

THE DISPOSITIONALIST DEITY: HOW GOD CREATES LAWS AND WHY THEISTS SHOULD CARE

by Ben Page

Abstract. How does God govern the world? For many theists “laws of nature” play a vital role. But what are these laws, metaphysically speaking? I shall argue that laws of nature are not external to the objects they govern, but instead should be thought of as reducible to internal features of properties. Recent work in metaphysics and philosophy of science has revived a dispositionalist conception of nature, according to which nature is not passive, but active and dynamic. Disposition theorists see particulars as being internally powerful rather than being governed by external laws of nature, making external laws in effect ontologically otiose. I will argue that theists should prefer a dispositionalist ontology, since it leads them toward the theory of concurrentism in divine conservation, rather than occasionalism, and revives the distinction between internal and external teleology. God on this view does not govern the world through external laws of nature, but rather through internal aspects of powerful properties.

Keywords: concurrentism; dispositions; God; laws of nature; metaphysics; occasionalism; ontology; philosophy of science; powers; teleology

Most people who talk about God do not talk about him “in any coherent sense at all,” laments David Bentley Hart (2013, 1). While Stephen Mumford complains, “I had heard many people discuss the laws of nature and I had seen what some of them purported to be. But I confess to finding laws somewhat puzzling existents” (2013, 15). Combining these misunderstood and complex topics therefore, is no short and simple matter. Consequently, I shall not examine what “God” means; rather commend an increasingly popular conception of laws of nature and provide reasons why theists might adopt this account. It should be noted from the outset that I will not be concerned with laws of science, “those regularities of the natural world which are known to us and which have been cast in appropriate symbolic forms” (Weinert 1995, 5). Rather, I will be addressing the ontological sense

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of laws of nature, with any subsequent use of “law,” unless otherwise stated, referring to natural physical laws. Mumford asks, “What in the world is a law?” (2004, xii). I will seek to answer this question presently and then proceed to explicate dispositionalism. Following this, I will provide two reasons why theists might adopt such a view, in light of its recovery of concurrentism and internal teleology, and conclude by rebutting a potential objection. This article will therefore be initially concerned with areas related to philosophy of science and metaphysics and then, having set the stage, will delve into matters of philosophy of religion.

WHAT ARE LAWS OF NATURE?

Scientists routinely tell us that things obey, are constrained, and determined by laws of nature, but far less frequently express what these laws metaphysically are. Ancient Greek and medieval philosophy did not conceive of laws of nature as we do, which is clear from both Aristotle (Johnson 2005, 60, n47) and Aquinas (Adams 2013, 3–13; Harrison 2008, 14–15), and yet still thought of the cosmos as orderly and regular. It is in the mechanistic philosophy of Descartes, Newton, and his immediate predecessors, that the idea of physical laws of nature is introduced (Ruby 1986, 357–59; Henry 2004, 73–114; Garber 2013, 46–47). From their conception, laws of nature were deeply embedded in a theistic worldview, being rooted within the divine will (Ott 2009, 1; Davies 2010, 70–73). Still today, some philosophers and historians think “law talk” requires God in order to make sense¹ and the confusion pertaining to what laws actually are “results in part from the fact that the idea of laws of nature has been torn loose from its original theological moorings” (Harrison 2008, 30). The history and origin of laws of nature is complex with too many subtleties to adequately address here, so I will concentrate upon the contemporary metaphysical debate surrounding physical laws.

Contemporary philosophy conceives the ontology of laws in three different ways: the strong external governing conception of laws, associated with Dretske–Tooley–Armstrong and antireductionist views of Carroll and Lange; the denial view, associated with disposition/power theorists;² and the reductive view, associated with “Hume”³ (Beebe 2000, 571–94). On this account, following the traditional reading of Hume’s empiricist analysis of causation, there are no connections in nature and, as such, laws merely describe the regularities observable in the world. Nothing determines that something does X or Y, rather X or Y happens and the laws, in this view, simply record nature’s happenings. I reject this conception of laws, but due to space will only be able to comment briefly on my grounds for doing so. Edward Feser offers one good reason for rejecting the “Humean” view when he writes: “If a law is just a regularity, then it does not *explain* anything. For what we need to know is *why* there are

just the regularities that exist in nature, rather than some other regularities or no regularities at all” (2014, 69). Merely describing regularities does not provide an explanation of those regularities, which is a major reason for postulating laws. Due to their empiricism, which precludes ontological commitment in the absence of experimental evidence for it, all the “Humean” can do is spot regularities, not genuine connections in nature. Mumford seems correct in thinking this “Humean” account “irrefutable but neither compelling, appealing nor intuitive. Being unappealing, in this case, should be thought to outweigh the irrefutability of the theory” (2004, 33). Our intuition that there are connections in nature, for instance, that negatively charged particles repel other negatively charged particles, strikes against the “Humean” view. As I endorse a richer ontology and therefore a greater ontological commitment than “Humeans,” I can explain why there are certain regularities in nature. By contrast, the “Humean” view provides us with no ontology of laws due to the limits of experimental evidence. Unfortunately some of us just cannot manage to be good “Humeans!”

Because I contend there are connections in nature, I must adopt a more metaphysically robust conception of laws. Across the literature, a particular thought experiment has been adopted as a way of arguing for a strong external governing conception of laws⁴ (Tooley 1977, 667–98; Carroll 1990, 185–219; Carroll 1994, 77–85). “Consider two worlds, w_1 and w_2 , each of which contains nothing but X-particles and Y-fields. In these worlds, as it happens, no X-particle ever enters a Y-field. Nevertheless, it might be a law in w_1 that any X-particle entering a Y-field acquires spin-up, while in w_2 , any such particle acquires spin-down. So here we have two worlds identical in all their non-nomic respects differing in the laws of nature that obtain in them” (Ott 2009, 248–49). If you can make sense of this thought experiment you will probably endorse a theory of laws much like the Dretske–Tooley–Armstrong conception (Armstrong 2010, 35–47) or the antireductionism of Carroll (1994) and Lange (2000). On the Dretske–Tooley–Armstrong view, laws are necessary connections between universals, although this necessity does not hold between different possible worlds. Armstrong, for instance, writes, “with the help of universals and the device of states of affairs *types* we have been able to define what we might think of as an intermediate necessity, indeterminate between Humean contingency and necessity. We might call this ‘nomic necessity’” (2010, 41). For the antireductionists, the use of universals is not required. Carroll is explicit in this, writing “we reject the answers given by Humeans and see no advantage in an appeal to universals. We reject all attempts to say what it is to be a law that do not appeal to nomic concepts” (2004, 5). What is key to both of these approaches is that laws involve some type of nomic connections, but these connections need not be the same in all possible worlds. An example will help illustrate this. When I put some

water in a pan on the stove, the water boils when it reaches 100°C. We might say that “water,” seen as a universal or particular, is linked up with “boils at 100°C,” which may also be seen as a universal or particular. In this world, it is necessary that under normal conditions water will boil at 100°C. Nevertheless, it is a contingent fact that “water” is linked with “boils at 100°C.” It could have been the case that “water” was linked with “boils at 112°C” or “boils at 58°C.” Different possible worlds will have different boiling points for water, not necessarily because the normal conditions are different but because the nomic link is different. A theist might understand this view as follows: God creates passive objects, either as universals or particulars, and then decides which nomic links should govern them. It might have been the case that in another world God decides to create the same objects, but sets up the nomic connections differently. On this account, there is nothing stopping him from doing so. It seems to me that we might think of this type of creation as a two-stage process, first objects and then nomic connections, or perhaps nomic connections and then objects. However, according to this explanation, it cannot be the case that a nomic connection arises with the very creation of an object, since this would require that these objects have the same nomic connections in every possible world. As we have seen, according to this explanation they may not have. By way of illustration, another example might be that in this world God creates negatively charged electrons, which repel other electrons by virtue of their negative charge. But it could have been the case that God created negatively charged electrons that attracted one another by virtue of their negative charge. Laws, on this conception, may be thought of as external to the objects they govern. This does not mean that the laws are in any sense outside the world, and does not require that they be connections of a platonic type. Rather, what I mean by this is that there is no essential nomic connection between being an object of a certain type and the law that object obeys. The connection between the law obeyed and the object is an external one, not one intrinsic or internal to the nature of the object.

