable restraints on what God may actually accomplish.

Also, although there are significant differences between Polkinghorne's and Peacocke's accounts of divine agency, both models rely on the idea of top-down causality conceived as the transfer of information but not energy, and both models hold that the higher-level properties of physical systems are supervenient upon lower-level properties—that is, higher-level properties can exist only through being realized in a particular configuration of lower-level properties. This implies that Polkinghorne's model, no less than Peacocke's, is vulnerable to the objection that all instances of information transfer have energetic implications and to the objection that the concept of higher-level properties supervening on lower-level properties provides no warrant for positing new causal powers. It thus seems clear that Polkinghorne, like Peacocke, fails in his attempt to affirm both the activity of God in creation and the causal closure of the physical.

MURPHY, TRACY, AND QUANTUM INDETERMINACY

The indeterminacy that characterizes quantum processes has seemed to some thinkers to suggest a way whereby God can be conceived as acting in creation without abandoning belief in the causal closure of the physical. Nancy Murphy and Thomas Tracy are two well-known proponents of such an approach (Murphy 1995, 325–58; Tracy 1995, 289–324).

Murphy argues that the indeterminacy associated with quantum events suggests that such events are either completely random or divinely determined (1995, 341). She contends that to think of quantum events as divinely determined is superior to thinking of them as completely random. The complete-randomness thesis forces us to abandon "the principle of sufficient reason which expresses our expectation that things happen when and as they happen due to some specific cause; that we should be able to give a reason why this happened now, rather than later or not at all" (1995, 338). By contrast, thinking of quantum events as divinely determined allows retention of the principle of sufficient reason. In Murphy's view, although subatomic entities have inherent powers, God's action is required if these powers are to be actualized (p. 344). Thus every quantum event requires a specific intentional act of God as its determining cause (p. 339).

There is no need, however, to conceive of God as competing with natural causes, because at the subatomic level natural causes are insufficient to determine all outcomes (p. 343). God's agency, on this model, is the hidden variable that underlies the apparent indeterminacy of quantum processes (p. 342).

Tracy's view is in many respects similar to Murphy's. Like Murphy, he holds that quantum indeterminacy makes possible the development of a model of divine agency in which God can be conceived as bringing about particular providential events without disturbing the immanent order of nature (Tracy 1995, 318–19). His view differs from hers in that he sees God as the determining cause of only some, not all, quantum events. Although God is the cause of the entities studied by quantum physics, God has created them with such a nature that their states of being are genuinely undetermined (p. 321). This permits Tracy to claim that God as the absolute ontological ground of creation may have brought into being a world that includes within its structure an element of indeterministic chance (p. 322).

A number of problems with the approach taken by Murphy and Tracy suggest that it is unsatisfactory. One is that it is unclear how the quantum processes of the microworld relate to events in the macroworld. Murphy and Tracy seem to be critical realists in their epistemology, but the standard Copenhagen interpretation of quantum mechanics, which they adopt, usually is linked to an extreme instrumentalism. As Lawrence Osborn notes, on the Copenhagen interpretation, "the probabilities generated by the Schrödinger wave equation do not correspond to any physical reality. There simply is no reality to be described until an act of measurement collapses the wave function. Quantum mechanics is merely a useful calculating device for predicting the possible outcomes of such acts of measurement" (Osborn 1999, 115).

It is difficult to see how Murphy's and Tracy's claim that God acts on microphysical entities in such a manner that one quantum state rather than another is realized can be made consistent with an interpretation of quantum physics holding that prior to an act of measurement such entities do not exist. Polkinghorne thus seems correct in his judgment that

the continuing perplexities about the quantum measurement problem remind us that we do not fully understand how the levels of the microworld and the macroworld interlock with each other. It does not seem that the proponents of divine action through quantum events have been able to articulate a clear account of how this could actually be conceived as the effective locus of providential interaction. (1998, 60)

A further concern is that quantum indeterminacies at the microlevel "dampen out" to deterministic regularities at the macrolevel. In order for quantum indeterminacy to make a difference in how events unfold in the world there must exist some means of amplifying the effect of particular quantum indeterminacies (Tracy 1995, 317). This implies that models of

divine agency that seek to exploit quantum indeterminacy are radically incomplete unless they also can account for the means by which particular quantum effects are amplified. The most natural candidates for providing a means of amplifying the effects of quantum events seem to be chaotic systems. Tracy, in fact, has suggested that chaotic systems might serve in this regard, although he is careful to hedge his bet, noting that the science involved is “new and quite uncertain” (1995, 323).

