ROCZNIKI FILOZOFICZNE
Volume LXVIII issue 3 – 2020
DOI: http://dx.doi.org/10.18290/rf20683-6

JEFFREY KOPERSKI

DIVINE ACTION AND THE LAWS OF NATURE: A REPLY TO ŁUKASIEWICZ

INTRODUCTION

In this reply to Łukasiewicz's "Divine Providence and Chance in the World" (this issue), I address two minor points and then a more significant one. First, what he calls "epistemic deism" is far more limited than its proponents generally realize. Physics beyond the quantum level places severe restrictions on what God could do through the collapse of the wave-function. Second, his criticism of the fine-tuning design argument has unintended implications. If he is correct, then most physicists—theists or not—are wrong about what phenomena need an explanation. Third and most important, Łukasiewicz incorrectly believes that the laws of nature only apply to closed systems. Fortunately, physics recognizes a division of labor between different types of laws and non-nomic conditions that would allow his approach to divine action to be strengthened.

EPISTEMIC DEISM AND THE AMPLIFICATION PROBLEM

What Łukasiewicz calls "epistemic deism" posits that God works through the many indeterministic collapse events described by the Copenhagen and GRW interpretations of quantum mechanics.[1] This approach has a possibly fatal weakness that is not fully appreciated in the divine action literature. While there are many collapse events in nature, their number is irrelevant if their effects do not register

JEFFREY KOPERSKI is Professor of Philosophy in the Department of Philosophy, Saginaw Valley State University; address for correspondence: 7400 Bay Road University Center, MI 48710, USA; email: koperski@svsu.edu; https://orcid.org/0000-0002-9249-7311.

[1] We should note that those holding this view, such as physicist and theologian Robert J. Russell, would vehemently reject this label. Rather than the "hands-off" God of deism, they consider their view to be "hands-on"—a way for God to actively govern creation.

in the realm of our experience. They seldom do. The macroscopic world largely obeys classical physics, which is why engineers have little need for quantum theory. For God to influence the macroscopic realm through quantum mechanics, the effects of those collapse events must be amplified.

While the amplification problem is not new (Tracy 1995, 317), little progress has been made. To be fair, advocates of epistemic deism—or what might better be called "divine quantum determination"—do offer examples of amplification. The interaction between photons and the mammalian eye is one; genetic mutations due to radiation might be another (Ellis 2001, 260). That there are so few examples should be a cause of concern, but the news gets worse the further one looks. In order to assess this model of divine action, all the relevant science must be considered, not just quantum mechanics. Differential dynamics, continuum mechanics, and condensed matter physics above the quantum level reveal barriers that explain why collapse events are not part of our common experience. Nature seems to have conspired to prevent quantum randomness from reaching the macroscopic realm. Based on our current understanding of physics, it is not an exaggeration to say that the amplification problem cannot be solved.[2]

Happily, Łukasiewicz does not endorse epistemic deism. My claim here is merely that the arguments against it run far deeper than is generally recognized.

FINE-TUNING AND SMALL PROBABILITIES

My most pointed disagreement is with Łukasiewicz's treatment of fine-tuning. In the last thirty-five years, physicists have discovered that a tiny change in one of twenty or so parameters in the laws of physics would have prevented the appearance of life. One example is the expansion rate of the universe, which can be represented by the cosmological constant Λ. If Λ were slighter larger, matter would not have been able to clump together to form stars or planets. If it were smaller, the universe would have collapsed back into itself shortly after the Big Bang. For life to be possible anywhere in the universe, Λ cannot vary more than one part in 10^{53} (Collins 2003, 180–82). Given that Λ depends on brute facts, such as the total amount of mass in the universe, there is no reason why it could not be much different than it is. Since life depends on Λ having the value that it does, we seem to have gotten very lucky indeed.

While low-probability events happen, most theistic philosophers believe that the extreme improbability of cosmological fine-tuning cannot be attributed to luck.

[2] For the complete argument and explanations of the relevant physics, see Koperski (2015b).

They believe that the universe looks like it has been constructed in just such a way so that life could exist because it *has* been designed to accommodate life by God.