I find this conception deeply problematic, and want to suggest instead that the lesson to be learnt from this thought experiment is that laws cannot be external to the objects they govern. Take, for example, the property possessed by an electron, namely negative charge. We might ask what is it that makes this property what it is? What are its constitutive identity criteria? It seems to me, following Shoemaker (1980), the best candidate is the causal role that a given property possesses. If we take away the causal role of a property, such as the role negative charge plays in repelling other negatively charged objects, it seems we actually attain a new property. What would it mean to say that in another possible world the “negative charge” of an electron might cause attraction, rather than repulsion, with another negatively charged electron? If properties are what

they are due to their causal roles, then no property can have a different causal role in other possible worlds. Mumford thinks likewise, asking, “If the causal role of a property is altered, are we still talking of the same property?” (2004, 104). If this view of properties is correct then the external view of laws appears deeply problematic. Part of what it is to be negatively charged is to repel other negatively charged objects and this comprises an essential aspect of negative charge. This view, that properties cannot change causal roles in other possible worlds, seemingly commits one to a “property-essentialism,” where the causal role of properties is essential to properties themselves.

It might be objected that one can imagine a negatively charged particle attracting another negatively charged particle in a different possible world. My response would be, you might be able to imagine it, but you certainly cannot conceive of it. It might be that in our imagination we can conjure up an image of a particle attracting another and call it negative charge attracting negative charge. But this is certainly not the same as conceiving negative charge attracting negative charge. If what provides a property’s identity is its causal role, then negative charge’s identity is essentially linked with its repelling other entities with negative charge. This is somewhat similar to a quadrilateral having four sides. It would not make sense to say that one could conceive of a quadrilateral having three sides, since by definition part of what it is to be a quadrilateral is to have four sides. Likewise, if a property’s identity is essentially linked to its causal role then it does not make sense to think the causal role could be different and that the identity of the property remain the same. Suppose, however, that the causal role is not taken to be the identity criteria of properties. What then is? The rival view is that there is something primitive that gives a property its identity, namely a quiddity. This means the property could do many different types of things, and yet continue to be the same property. In fact as Chakravartty notes, “*any* nomic profile *at all* is compatible with the identity of a given property . . . there is a possible world in which it has any causal profile one might imagine” (forthcoming). This is no doubt a strange situation, where negative charge can cause the smell of chocolate, but this may nevertheless appeal to some philosophers. But as scientists this “adoption of quiddities seems a bizarre way to make sense of our ordinary talk of properties, let alone property talk in the scientific domain” (Chakravartty forthcoming). The lesson I take is that we should adopt causal role as central to the identity of a property and remember to distinguish between imagination and conception. What a property can in fact do across all possible worlds is far more restricted than our imaginations might suggest.

It might further be objected that even though it seems there are many properties to which causal role is necessary or essential to identity, there must be some properties to which causal role is inessential. One response

would be to deny the claim that there are properties to which causal role is inessential and defend the claim that all properties have an essential causal role, an approach reflected in dispositional monism.⁵ Alternatively one could hold to a dual-aspect or identity view, according to which properties have a categorical nature and also an essential causal role. Finally one could opt for a property dualist view, according to which categorical properties and properties with an essential causal role, known as dispositional properties, are distinct and equally fundamental.⁶ If one were to embrace this view, categorical properties would have to be seen as causally inactive in order for the argument presented in this article to remain effective, a position endorsed by Molnar. A categorical property like location could be seen as causally relevant, since operations of dispositions are location sensitive, nevertheless the property itself causally inert (Molnar 2003, 162–65). What my argument cannot accept is properties with a contingent causal role, which each of the above potential responses avoids.

What I hope to have shown is that it is more plausible to think that laws are internal to properties, since a property's causal role is essential to the property itself, and therefore we should be skeptical of attempts to ground a property's causal role in something inessential, or as I have termed it, external, to it. I do not suppose that this argument alone will have persuaded everyone, but I hope it will have shown that the idea of external governing laws is at least deeply problematic.⁷ Recent efforts in metaphysics have revived a conception of properties that have their causal role as essential, which additionally provides us with a more satisfactory ontology of laws.

DISPOSITIONS

Dispositions/powers/capacities/tendencies, were not long ago objects of scorn, with Mellor writing that they “are as shameful in many eyes as pregnant spinsters used to be—ideally to be explained away, or entitled by a shotgun wedding to take the name of some decently real categorical property” (1974, 157). The main reason for this apathy was due primarily to Molière's *virtus dormitiva* objection, where he argued that dispositions are vacuous, providing no explanatory power. However, contemporary theorists do not ascribe much weight to this objection. They have shown a willingness to accept that, although dispositional ascriptions are not very informative, they are nevertheless not tautological.⁸ A realist view of dispositions has therefore undergone something of a revival and is now becoming increasingly popular both in metaphysics and philosophy of science. Dispositions offer a conception of property-like entities which place their causal role as central. Given space restrictions, I cannot

offer a complete explication and defense of dispositions; however, I will offer a few thoughts sufficient for the purpose of this article.⁹ Perhaps the easiest way to explain what dispositions are is through examples. Take “fragility” and “solubility” as dispositions. When in the appropriate manifestation conditions, they are activated and manifest. Salt, for example, dissolves once it is placed in water, one of its appropriate manifestation conditions. However, salt’s disposition to dissolve is real even if it is never in the appropriate manifestation conditions and consequently never manifests. Dispositions, thus, point toward their manifestation and are real even when not manifesting (Oderberg 2009, 680). We might say, as Charles B. Martin does, that dispositions are always in a “ready to go” state (2007, 55). Dispositions are also causally primitive, conveying power or “oomph” and therefore dispositions of objects make objects powerful themselves and thereby exclude the need of external laws to make objects powerful and act. One may wonder if we should think of dispositions as relational or not. This is an issue debated within the dispositionalist family, some holding that they should be seen as relational (Bird 2007, 139) and others holding that they should not (Chakravartty 2013). For the purpose of this article, one need not have decided where one stands on this issue. Finally, we might say that a disposition has a type of physical/conditional necessity, rather than an unqualified necessity (Hüttemann 2013, 121–22; Marmodoro forthcoming). This means that once the manifestation conditions are present, with no impediments, a manifestation necessarily occurs. Charlotte Witt (2008, 132–33) contends Aristotle held to this type of necessity, with Stephen Brock (2002, 229–32) arguing Aquinas also thought this way.