Tracy is correct to be cautious. As already noted, chaos comes in degrees and frequently has no significant effect on the behavior of the system in which it occurs. This being the case, marrying quantum indeterminacy with chaos theory provides little insight into how God can be conceived as acting in creation.

Yet another difficulty for those attempting to develop a model of divine agency based on integrating quantum indeterminacy and chaos theory is that quantum theory seems to imply that chaos cannot occur. According to quantum theory, systems described by the Schrödinger equation are not capable of exhibiting the type of sensitive dependency on their initial state that is characteristic of chaotic systems. We have at present no resolution of the problem of how to reconcile quantum theory and chaos theory, and no solution seems apparent on the horizon (Koperski 2000, 555–56). Given this state of affairs, any suggestion that the *modus operandi* of divine agency in creation is the amplification of quantum events by means of chaotic systems remains a vague speculation, not a well-developed model.

GOD’S INTERVENTION AND THE CONSERVATION OF ENERGY

An unquestioned assumption underlying all of these models is that any direct intervention by God, in the sense of overriding nature to change what would otherwise occur, necessarily involves violating the laws of nature. This assumption, in my view, is badly mistaken. That it is mistaken can be seen once one realizes that the laws of nature do not by themselves suffice to explain or predict any event. Any explanation or prediction involving the laws of nature must make reference not only to these laws but also to the actual “stuff” of nature whose behavior is described by these laws. Thus, for example, the standard covering law model of explanation finds it necessary to refer not only to laws of nature but also to the material conditions to which they apply.

If we keep in mind this basic distinction between the laws of nature and the “stuff,” call it mass/energy, the behavior of which they describe, we can see how God can intervene to change what would otherwise occur without violating the laws of nature. If God creates or annihilates a unit of mass/energy, or simply causes some of the “stuff” to occupy a different position than it did formerly, God changes the material conditions to which the laws of nature apply. God thereby intervenes to cause an event that would

not otherwise have occurred while breaking no law of nature. One would not, for example, violate or suspend the laws of motion if one were to toss an extra billiard ball into a group of balls in motion on a billiard table, yet such an act would override the outcome of what would otherwise be expected to happen on the table. Similarly, to consider a very dramatic case of intervention, if God were to create *ex nihilo* a fertilized egg in the body of a virgin, no laws of nature would be broken, yet the usual course of nature would have been overridden in such a way as to produce an event nature would not otherwise have produced.⁵

A likely objection at this point is that divine intervention implies that at least one fundamental law of nature must be violated, because the creation, annihilation, or moving of material entities by a nonphysical agent involves the creation or destruction of energy and thus violates the Principle of the Conservation of Energy. William Stoeger writes that “direct divine intervention . . . would involve an immaterial agent acting on or within a material context as a cause. . . . This is not possible . . . if it were . . . energy . . . would be added to a system spontaneously and mysteriously, contravening the conservation of energy” (Stoeger 1995, 244). This objection, however, fails to take into account an important distinction between two forms of the Principle. The Principle is commonly stated as “Energy can be neither created nor destroyed” or as “In an isolated system the total amount of energy remains constant,” the assumption being that these two statements are logically equivalent. This is false. We can deduce the second proposition from the first, but we cannot deduce the first from the second. The first proposition is considerably stronger, that is, carries a greater ontological commitment, than the second.

The significance of this distinction is considerable. First, it bears emphasis that the strong form of the Principle, the claim that energy can be neither created nor destroyed, rules out not only divine interventions but theism itself because it rules out the possibility of creation *ex nihilo*.⁶ Second, although the believer in divine intervention must reject the strong form of the Principle, she can accept what I am calling its weak form.⁷ She rejects not the well-evidenced claim that in a causally isolated system energy is conserved but the much more dubious claim that nature is an isolated system, in the sense that it is not open to the causal influence of God. She is in a position to accept all of the experimental evidence taken to support belief in the Principle, because that evidence only demonstrates that there is good reason to believe that energy is conserved in a causally isolated system. In short, she is in a position to affirm the Principle when it is formulated as a scientific law and not as a metaphysical principle that excludes the possibility of theism’s being true.⁸

It is therefore clear that conceiving of divine intervention as involving the creation or annihilation of mass/energy does not imply that the Principle is violated, so long as there is good reason to adopt its weak rather

than its strong form. Accepting the occurrence of divine interventions involving the creation or annihilation of energy does not commit one to denying the vast body of experimental evidence supporting belief that energy is conserved in an isolated system. Rather, accepting the occurrence of divine interventions commits one to arguing that the inference employed in moving from the claim that energy is conserved in an isolated system to the claim that energy can be neither created nor destroyed is ill-founded.