Łukasiewicz argues to the contrary that it is illegitimate to form a theistic design argument based on such examples. Theistic philosophers are wrong to interpret these *prima facie* small probabilities as needing an explanation. While I will not rehearse his arguments here, we should note that there are two questions that must be answered. First, does fine-tuning need an explanation? Second, what is the best explanation? The first question has nothing to do with God or the design argument. Moreover, the answer given by most physicists—theistic or not—is yes. The discovery of fine-tuning is very surprising from a purely scientific point of view and demands an explanation.

As for the second question, some predict that more research will yield an explanation, perhaps in terms of yet-to-be-discovered laws. Others appeal to a multiverse in which individual universes each have different values for the fine-tuning constants. Given the problems with these proposed naturalistic explanations,[3] many theistic philosophers and scientists believe that design is the best answer.

Here, then, is the key point. While Łukasiewicz's criticism is aimed at philosophers who argue for design based on the small probability of fine-tuning, it applies equally well to anyone who believes that fine-tuning requires an explanation. If he is correct, then not only are advocates of the design argument in error, but every physicist who believes that fine-tuning demands an explanation. Łukasiewicz cannot say that philosophers are wrong in trying to explain fine-tuning, but physicists such as Stephen Hawking, Roger Penrose, Leonard Susskind, Andrei Linde, and Alan Guth are not. To be consistent, one must say they are all wrong and fine-tuning does not need an explanation of any kind. I think it will take a more robust argument to show that most physicists are mistaken about what requires an explanation.

Once we agree that fine-tuning does need an explanation (question 1), then we can assess which explanation is the best (question 2). Many will say that theistic design cannot be a legitimate scientific explanation. Regardless of whether it is science or philosophy, at present I believe that design is currently the best explanation.

NONVIOLATIONIST DIVINE ACTION

Turning to the main topic, Łukasiewicz presents an "interventionist theory of divine action," but one in which God's acts do not break the laws of nature. His choice of the term "interventionist" will confuse some and be off-putting to others

[3] See Koperski (2015a, chap. 2) for more.

who should be allies. In the current literature on divine action, most understand "intervention" to signify breaking the laws of nature. Those who reject the idea that God violates his own laws refer to themselves as "noninterventionists." Robert J. Russell, for example, calls his model of divine action NIODA, for non-interventionist objective divine action. And yet Russell is no deist. He believes that God actively guides creation through those quantum collapse events discussed earlier. Russell is a noninterventionist insofar as he is trying to distance himself from theists who believe that God violates the laws of nature.

But I agree with Łukasiewicz that Russell's choice of terms is also misleading. "Noninterventionism" does sound like deism or something close to it: God does not intervene (i.e., God does nothing beyond create and sustain the universe). I suggest a third option. Let "intervention" refer to God breaking the laws—a widely-held interpretation of miracles. Let "nonintervention" refer to deism and other views where God plays no direct causal roll in physical systems. Both Russell and Łukasiewicz occupy a middle ground, what I call "nonviolationism." A nonviolationist believes that God acts in nature, perhaps often, but does not violate the laws when doing so.

Each of three models of divine action that Łukasiewicz presents presuppose the "indeterministic nature of quantum events." If one important part of his analysis is correct, however, this assumption is not needed. Following Alvin Plantinga, Łukasiewicz believes that laws only apply to causally closed systems. More precisely, a necessary condition for any law to apply to a given system is that the system is closed to outside influences. Consider a mechanical clock with a pendulum. The hands of the clock move according to the laws of mechanics. But if I reach in and move the hands, I have not violated those laws. They simply do not apply during this perturbation. When the hands are touched, the clock is no longer a closed system governed solely by mechanical laws.

Plantinga argues that the same conclusion applies when God acts on a system: it is no longer mechanically closed and so the laws do not strictly apply (2011, 82–83). Indeed, on this conception it is not possible for God to break a law of nature. Any time God acts in the world would be a period in which a given system is not causally closed and so the relevant laws do not apply. If a law does not apply, then that law cannot be violated. But Plantinga is clear: this is true regardless of whether quantum or classical mechanics holds (2011, 83–84). There is no need to invoke quantum indeterminism. The causal closure condition applies in any world governed by natural laws. Łukasiewicz should welcome this given that quantum mechanics might not be indeterministic after all. According to Bohmian mechanics and the many-worlds interpretations, quantum mechanics is just as deterministic as classical mechanics.