However Mumford, one of the leading dispositionalists, has suggested that Aquinas held to some type of dispositional modality (2013, 19; Mumford and Anjum 2014, 108), an irreducible modality between full necessity and contingency which he himself advocates (Mumford and Anjum 2011, 175–94), attributing this to Geach’s explication of Aquinas (Anscombe and Geach 1961, 101–04). This I think is a mistaken interpretation.¹⁰ Aquinas distinguishes necessity in a number of ways, including a distinction between absolute and conditional necessity (*Summa Contra Gentiles* II, 30; *Questiones Disputatae de Veritate*, q.17, a.3; *Commentary on the Metaphysics*, Bk V, Lesson 6, 832–35¹¹; *De Principiis Naturae*, 26). For Aquinas, absolute necessity can attain in different ways. Aquinas says that the absolute necessity of death comes from the matter of things, since all material things are made up of contrary elements and so it is absolutely necessary that they will corrupt or cease (Bobick 1998, 69–71). Another mode of absolute necessity, which he also calls natural necessity, may arise out of the very nature of a thing (Pasnau 2002, 232). Aquinas would say that it is absolutely/naturally necessary that negative charge repels negative charge since it is the nature of negative charge to do that. Conditional

necessity, however, is different since it can be hindered, perhaps due to an extrinsic impediment, “for if fire is hot, it is necessary that it have the power to heat, although it is not necessary that it heat, since it may be hindered by something extrinsic” (*Summa Contra Gentiles* II, 30). For Aquinas there are three conditions, any of which being met will restrict the cause from producing its effect. First, where an external impediment frustrates the effect; second, if the agent is unable, due to lack of power, to cause it; and third, if the matter of the patient is not disposed to receive the effect¹² (*Commentary on the Metaphysics*, Bk V, Lesson 6; *Summa Contra Gentiles* III, 74). If none of these conditions are met, the cause will follow of necessity, which is what conditional necessity claims. We can therefore follow Brock in saying that “Nowhere in his treatment does Thomas propose anything like a cause that might fail even without an impediment” (Brock 2002, 229), which seems to be what dispositional modality allows. Aquinas himself seems to make this point, writing “Not every cause produces its effect of necessity even if it is a sufficient cause, inasmuch as the cause can sometimes be impeded from attaining its effect, as for instance natural causes, which do not produce their effects necessarily, but only for the most part, since they are impeded” (*De Malo*, q.6, ad.15; ad.21; *Commentary on the Physics* II, 13, 257; *Summa Theologica* I-II, q.75, a.1, ad.2) It may be the case that we never know if any of the three conditions above are satisfied. Yet for Aquinas, if none of these conditions are met, the effect will happen of necessity. Therefore, although Aquinas does not speak much of conditional necessity with respect to unconscious material objects, he nevertheless reveals enough to show that he endorses it.¹³ Thomists have developed his thought in this way, providing further support that he would have adopted this position. Cajetan, for instance, makes explicit what I think is implicit in Aquinas’s writing, saying: “an irrational active potency necessarily operates when a subject is present and impediments are withdrawn; for heat necessarily heats when a subject that can be heated is present, and nothing impedes it” (Continuation to Aquinas’s *Commentary on Aristotle’s on Interpretation*, II, XI, 4). More examples could be given,¹⁴ but I think this provides sufficient grounds to suggest that the Mumford reading, based on Geach, is mistaken and that Aquinas would have more likely held to conditional necessity, as Brock has argued.

If one assumes this conception of dispositions can be held, then laws can be thought of as dependent on properties.¹⁵ When God creates the world, he creates particular objects which have properties that are disposed to behave in certain ways when met by appropriate manifestation conditions. Properties themselves are powerful. God no longer needs to create laws to govern the actions of properties and objects. Rather, properties and objects are active themselves and do what they do in virtue of what they are. On this view, the truth-makers of laws are “the essential irreducible

powers of the objects of that world” (Molnar 2003, 162). Laws are abstractions of what powerful properties normally do in particular situations. In this respect, the notion of “laws of nature” may be unhelpful. Martin writes, “If you accept arguments for a realism of dispositions and their reciprocal disposition partners and grant that dispositions could be fully actual although their partnerings or manifestings might not be, then *what* is the need for universal laws? Again, laws appear to be ontologically otiose” (2007, 22). Walter Ott concurs suggesting, “All talk of ‘laws of nature’ is a dispensable convenience” (2009, 250). While Mumford concludes, if we had recognized “that properties were already modal, and the particulars that instantiated them were thereby already powerful, we need never have posited laws in the hope of them doing work that was already being done” (2004, 196).

However, it may be objected that recent work in quantum mechanics has led to the view that we should see relations, or laws, as fundamental, rather than objects with dispositions. This is the view of ontic-structuralism, held by Steven French (2014) and James Ladyman and Don Ross (2007) where a radical departure from the usual way of thinking is needed. Ladyman and Ross set out their position writing, “The identity and individuality of objects depends on the relational structure of the world. Hence, a first approximation to our metaphysics is: ‘There are no things. Structure is all there is’” (2007, 130). They continue noting, “We shall argue that in the light of contemporary physics . . . talk of unknowable intrinsic natures and individuals is idle and has no justified place in metaphysics” (2007, 131). The claim is that physics has shown us that relations, structures or laws (understood in this way) are fundamental, and therefore all talk of dispositions is just old fashioned and wrong! Thankfully, things are not quite that simple. Ontic-structuralism has had numerous critics, but more importantly, there have been many philosophers of science who have interpreted the results of quantum mechanics in a dispositionalist manner.¹⁶ It is ironic that structuralists have argued that one should adopt their view due to science, since dispositionalists have done likewise.¹⁷ I happen to think that science can justify more than one metaphysical account of the world and therefore follow Chakravartty in thinking that “by itself, scientific practice does not yield *any* ontology *at all* unless one is willing to adopt some philosophical lenses through which to interpret its outputs” (forthcoming). The latest results of science should not be seen to threaten dispositionalism, although some metaphysical interpretations of the science might.

As mentioned previously, the early modern conception of physical laws was directly related to the will of God, and many today have argued that laws still require a recognition of God to make sense of them. Nevertheless, I am suggesting that some contemporary understandings of laws have

moved us back towards the conception of nature's regularity held by both Aristotle and Aquinas. Why would a theist accept this internalist view and reject the modern externalist one, especially when Lydia Jaeger (2010b) has suggested that Nancy Cartwright (1999), who endorses a similar view to the one I have advocated, takes this position partly due to her atheistic outlook?¹⁸ What reasons, then, might a theist have for accepting this view? Some suggest thinking about dispositions in the Aristotelian and Thomistic categories of act and potency (Oderberg 2007, 131–43; 2009, 677–84; Feser 2014, 47–87) which might subsequently allow us to reconstruct a version of Aquinas's first way.¹⁹ Further, Steven Horst has recently shown how this conception of laws might furnish an improved analysis of miracles (2014, 338–44). While I think both these suggestions commendable, I wish to focus on two other aspects of this dispositional conception of laws, which should provide reasons for theists to adopt such a view.