That the inference is ill-founded and tends to beg the question seems clear. The experimental evidence taken to support belief in the Principle establishes that we have good reason to believe that energy is conserved in an isolated system, but it is neutral as regards the further question of whether or not there exists something capable of creating or destroying energy. All that any experiment or series of experiments can show is that energy was conserved in an isolated system on a particular occasion or series of occasions. If the move from the weak form of the Principle is to be justified, it must be on the basis that the strong form provides an explanation of why the weak form holds true and that there exists no additional evidence that energy is ever created or destroyed.

This move is problematic on several counts. First, the theist is able to explain why the weak form of the Principle holds true without in any way endorsing the strong form. Conceiving of the universe as a dependent created contingent reality in which secondary physical causes operate equally explains why the weak form holds true, that is, why energy is conserved in a causally isolated system. To go further and insist that energy can be neither created nor destroyed seems to pay the metaphysical compliment of attributing necessary existence to energy rather than to God and makes clear that the strong form functions not simply as a statement of observed regularity in nature but as a defining postulate of physicalism.⁹

Second, the strong form is at odds with the Big Bang theory of the origin of the universe, a theory commonly accepted and commonly interpreted as implying an absolute beginning to the mass/energy that composes the universe (Smith and Craig [1993] 1995, 108–40). It is possible to accept both the weak form of the Principle and the Big Bang theory, but it is hard to see how acceptance of the Big Bang theory is consistent with affirming the truth of the strong form, the claim that energy can be neither created nor destroyed.

Third, leaving aside the fact that the Big Bang theory of cosmology seems to imply the falsity of the strong form, it is clear that divine interventions in nature cannot be objected to on the basis of the strong form. Divine interventions may imply the creation or annihilation of energy, but they do not imply that energy is not conserved in an isolated system. Positing divine interventions commits one not to denying that energy is conserved in an isolated system but rather to denying that the physical universe is an isolated system in the sense that it is never causally affected by God.

Given a positive body of evidence for divine intervention, it will not do to try to frame a Humean type balance-of-probabilities argument designed to reveal a conflict between the experimental evidence taken to support belief in the Principle of the Conservation of Energy and the evidence in favor of such intervention. The occurrence of divine interventions conceived as acts of creation or annihilation of energy conflicts not with any positive evidence supporting belief in the Principle but rather with a metaphysical commitment to the indestructibility of energy. Faced with reports of events that suggest divine intervention and thus constitute *prima facie* positive evidence that energy can be created or destroyed, it begs the question to dismiss such events or to argue that they are antecedently improbable on the grounds that they imply the falsity of the Principle's strong form (Larmer 1988, 61–92).

CONCLUSION

The currently dominant models of divine activity in creation not only accept but insist on the causal closure of the physical. This insistence is based on the view that direct divine intervention in the natural order implies violation of laws of nature, particularly the First Law of Thermodynamics, that is, the Principle of the Conservation of Energy. It is false, however, that direct divine intervention implies violation of the laws of nature, even in the case of this Principle. Given this, and given the difficulties encountered by models of divine agency that accept the causal closure of the physical, it seems that the widespread assumption that genuine integration of theistic and scientific belief must posit the causal closure of the physical is mistaken and should be abandoned.

NOTES

A version of this essay was presented at the conference "God Nature and Design: Historical and Contemporary Perspectives," Ian Ramsey Centre, St. Anne's College, Oxford, 12 July 2008.