CONDITIONAL LAWS

To this point, I have been assuming that Plantinga's view about closed systems and laws is correct. In fact, what he says is only true of conservation laws. There are conditions under which they hold and others in which they do not. Any undergraduate textbook will point out that conservation of energy and momentum only apply to closed or isolated systems. If the system is influenced by outside forces, there is no conservation, just as Plantinga says.

But there are other kinds of laws. The laws of mechanics, like Newton's second law of motion, and special force laws, like universal gravitation, do not have any closed system provisos. They apply in all circumstances. Hence, the laws that require a closed system are far fewer than Plantinga or Łukasiewicz seem to realize. Is this a fatal oversight for Łukasiewicz's account? No. There is a type of contingency in other laws that, while more complicated, will do the work needed.

It will be helpful if we first detour into another approach so that contrasts can be drawn. One popular way to express contingency for the applicability of laws is in terms of *ceteris paribus* conditions. Consider a simplified form of universal gravitation: $F = G\frac{m_1 m_2}{r^2}$. Is it true? Not of any charged bodies, Nancy Cartwright argues, since they are also subject to Coulomb's law. Given the influence of a second force, no charged body ever perfectly obeys universal gravitation. According to Cartwright and others, this shows that gravitation contains an implicit *ceteris paribus* condition:

> *If* there are no forces other than gravitational forces at work, *then* two bodies exert a force between each other which varies inversely as the square of the distance between them, and varies directly as the product of their masses. (1983, 58)

So *ceteris paribus*, two bodies mutually attract according to universal gravitation. But when other influences are at work, the law does not apply as written. Many metaphysicians now agree that laws of nature only ever hold according to implicit *ceteris paribus* conditions.

This is a different way of approaching the conditions under which laws apply. Neither it nor Plantinga's view, however, correctly describe how such laws work in physics.

Say that you know all the applicable laws for some system and have them written down in mathematical form. Let us also say that these laws are foundational in the sense that they do not depend on more fundamental physics. Can you then predict the behavior of the system? Perhaps not if the equations do not have a closed form solution. So, let us give you an ideal computer with infinite memory and no roundoff errors in order to perfectly simulate the evolution of the system according to those equations. Even then, you will still need the precise state of the system at some point in time. In terms of the differential equations to be solved or numerically simulated, this information constitutes the initial conditions of the system.[4] This illustrates that, even in a classical world, the laws of nature do not in themselves determine all events. The future state of a system depends on contingent, non-lawlike information.

While there is a distinction between laws on one hand and initial/boundary conditions on the other, there is still more to consider. Laws are general. Universal gravitation and the laws of motion do not in themselves say how they apply to individual systems. The method for generating a mathematical model for a specific system from a set of laws was articulated by physicist Leonhard Euler in the eighteenth century (Wilson 2016, sec. 2):

1) Determine what sort of system one is trying to describe.

For simplicity, let us consider a collection of point particles floating in space.

2) Determine the relevant forces acting on these bodies.

For point particles, these will typically be gravitational attraction and electrical repulsion/attraction. (Contact forces would be possible for extended bodies.)

3) For a given particle, determine the influence (direction and strength) of one force.

This requires some sort of coordinate system, such as three-dimensional Euclidean space with defined axes (Cartesian coordinates). For one particle, calculate the degree to which a force acts along each axis (vector decomposition).

4) Repeat (3) until all forces have been accounted for, and then do the same for every particle in the system.

[4] This example is a modern take on one given by Laplace, what many now call a Laplacian demon ([1814] 1902, 4).

5) For each particle, sum up the forces along each axis.

6) For each particle, set the sum of forces along a given axis equal to its mass times the acceleration. Do the same for the other axes. Repeat for each particle.

This is where the force laws are incorporated into Newton's second law of motion. The result is a set of differential equations for the system that can be solved or numerically integrated on a computer once the initial conditions have been determined.