OCCASIONALISM AND CONCURRENTISM

One reason a theist might adopt a dispositionalist view of laws is that it seems to imply concurrentism rather than occasionalism. I follow Alfred Freddoso in defining the three main theories of divine conservation, how God sustains all of creation, as follows: "According to mere conservationism, God contributes to the ordinary course of nature solely by creating and conserving natural substances along with their active and passive causal powers or capacities" (1994, 134). Occasionalism, according to the version which Freddoso has argued is the only form worth defending, holds that "God alone brings about effects in nature; natural substances, contrary to common opinion, make no genuine causal contribution at all to any such effect" (1994, 132–33), and there are no essences or causal powers in the material world.²⁰ Concurrentism "occupies a middle ground between what its advocates perceive as the unseemly extremes of occasionalism and mere conservationism. According to concurrentism, a natural effect is produced immediately by *both* God *and* created substances, so that, contrary to occasionalism, secondary agents make a genuine causal contribution to the effect and in some sense determine its specific character by virtue of their own internal properties, whereas, contrary to mere conservationism, they do so only if God cooperates with them contemporaneously as an immediate cause in a certain 'general' way" (Freddoso 1994, 134).

Discussions of divine conservation have been uncommon in contemporary philosophy of religion, with Freddoso (1994, 134) and Hugh McCann and Jonathan Kvanvig (1991, 587) suggesting that mere conservationism is often taken for granted. Nevertheless as Freddoso notes, "almost all the important figures in the history of philosophical theology have rejected it as philosophically deficient and theologically 'unsafe'. According

to Albert the Great, writing in the thirteenth century, the opinion that secondary causes are sufficient by themselves to produce at least some effects without God's direct causal influence 'has all but disappeared from the lecture hall and is regarded as heretical by many moderns'" (1991, 555). This is clearly not the case today, but below I will suggest a reason for theists to reject mere conservationism, even though it is consistent with dispositionalism.

An example might be useful to clarify what these theories amount to and to highlight their differences. The book of Daniel, Chapters 1–3, tells the story of Shadrach, Meshach, and Abednego. In Chapter 3, King Nebuchadnezzar orders the three men to be thrown into a furnace where a miracle occurs. "The fire had not had any power over the bodies of those men; the hair of their heads was not singed, their tunics were not harmed, and not even the smell of fire came from them" (Daniel 3:27 NRSV). According to the three conceptions, God acted differently to protect these men. Mere conservationism holds that God merely conserves objects in being and all power comes from objects themselves. God on this view cannot override or remove his concurrence from objects; rather He merely sustains things in doing what they naturally do. This view therefore leads to a problem within the story, since if God had preserved the natures of each of the objects and allowed their powers to work as normal, the men's flesh would surely have burned. Instead, God must have either changed the nature of the fire—but then it was not fire at all; changed the nature of flesh—leading us to ask if they were real men; or placed a protective barrier over these men. One might find the supposition that a protective barrier could be placed around the men more than adequate, and indeed this would seem to be adequate in protecting the men. However, if one wants to hold that God is absolutely sovereign over nature, the idea that he might only be able to produce a miracle in this way shows a distinct inability to exercise sovereignty over the natural world. Molina, for instance, writes:

If God did not cooperate with secondary causes, He clearly would not have been able to bring it about that the Babylonian fire did not burn the three young men except by opposing it, as it were, and impeding its action either (i) through some contrary action or (ii) by placing something around the young men or conferring on them some resistant quality which would prevent the fire's impressing its action upon them. Therefore, since this derogates both the divine power and also the total subjection by which all things submit to and obey that power, one should claim without doubt that God cooperates with secondary causes, and that it was only because God did not concur with the fire in its action that the young men were not incinerated by it. (*Concordia*, pt. II, disp. 25, § 15, quoted in Freddoso 1991, 574)

Since mere conservationism has difficulties in accounting for miracles, particularly miracles of omission, and since many, such as Molina, want to say God has the ability to perform these types of miracles, miracles *contra naturam* (Aquinas, *De Potentia*, Q6, A2, ad.3). God's sovereignty according to mere conservationism is radically diminished and therefore theists should not embrace it.²¹

Occasionalism holds that there are no necessary connections in nature, it embraces antiessentialism, and considers that no created object has powers, rather God possess all power. Fire does not burn flesh since there is no actual connection between fire burning and flesh melting. There is a connection only in the sense that this is what God has regularly used fire for, but God does not have to act as he normally does, and in this instance he chooses not to. God could just as easily have connected the fire with the feeling of a nice cool breeze when the men were in the furnace, since fire and flesh have no intrinsic nature on this view. On the concurrentist view the fire does have a nature, as does flesh, and fire and flesh also have causal powers. Nevertheless, this is not the total cause of each event; rather, God has to concur with these causes in order for the burning of flesh to take place. For some concurrentists, for example, Suárez, all God does remove his concurrence from the secondary causes of nature, which by itself is not sufficient to burn the men (*Disputationes Metaphysicae*. 22, sect. I, 11; Freddoso 1991, 573–74; Ott 2008, 171; Ott 2009, 23). Aquinas, however, seems to think God cannot remove his concurrence without causing the object to cease existing, and thus God must either provide power which by itself nature is unable to, or act against nature by acting contrary to the natural dispositions of objects (Adams 2013, 12–13; Silva 2013a, 658–67; Silva 2014, 277–91).

Why would anyone hold to occasionalism? One significant reason seems to be to give more power to God, and magnify his omnipotence (McCracken 1983, 211). The “creators” of the notion of laws of nature thought of the world as passive and inert with laws being the actors and all power of laws found in God, seemingly leading to occasionalism. Nevertheless, occasionalism has always had its critics and problems. Michael Dodds writes, “Aquinas has two words for occasionalism: ‘stupid’ and ‘impossible’” (2012, 211). One problematic element of occasionalism is that it removes the creator–creature distinction by making all causation univocal. God on this view causes as we cause and does not “transcend the categories of secondary causality, but would have to belong to one of them” (Dodds 2012, 211). Another problem for occasionalists is how to deal with the problem of evil, since concurrentists “can argue with some plausibility that the defectiveness of evil states of affairs (whether they be moral evils or physical evils) is traceable solely to the causal contribution of the secondary or creaturely causes.” (Freddoso 1988, 115–16)

Occasionalists, however, hold that God is the sole cause of everything in nature, which therefore makes him the sole cause of evil. I wish to focus, however, on a different problem, analogous to the problem I alluded to earlier regarding laws.

Eleventh century Muslim philosopher and occasionalist Al-Ghazali allowed that two pieces of cotton could be exposed to exactly the same conditions, such as fire, and yet the outcomes be different, with one burning to ashes and the other not²² (*The Incoherence of the Philosophers*, 166–77). A concurrentist could agree with this, in so far as God removes his concurrence from one of the flames acting on the pieces of cotton and not the other, or by his acting against the natural disposition of one of the flames, but he could not agree that if God's concurrence were involved in both circumstances, two different things would occur. An occasionalist, however, has no problem with this result; since cotton and fire have no natures, God can make one piece of cotton burn and the other not. But a critic of occasionalism can ask: if cotton has no nature, then what is it that makes cotton cotton? Is it how it looks, the effect it has, how it feels? But in each of these cases cotton owes how it looks, its effects and feeling to causal properties with essential natures. The occasionalist seems to have to allow that, since nothing has any nature, anything could be cotton. The problem with occasionalism, then, is that we do not know what it is that does something, since something could do anything, although in the strict sense God does everything. This antiessentialism, regarding natural properties, renders the position unintelligible. As Katherin Rogers writes, "What is it to be something with no causal power at all? Could such an object have properties? Can an object *exist* without properties? It is impossible, I take it, to conceptualize an object which can neither affect nor be affected by any other created thing in any way at all" (2001, 359).