1. Arthur Holmes comments that in pantheism "the problem is not that God does not act 'coercively' [that is, intervene in the course of nature so as to produce an event that would not otherwise occur] but could if he chose. It is rather that God cannot so act. The . . . rejection of special divine acts stems from an underlying metaphysic." He goes on to note that the reason this is so is that pantheism conceives of God acting as the final or formal cause of events or entities but never as their efficient cause. It is thus in principle incapable of acknowledging the occurrence of the miracles so central to the Christian faith (Holmes 1987, 185, 190).

2. Peacocke is nevertheless inclined to waffle on this issue:

. . . we cannot rule out the possibility that God might "intervene," in the popular sense of that word, to bring about events for which there can never be a naturalistic interpretation. . . . [There are, however, good reasons] for questioning whether such direct "intervention" is normally compatible with and coherent with other well-founded affirmations concerning the nature of God and of God's relation to the world. The historical evidence that such an intervention *has* happened will therefore have to be especially strong and the event in question of a kind that renders it uniquely revelatory in its particular context of God's purposes. . . . We may well conclude from the historical record . . . that there are in the end very few events that pass through this sieve. If they do do so, they will be of inestimable significance for our understanding of God. . . . Meanwhile, under pressure from the

scientific perspective . . . a more holistic and coherent model of God's continuing interaction with and on the world has emerged. . . . (Peacocke 1990, 183)

Such a passage leaves one wishing that Peacocke would clearly specify which, if any, events in the Christian faith he accepts as miraculous and how such events can be accommodated within the model of divine action he advocates.

3. This suggestion is also deistic, inasmuch as it confines God's agency to initiating and conserving the universe but in no way interacting with it.

4. Although not a direct response to Peacocke, Jaegwon Kim's comments are relevant:

Given the close similarity between supervenience and the realization relation, we may regard the two models as essentially identical in philosophical import. Both construe higher-level causal relations as grounded in, or derivative from, the causal processes at a more basic level. If physical facts determine all the facts . . . then physical facts, including causal facts about physical processes, must determine all the causal facts, including facts about mental causation.

But is this view of mental [top-down] causation something that the nonreductive physicalist and the emergentist could accept? The answer, arguably, is in the negative. For on this approach the causal powers of M [higher-level properties] are wholly derived from the causal powers of its realizer P [lower-level properties]: This instance of M [higher-level properties] causes whatever its physical realizer P [lower-level properties] causes. Since whatever causes P [lower-level properties] to be instantiated also causes M [higher-level properties] to be instantiated thereby, it follows that the given instance of M [higher-level properties] enters into exactly the same causal relations that the corresponding instance of P [lower-level properties] enters into: Something is a cause or effect of the M-instance [higher-level properties] if and only if it is a cause or effect of the P-instance [lower-level properties]. *There are no new causal powers that magically accrue to M [upper-level properties] over and beyond the causal powers of P [lower-level properties]. No new causal powers emerge at higher levels, and this goes against the claim . . . that higher-level properties are novel causal powers irreducible to lower-level properties.* (Kim 1998, 232; emphasis added)

5. C. S. Lewis puts this point very nicely when he writes, "If events ever come from beyond Nature . . . she will [not be] . . . incommoded by them. The moment [they] enter her realm they obey all her laws. Miraculous wine will intoxicate, miraculous conception will lead to pregnancy. . . . The divine art of miracle is not an art of suspending the pattern to which events conform but of feeding new events into that pattern" (Lewis 1947, 72).

6. An essential claim of theism is that God causes the universe to exist. If the universe is conceived to be composed of forms of mass/energy, and energy can be neither created nor destroyed, this claim is false.

7. I am using the term *weak* only in the sense of carrying less ontological commitment. In my view, the weak form of the Principle of the Conservation of Energy is on solid epistemological ground, but the strong form is not.

8. An anonymous referee suggests that the strong form of the Principle should be understood as applying only to secondary causes and is thus a scientific, not a metaphysical, principle. Whatever the merits of this suggestion, this is not the way it functions in the discussion. For example, as already noted, Stoeger takes the Principle to demonstrate the impossibility of an immaterial agent acting as a cause in the natural world (Stoeger 1995, 244).

9. Curt Ducasse fails to distinguish between what I have termed the weak form and strong form of the Principle. He sees clearly, however, the implications of the strong form when he writes that "conservation of energy is something one has to have, if (as the materialistic ontology of . . . naturalism demands) one is to be able to conceive the physical world as wholly self-contained, independent, isolated" (Ducasse 1951, 241).

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