Note that none of the laws mentioned here contains *ceteris paribus* clauses as Cartwright describes. There is instead a division of labor between different types of laws, initial and boundary conditions, and the differential equations produced. Euler's method encompasses all the forces at work, not just gravity, and the vector decomposition of forces can accommodate any number of forces on each particle. There are no implicit *ceteris paribus* clauses to be found.

For our purposes, it is important to recognize which aspects of all this are subject to change and which are not. Consider a new system: a block sliding down an inclined plane. Applying Euler's method in this case is relatively simple. But what if someone lifts one side of the plane as the block is sliding? The (normal) force of the block on the plane will change, as will the force due to friction, producing a new differential equation at the end, but the laws do not change. Gravitation remains the same. So does the relation between friction and the normal force on the plane. All other information encoded in the Euler procedure that does not refer to laws is subject to change. We cause such changes all the time, like the tilting of the plane or when stepping into a stream, and we do so without breaking or violating any laws.

This is because the laws of nature adapt to changes in non-nomic conditions. If we have robust (libertarian) free will, which I believe we do, then every conscious act brings about some change in the world that is not fully determined by the laws of nature. And yet nature is not confused by such events nor are any laws violated by them. The laws are designed—literally, in my view—to adapt to change. Moreover, nothing in this analysis requires quantum mechanics or indeterministic events at the level of fundamental physics.

What are the implications for divine action? Instead of a person lifting the inclined plane, say that God introduces the same force. As far as Euler's method is concerned, a force is a force regardless of how it is generated, and so the results would be the same. The laws would adapt to this change in conditions just a readily.

"Surely the laws have been violated if *God* were to act in this way," says my incredulous critic. Very well, what laws have been violated? Not gravitation. Not any laws of mechanics. Again, the laws adapt to changes in non-nomic conditions and physics has nothing to say about the source of those changes.

"But physics wouldn't be able to explain the origin of this new force." True, but except for extreme reductionists, no one thinks that physics can explain the origin of our free will choices either. On my view of divine action, there will be events that cannot be explained by fundamental science. This should not be a concern, however. Only those who hold to absolute scientism and reductionism believe otherwise. In any case, the issue here is not the limits of scientific explanation, but whether divine action violates the laws of nature.

"Ah, but there are more than force laws and laws of motion," says my fictional critic. "What about conservation laws? Surely the introduction of this new force from nowhere constitutes a violation of conservation of energy." Perhaps. Let us consider how conservation laws work. Conservation laws *are* conditional, although not in the *ceteris paribus* sense. There are clearly specified physical conditions under which conservation applies and those where it fails. Here is where Łukasiewicz's comment "that the world is a *causally open* system" is relevant. Let us focus on conservation of energy.

Consider a closed system, say a single planet in an elliptical orbit around a star.[5] Energy is conserved. Now say that a random asteroid from far beyond this star strikes the planet. Given this new influence from outside the system, it can no longer be considered closed. Has conservation of energy been violated? No, the conditions under which conservation applies are no longer in place. Laws that do not apply to a given system cannot be violated.[6] Now consider two colliding balls sliding on a frictionless plane. If the collision is perfectly elastic—another idealization—then conservation applies in this closed system. But if someone reaches in and stops one of the blocks, that action does not violate conservation, which no longer applies. Likewise, if God were to introduce the same force, conservation would not be violated. The conditions under which conservation applies no longer hold.

My conclusion is that whatever changes in the world that finite creatures with free will can make, all without violating any laws, God can do the same. Once again, nothing here requires quantum mechanics unless our libertarian freedom itself depends on quantum indeterminism. Łukasiewicz believes that it does. I am doubtful.

[5] Technically this system is subject to gravitational pull of other distant bodies, but their influence is negligible.

[6] The closed/open distinction is not the most rigorous way to state these conditions. Instead, one needs to consider Noether's theorem and the time invariance of a system's Lagrangian. For more, see Pitts (2019) and Koperski (2020, sec. 7.3).

Ultimately, Łukasiewicz and I are in broad agreement. We both argue for nonviolationist models of divine action, showing how God can act within nature without violating its laws. Unlike most such models, especially those that restrict divine action to indeterministic quantum events, the one outlined here allows for a great deal of space in which God can act. Some have theological reasons for thinking that God does not often act in nature, or perhaps not at all. In other words, there are noninterventionist arguments against such free-ranging divine action. My point here is merely that so far as the physics alone is concerned, no such restriction exists.