The problem with removing power from nature is the view of the world that results. Properties and objects appear dead and passive, there is nothing that they do, nothing they are essentially connected to, but this results in a world difficult to make sense of.²³ As Peter Harrison writes, "part of the reason for the rise of occasionalist understandings of causation at this time [the seventeenth century] is that they meshed neatly with atomic or corpuscular matter theory" (2008, 23). The adoption of atomism removed powers from nature resulting in atoms or corpuscles being understood as passive. Breaking inherent internal connections in nature, where natural power resided, meant that power must now be placed elsewhere. God was therefore seen to provide all power to natural objects, and thus occasionalism naturally followed.²⁴ Whereas before connections were internal to a thing's nature, now they were loose and separate due to the new atomic philosophy. Therefore, the connections were removed and placed elsewhere, namely in God. Modern proponents of occasionalism are aware of

the problem as to where causal power comes from. This awareness can be seen in William Vallicella's defense, where he employs a Dretske–Tooley–Armstrong view of laws with an added “vertical” supplementation” (1996, 358–59) of “causal-oomph” from God. Ott likewise writes of Descartes and Malebranche, that “neither of them suggests that the laws might operate ‘on their own’, an alternative regarded on all hands as absurd” (2009, 248). Even external laws need power, which God duly supplies. If one removes God from this picture, which is what happened later in the eighteenth century, then laws must contain power themselves, with the power being primitive and unexplainable. What seems to me to be clear is that the introduction of laws and the removal of power in nature led as a matter of course to occasionalism in the seventeenth century, as it could today. It may be the case that laws can be thought of as having some type of created power, which avoids occasionalism, yet I find the reintroduction of dispositionalism more congenial in avoiding occasionalism, and with less strange conclusions.²⁵

Dispositionalism, thus, leads the theist toward mere conservationism or concurrentism, while ruling out occasionalism. As I pointed out earlier, there are grounds for ruling out mere conservationism, if one accepts miracles and does not accept a limitation on God's sovereignty. Therefore, I argue that theists who wish to embrace dispositionalism should be concurrentists regarding divine conservation. Dispositionalism argues that properties have essential connections in nature, manifestations which they point to, and therefore there is nothing external to them which make them powerful. The objection that this account limits God's power is debatable, as one might argue that “a created world with genuine secondary causation . . . rather displays it [God's power] more fully than would a universe of impotent beings. God is not a niggardly sovereign jealously guarding the prerogatives of causal power, but rather a generous Creator who graciously bestows the gift of action along with the gift of being” (Shanley 1998, 102; Aquinas, *Summa Contra Gentiles* III, 69). Further, God does not compete with secondary causes in nature, but rather they are of different orders, operating on “different ontological levels such that there is no question of them ‘interfering’ with each other” (Shanley 1998, 103, 108; Rogers 2000, 117; 2001, 350; Ott 2009, 170).

Dispositionalism regarding laws draws us back to a concurrentist understanding of the God–nature relation, emphasizing nature's connections and powers, while rejecting the problematic view of occasionalism.

INTERNAL AND EXTERNAL TELEOLOGY

There is a second reason theists might wish to adopt a dispositionalist view of laws, namely that it revives a teleological conception of nature. It is

commonly thought that there is one type of teleology: design imposed externally. Many therefore think that nature itself has no design. Nevertheless, historically there has been another type of teleology that considers design internal to each object. (Feser 2010). Aquinas argued that “every agent acts for an end: otherwise one thing would not follow more than another from the action of the agent, unless it were by chance” (*Summa Theologica* I, q.44, a.4.; *Summa Theologica* I-II, q.1, a.2; *Summa Contra Gentiles* III, 2.). The dispositionalist account of laws revives this distinction.

Early modern philosophy conceived of nature as a giant artifact, such as a complex and intricate clock (Lehoux 2006, 528; Harrison 2008, 16–18, 20; Plantinga 2011, 77). Teleology, therefore, came to be based on artifacts, as is clear from William Paley’s teleological argument from complexity (*Natural Theology*, Ch1). The complex arrangement of a thing revealed design, with the regularity of a thing explained by laws. However, in previous centuries teleology was linked to regularity, or what things usually do. Artifacts were thought of as using the natural directionality in substances for man’s own purpose. Why an object continued to act consistently toward the same end was thought to need a teleological explanation. Conceiving of nature as a machine introduced passivity into nature and imagined God as a divine artificer creating a highly complex world machine, imposing teleology which was not internal to objects themselves. Jaeger notes, “Kepler wrote (to Herward von Hohenberg, February 10, 1605), the movement of the celestial bodies is to be conceived ‘not on the model of a divine, animate being, but on the model of a clock’ (Harrison 2008, 20). . . . A created cosmos is as a whole an artefact, produced by God” (2012, 456). If someone asked, when conceiving of nature as a machine, why X always did Y, the explanation would have to be given in terms of laws that were not internal to the objects themselves. That is, God ordered it in such a way. But if one conceived of nature as Aristotle or Aquinas did, this would be the wrong way to think of nature. Things act as they do since they have internal directionality due to being the type of thing they are. Nothing other than an explanation of what the object is needs to be provided; it does what it does because that is what it is. Removing internal directionality resulted in something outside the object itself being posited to explain why X did Y or Z, resulting in the ascription of passivity to nature. Nevertheless, as already noted, passivity and externality are aspects of nature dispositionalists deny.

A disposition is something that is directed toward its manifestation, it is “characterized by its ‘*esse-ad*’ or ‘being-toward’, its directedness toward non-actual states of affairs” (Ott 2009, 167). This towardness or directedness reintroduces the distinction between external and internal teleology. Modern dispositionalist theories seemingly have revived an aspect of what Aquinas would have called a “final cause.” George Molnar thinks dispositions have a “physical intentionality” (2003, 60–81). John Heil terms it a

“natural intentionality” (2003, 221; 2006, 250), Martin (2007, 178), and David Armstrong (1999, 35) concur that dispositions exhibit intentionality, with Jonathan Lowe (2009, 150) arguing it is a type of normativity. John Lamont’s view aligns with my analysis. He writes that “recent defenses of physical intentionality, however, could be seen as advancing a view at least analogous to Aristotle’s postulation of final causes in things” (2007, 880–81; Oderberg 2008; Feser 2009, 50; Ott 2009, 11 n.27, 30) with Feser showing that final causation is a more suitable description than contemporary notions of intentionality (2014, 88–105; Oderberg forthcoming). The main reason being that some aspects of mental intentionality, such as a disposition having an indeterminate object or exhibiting referential opacity, are nontransferable onto the physical world (Bird 2007, 118–26).

Some may worry that final causation means there must be a God guiding everything, and indeed this is how the Thomist sees things. Nevertheless, what I mean by final causation is what we might think of as the lowest or most basic level of final causation, which Aquinas gives to us as meaning that, “every agent, of necessity, acts for an end” (*Summa Theologica* I-II, q.1, a.2; *Summa Theologica* I, q.44, a.4; *Summa Contra Gentiles* III, 2). He adopts this view in order to make sense of efficient causation. If the cause X did not act in order to achieve the end Y, why does it always achieve Y and not A, B, C or D? Accepting this level of final causality obviously leaves open the question as to what the source of that finality is. It should also be noted that not everything has an end, only an agent, or something acting as an efficient cause. There may well be byproducts in achieving this end that do not act for any end, but this need not trouble us or Aquinas. We might take this finality as irreducible and not requiring of a divine mind, as Aristotle did, and since all I am trying to establish here is that there is an irreducible teleology that is internal to things, or in our case properties, this is all I require.²⁶ One can accept there is an irreducible teleology which is internal to things, while not committing to this directionality’s source. This is a further step, and certainly one Aquinas takes, and perhaps one we might also wish to take. Nevertheless, all I am trying to achieve here is reviving this distinction, which may prove fruitful for the theist.

Why might a theist be interested in reviving the external/internal teleology distinction? Due to a lack of space, I can only gesture toward areas where further work might be undertaken to see if these insights are fruitful. One reason could be to reformulate a Thomistic teleological argument, the fifth way, which relies on final causality rather than complexity.²⁷ Another might be to argue that nature, and evolution, is internally teleological.²⁸ This suggestion would appear to be welcomed by some evolutionists such as James Shapiro, who writes “despite widespread philosophical prejudices, cells are now reasonably seen to operate teleologically: their goals are survival, growth, and reproduction” (2011, 137). Similarly Denis Walsh

writes, “The understanding of how evolution can be adaptive requires us to incorporate teleology—issuing from the goal-directed, adaptive plasticity of organisms—as a legitimate scientific form of explanation. The natural sciences must, once again, learn to live with teleology” (2008, 133). Internal teleology may also provide the theist with the resources to defend a classical view of natural law ethics.²⁹ Anthony Lisska writes, “An act is morally wrong . . . because the act prevents the completion—the self-actualization, as it were—of the dispositional properties which determine the content of human nature” (1996, 104). If directionality is built into nature, as I have suggested, then nature is not value free but is value laden, “there is no way of describing the world accurately that omits natural normative teleology” (Oderberg 2010b, 65).

Armstrong has proposed an objection to this type of account, namely that it implies Meinongianism, the view that there are subjects of true predication that have no being.³⁰ He writes, “it seems to smack of a Meinongian relation to the non-existent—in this case a relation to the manifestation that does not occur” (2002, 168; 1999, 35). Indeed this relation to something nonexistent has often been seen as a problem with final causality, or internal teleology, for how can the existent relate to something nonexistent?³¹ Making use of the Aristotelian notion of formal causality,³² it seems to me the theist has a simple response, namely to argue that the ends of each object do exist formally within the intellect of God, who directs all objects toward their ends (Feser 2013b; 733–35).

Thus, it seems possible to revive internal teleology within a dispositionalist ontology, where the final causes/physical-intentionality/natural-intentionality of objects/properties provide the truth-makers of law statements, with laws being thought of as a *façon de parler*, rather than something of ontological significance. As Mariano Artigas writes, “Because the laws of physics indicate the existence of directionality in nature the new science contained teleological features” (2001, 138). Paul Hoffman agrees, writing, “The sort of tendency expressed by such laws has the implication that C is aimed at E, and that is sufficient to give the laws a teleological character” (2009, 308). If my earlier argument was correct, then it is the internal nature of properties, or dispositions, which conveys this teleological direction, with laws being thought of as merely a description of what these properties usually do.

NECESSITY IN NATURE

Some will find necessity in nature an unpalatable consequence of the conception of laws I am proposing, but I shall suggest it is not problematic. The necessity I am concerned with here is that the laws of nature will be the same in all possible worlds if all the properties are the same. This will not have adverse effects on concurrentists or their acceptance of miracles,

since God can still remove his concurrence on particular occasions, or provide power that nature is unable to supply. What God cannot do is change the nature of properties so that in one world property X has causal role Y, and in another world the same property X has causal role Z. It is this sense of laws being necessary that I am concerned with. David Oderberg explains this, writing, “Laws of nature are truths about how objects must behave. How objects must behave depends wholly on how objects must be. Hence the laws depend wholly on how objects must be. Hence they obtain in every world in which the objects they are about exist. In other words, every world in which certain objects exist will be a world in which those objects must behave in a certain way. . . . There is no world, then, in which the objects exist and the laws about them do not obtain. So the necessity of those laws is metaphysical, since it is a necessity derived from the essences of the objects” (2007, 144). This will not sit well with some theists, as it appears to limit God’s omnipotence. Jaeger, for instance, writes, “For Judeo-Christian theism, the world, with its order, is grounded in God’s will; it takes its origin from a free act. Thus it might not exist, or it could be different from what it is. The world, and by consequence natural order, is thus contingent and not necessary” (2010a, 1613). Read one way, Jaeger would not welcome my conclusion that physical laws are necessary, since she might wish to allow that God could make fire cause a cool breeze rather than heat. However, taken more charitably, my view can agree with Jaeger’s statement.

As mentioned earlier, on an external view of laws, God creates in a two-step process. First he creates objects, and then he creates laws to govern objects. On the dispositionalist account, however, God creates in one step, since dispositions determine what objects do (Heil 2003, 93). This account can agree with Jaeger that order is grounded in God’s will, since what exists depends on what dispositions God has actualized. Additionally, this view holds that God is free to create or refrain from creating. The world’s order is still contingent, in the sense that God could have created other objects and other dispositions, but is not contingent in the sense that God could have created the same property to do different things in different worlds (Molnar 2003, 163–64; Heil 2012, 118). If God had done this, he would have merely created two different properties. This does not seem to limit God’s omnipotence, since it is contradictory to suppose that God could make negative charge repel negative charge in one world, while attract negative charge in another. Unless the theist wishes to embrace the extremely unpopular thesis that God can do the contradictory then she should have no problem with the view I am commending. I can therefore fully agree with Alvin Plantinga when he writes, “it is not necessary, not part of the divine nature, to institute or promulgate just *these* laws” (2011, 281), while also maintain that if God creates the objects and dispositions of this world in another world, the laws of nature must

be the same. The necessity of laws then, does not seem problematic for the theist.

CONCLUSION

The question, what laws of nature are, had not been thought about to a significant extent until recently. I have suggested in this article that a dispositionalist, internalist account of physical laws is the most metaphysically compelling, whilst theists have further theological reasons to adopt this account. As I have sought to show, this account leads the theist toward concurrentism regarding the God–world relation in terms of causation. Moreover, it revives the distinction between internal and external teleology, and embeds the whole world with directionality. Finally, one need not be concerned that laws turn out necessary on this account, since it seems logically contradictory that they turn out otherwise, given the properties and natures in this world. God, though, is still free to create any nature he chooses, since “the laws of nature are the laws of natures” (Oderberg 2007, 144), and thereby instantiate any law. This article has sought to show many things, and therefore it is no doubt the case that further argument and investigation are necessary. However, I hope to have shown that a dispositionalist Deity is an option theists should strongly consider. More work needs to be done, and no doubt further implications will be uncovered. With historical defenders of this view, such as Aquinas and Suárez, and the metaphysics behind it becoming increasingly popular, theists must have some powerful defeaters in order not to embrace this conception of God and laws. The old might once again become the new.