REFERENCES

CARTWRIGHT, Nancy. 1983. *How the Laws of Physics Lie*. Oxford: Clarendon Press.

COLLINS, Robin. 2003. "Evidence for Fine-Tuning." In *God and Design: The Teleological Argument and Modern Science*, edited by Neil A. Manson, 178–99. New York: Routledge.

ELLIS, George F. R. 2001. "Quantum Theory and the Macroscopic World." In *Quantum Mechanics: Scientific Perspectives on Divine Action*, edited by Robert J. Russell, Kirk Wegter-McNelly, and John Polkinghorne, 259–91. Berkeley, CA: Center for Theology and the Natural Sciences.

KOPERSKI, Jeffrey. 2015a. *The Physics of Theism: God, Physics, and the Philosophy of Science*. Chichester: Wiley–Blackwell.

KOPERSKI, Jeffrey. 2015b. "Divine Action and the Quantum Amplification Problem." *Theology and Science* 13 (4): 379–94. https://doi.org/10.1080/14746700.2015.1082872.

KOPERSKI, Jeffrey. 2020. *Divine Action, Determinism, and the Laws of Nature*. New York: Routledge.

LAPLACE, Pierre Simon. (1814) 1902. *A Philosophical Essay on Probabilities*. Translated by F. W. Truscott and F. L. Emory. New York: Wiley.

PITTS, J. Brian. 2019. "Conservation Laws and the Philosophy of Mind: Opening the Black Box, Finding a Mirror." *Philosophia* 48: 673–707. https://doi.org/10.1007/s11406-019-00102-7.

PLANTINGA, Alvin. 2011. *Where the Conflict Really Lies: Science, Religion, and Naturalism*. Oxford: Oxford University Press.

TRACY, Thomas F. 1995. "Particular Providence and the God of the Gaps." In *Chaos and Complexity: Scientific Perspectives on Divine Action*, edited by R. J. Russell, N. Murphy, and A. R. Peacocke, 291–324. Berkeley, CA: Center for Theology and the Natural Sciences.

WILSON, Mark. 2016. "Mechanics, Classical." In *Routledge Encyclopedia of Philosophy*. London: Routledge. https://doi.org/10.4324/9780415249126-Q068-1.

DIVINE ACTION AND THE LAWS OF NATURE: A REPLY TO ŁUKASIEWICZ

S u m m a r y

This reply to Łukasiewicz's "Divine Providence and Chance in the World" argues for three conclusions. First, what he calls "epistemic deism" faces challenges from physics that are not widely recognized. Second, if theists in favor of the fine-tuning design argument are wrong, then so are most physicists, who believe that fine-tuning requires an explanation. Third, not all laws of nature are conditional in the way that Łukasiewicz believes. Fortunately, the distinction between laws and non-nomic information provides a way to expand his model of divine action.

Keywords: divine action; quantum mechanics; fine-tuning; laws of nature; conservation of energy.

DZIAŁANIE BOGA A PRAWA PRZYRODY:
ODPOWIEDŹ ŁUKASIEWICZOWI

Streszczenie

W odpowiedzi Łukasiewiczowi na *Opatrzność Boża a przypadek w świecie* bronię trzech wniosków. Po pierwsze, stanowisko nazwane przez niego „deizmem epistemicznym" staje przed wyzwaniami ze strony fizyki, których często się nie zauważa. Po drugie, jeśli teiści opowiadający się za argumentem celowościowym opartym na tzw. delikatnym dostrojeniu nie mają racji, to nie ma jej również większość fizyków, która uważa, że delikatne dostrojenie wymaga wyjaśnienia. Po trzecie, nie wszystkie prawa przyrody są warunkowe w takim sensie, jaki przyjmuje Łukasiewicz. Na szczęście rozróżnienie między prawami a nienomologiczną informacją pozwala na rozszerzenie jego modelu działania Boga.

Słowa kluczowe: działanie Boga; mechanika kwantowa; delikatne dostrojenie; prawa przyrody; zachowanie energii.