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NOTES

1. For further discussion of this, see Cartwright (1993, 299), Jaeger (2012, 461), Harrison (2013, 137), Garber (2013, 66).

2. It is difficult to classify this view adequately since there are a number of positions within it. Ellis (2001) seems to take it that laws are reduced to dispositions, Bird (2007, 202) and Molnar (2003, 199) take it that laws supervene on dispositions, and Mumford (2004) takes it that dispositions eliminate the need for laws altogether. What is clear is that dispositions play a primary role and laws are in some sense dependent on them.

3. Here I am taking Hume on the traditional reading, and do not wish to enter into debates as to whether this reading is correct.

4. For further discussion of these thought experiments, see Beebe (2000, 571–94), Loewer (1996, 101–27), Ott (2009, 248–49).

5. In the literature different terms have been used for dispositional properties and categorical properties. Dispositions have been called powers, capacities and potencies with categorical properties called occurrent, qualities, and actualities. Whether these terms are synonymous is not for this paper to discuss, but the variation in terminology can cause some confusion.

6. Mumford (2004) and Bird (2007) hold to dispositional monism; Martin and Heil (1999), Martin (2007), and Heil (2012) hold to a dual-aspect or identity view; and Ellis (2001) and Molnar (2003) opt for a dualist view.

7. For further criticism of an external governing conception of laws, see Mumford (2004), Bird (2007).

8. For further criticism of Molière, see Feser (2014, 43–46), Mumford (1998, 136–42), Martin (1997, 189–90), Michon (2007), Hutchison (1999), Chakravartty (2007, 125–26).

9. Much work has recently been done on a realist theory of dispositions/powers. For a fuller explication and defense, please see Mumford (1998); Molnar (2003); Mumford and Anjum (2011); Groff and Greco (2013); Marmodoro (2010); Bird (2007); Jacobs (forthcoming).

10. To be fair to Mumford and Anjum, they do suggest Geach's reading of Aquinas might be wrong (Mumford and Anjum 2014, 109).

11. Aquinas uses the term relative necessity here, rather than conditional.

12. For further elaboration of these three conditions, see Silva (2013b, 641–48).

13. For further work on this issue from people who seem to agree with my assessment, see Smith (1958, 241); Rosental (2011, 35–39), MacDonald (1993, 176–77), Makin (1989, 253–74), Brock (2006, 296–97).

14. Some examples of Thomists who endorse conditional necessity: Harper 1884, 390–94; Coffey 1918, 421–22; Phillips 1934, 164–65; Freddoso 1986, 215–42; Wallace 1996, 19–22.

15. See Note 2 for the different ways one could spell this out.

16. See, for instance, Kuhlmann (2010), Dorato (2006, 2007), Dorato and Esfeld (2010), Suárez (2004, 2007), Bigaj (2012, 2014)—note that Suárez calls dispositions propensities.

17. For discussion of these arguments, by other dispositionalists who are not convinced of the arguments from science for dispositions, see Chakravartty (forthcoming), Williams (2010).

18. I do not wish to conjecture if this is correct.

19. For modern defenses of Aquinas's first way, see Feser (2013a; 2009, 62–81), Martin (1997, 132–45), Oderberg (2010a).

20. This is argued for by a critic and accepted by a proponent of occasionalism, so should not be thought of as a straw man (Freddoso 1988, 91–99; Vallicella 1996, 351).

21. For further criticisms of mere conservationism, see Freddoso (1991, 553–85).

22. Ockham seems to endorse something similar. As Adams notes, "Ockham acknowledges, God could have made it a rule that whenever fire comes near, God acts alone to produce heat in the nearby combustible. Nevertheless, Ockham refuses to take occasionalism seriously as a hypothesis about what really happens" (2013, 22).

23. For further explication of this, see Mumford (2013, 15), Ellis (2002, 2–3), Sheldrake (1991, 37), Artigas (2001, 73).

24. For more on the historical development of the laws of nature and its ties with atomism and occasionalism, see Milton (1998). A good historical example to study is that of Descartes. For his ideas on laws of nature, see Henry (2004).

25. It might be thought that a law ontology admits a wider range of possibilities and so should be preferred. However, it has been argued that restricted modal options are not problematic (Wilson 2012), but also that restricting modality to dispositions is not overly restrictive (Vetter, 2015).

26. For an interesting account of another modern construal of teleological causation, see Hawthorne and Nolan (2006).

27. For modern defenses of a Thomistic fifth way, see Feser (2013b, 707–49; 2009, 110–20), Martin (1997, 179–206).

28. For the examples of how evolution can be thought of as teleological, or how one could develop an argument to the effect that evolution is internally teleological, see Gilson (1984),

Stove (1995, 258–306), Davies (1999, 121–22), Conway Morris (2003), Walsh (2008), Ariew (2007), Ayala (2000).

29. For further examples of how internal teleology allows a natural law theory to be, or at least could be developed, see Lisska (1996), Oderberg (2010b), Feser (2009, 175–80), Artigas (2001, 131), Foot (2001, 25–38), Mercier (1917, 212–23), Pruss (2013, 99–108).

30. For Meinong the subject “neither exists (in the manner of causally active/passive things like electrons and mountains) nor subsists (in the manner of such causally inert items as propositions and numbers. The pure object has no being at all, whence it follows that *Aussersein* [(it)] is not a third mode of being alongside of existence and subsistence” (Vallicella 2002, 38).

31. One example of this is Hobhouse (1913, 314).

32. For a modern defense of formal causality, see Tabaczek (2013), Dodds (2012, 99–102).

REFERENCES

- Adams, Marilyn McCord. 2013. “Powers versus Laws: God and the Order of the World According to Some Late Medieval Aristotelians.” In *The Divine Order, The Human Order, and The Order of Nature*, ed. Eric Watkins. Oxford: Oxford University Press.
- Anscombe, Elizabeth, and Peter Geach. 1961. *Three Philosophers*. Oxford: Basil Blackwell.
- Ariew, Andre. 2007. “Teleology.” In *The Cambridge Companion to the Philosophy of Biology*, ed. David L. Hull and Michael Ruse. New York: Cambridge University Press.
- Armstrong, David. 1999. “Comment on Ellis.” In *Causation and the Laws of Nature*, ed. Howard Sankey. Dordrecht: Kluwer Academic Publishers.
- . 2002. “Two Problems for Essentialism.” In *The Philosophy of Nature*, ed. Brian Ellis. Stocksfield, UK: Acumen.
- . 2010. *Sketch for a Systematic Metaphysics*. New York: Oxford University Press.
- Artigas, Mariano. 2001. *The Mind of the Universe*. West Conshohocken, PA: Templeton Foundation Press.
- Ayala, Francisco J. 2000. “Darwin and the Teleology of Nature.” In *Science and Religion in Search of Cosmic Purpose*, ed. John F. Haught. Washington, DC: Georgetown University Press.
- Beebe, Helen. 2000. “The Non-Governing Conception of the Laws of Nature.” *Philosophy and Phenomenological Research* 61(3):571–94.
- Bigaj, Tomasz. 2012. “Ungrounded Dispositions in Quantum Mechanics.” *Foundations of Science* 17(3)205–21.
- . 2014. “Quantum Dispositions and the Notion of Measurement.” *Filozofia Nauki* 22(1): 5–23.
- Bird, Alexander. 2007. *Nature’s Metaphysics*. New York: Oxford University Press.
- Bobick, Joseph. 1998. *Aquinas on Matter and Form and the Elements*. Notre Dame, IN: University of Notre Dame Press.
- Brock, Stephen. 2002. “Causality and Necessity in Thomas Aquinas.” *Quaestio* 2(1):217–40.
- . 2006. “G. E. M. Anscombe and Thomas Aquinas on Necessity and Contradiction in Temporal Events.” In *Analytical Thomism*. ed. Craig Paterson and Matthew S. Pugh. Farnham, UK: Ashgate.
- Carroll, John. 1990. “The Humean Tradition.” *The Philosophical Review* 99(2):185–219.
- . 1994. *Laws of Nature*. Cambridge: Cambridge University Press.
- . 2004. “Introduction.” In *Readings of Laws of Nature*, ed. John Carroll. Pittsburgh, PA: University of Pittsburgh Press.
- Cartwright, Nancy. 1993. “Is Natural Science ‘Natural’ Enough? A Reply to Phillip Allport.” *Synthese* 94(2):291–301.
- . 1999. *The Dappled World*. Cambridge: Cambridge University Press.
- Chakravartty, Anjan. 2007. *A Metaphysics for Scientific Realism*. Cambridge: Cambridge University Press.
- . 2013. “Realism in the Desert and in the Jungle: Replies to French, Ghins, and Psillos.” *Erkenn* 78(1):39–58.
- . forthcoming. “Saving the Scientific Phenomena: What Powers Can and Cannot Do.” In *Putting Powers to Work*, ed. Jonathan Jacobs. Oxford: Oxford University Press.
- Coffey, Peter. 1918. *Ontology: The Theory of Being*. London: Longmans, Green.
- Conway Morris, Simon. 2003. *Life’s Solution*. New York: Cambridge University Press.

- Davies, Paul. 1999. *The Fifth Miracle*. New York: Simon and Schuster.
- . 2010. "Universe from Bit." In *Information and the Nature of Reality*, ed. Paul Davies and Niels H. Gregersen. Cambridge: Cambridge University Press.
- Dodds, Michael. 2012. *Unlocking Divine Action*. Washington, DC: Catholic University of America Press.
- Dorato, Mauro. 2006. "Properties and Dispositions: Some Metaphysical Remarks on Quantum Ontology." *AIP Conference Proceedings* 844(1):139–57.
- . 2007. "Dispositions, Relational Properties and the Quantum World." In *Dispositions and Causal Powers*, ed. Max Kistler and Bruno Grassounou. Farnham, UK: Ashgate.
- Dorato, Mauro, and Michael Esfeld. 2010. "GRW as an Ontology of Dispositions." *Studies in History and Philosophy of Modern Physics* 41(1):41–49.
- Ellis, Brian. 2001. *Scientific Essentialism*. Cambridge: Cambridge University Press.
- . 2002. *The Philosophy of Nature*. Stocksfield, UK: Acumen.
- Feser, Edward. 2009. *Aquinas*. Oxford: Oneworld.
- . 2010. "Teleology: A Shopper's Guide." *Philosophia Christi* 12(1):142–59.
- . 2013a. "The New Atheists and the Cosmological Argument." *Midwest Studies in Philosophy* 37(1):154–77.
- . 2013b. "Between Aristotle and William Paley: Aquinas's Fifth Way." *Nova et Vetera* 11(3):707–49.
- . 2014. *Scholastic Metaphysics*. Heusenstamm, Germany: Editiones Scholasticae.
- Foot, Philippa. 2001. *Natural Goodness*. New York: Oxford University Press.
- Freddoso, Alfred J. 1986. "The Necessity of Nature." *Midwest Studies in Philosophy* 11(1):215–42.
- . 1988. "Medieval Aristotelianism and the Case against Secondary Causation in Nature." In *Divine and Human Action*, ed. Thomas V. Morris. Ithaca, NY: Cornell University Press.
- . 1991. "God's General Concurrence with Secondary Causes: Why Conservation Is Not Enough." *Philosophical Perspectives* 5(1):553–85.
- . 1994. "God's General Concurrence with Secondary Causes: Pitfalls and Prospects." *American Catholic Philosophical Quarterly* 68(2):131–56.
- French, Steven. 2014. *The Structure of the World*. New York: Oxford University Press.
- Garber, Daniel. 2013. "God, Laws, and the Order of Nature: Descartes and Leibniz, Hobbes, and Spinoza." In *The Divine Order, the Human Order, and the Order of Nature*, ed. Eric Watkins. New York: Oxford University Press.
- Gilson, Étienne. 1984. *From Aristotle to Darwin and Back Again*. Notre Dame, IN: University of Notre Dame Press.
- Groff, Ruth, and John Greco. 2013. *Powers and Capacities in Philosophy*. New York: Routledge.
- Harper, Thomas. 1884. *The Metaphysics of the School Vol. 3*. London: Macmillan.
- Harrison, Peter. 2008. "The Development of the Concept of Laws in Nature." In *Creation: Law and Probability*, ed. Fraser Watts. Aldershot, UK: Ashgate.
- . 2013. "Laws of Nature in Seventeenth Century England." In *The Divine Order, the Human Order, and the Order of Nature*, ed. Eric Watkins. New York: Oxford University Press.
- Hart, David Bentley. 2013. *The Experience of God*. New Haven, CT: Yale University Press.
- Hawthorne, John, and Daniel Nolan. 2006. "What Would Teleological Causation Be?" In *Metaphysical Essays*, ed. John Hawthorne. New York: Oxford University Press.
- Henry, John. 2004. "Metaphysics and the Origins of Modern Science: Descartes and the Importance of Laws of Nature." *Early Science and Medicine* 9(2):73–114.
- Heil, John. 2003. *From an Ontological Point of View*. New York: Oxford University Press.
- . 2006. "Commentary: Intentionality Is Not Only a Mark of the Cognitive." In *John Heil: Symposium on His Ontological Point of View*, ed. Michael Esfeld. Heusenstamm, Germany: Ontos Verlag.
- . 2012. *The Universe As We Find It*. Oxford: Oxford University Press.
- Hobhouse, Leonard T. 1913. *Development and Purpose*. London: Macmillan.
- Hoffman, Paul. 2009. "Does Efficient Causation Presuppose Final Causation? Aquinas Vs. Early Modern Mechanism." In *Metaphysics and the Good*, ed. Samuel Newlands and Larry M. Jorgensen. New York: Oxford University Press.
- Horst, Steven. 2014. "Miracles and Two Accounts of Scientific Laws." *Zygon: Journal of Religion and Science* 49:323–47.
- Hutchison, Keith. 1999. "Dormitive Virtues, Scholastic Qualities, and the New Philosophies." *History of Science* 29(3):245–78.

- Hüttemann, Andreas. 2013. "A Disposition-Based Process-Theory of Causation." In *Metaphysics and Science*, ed. Stephen Mumford and Matthew Tugby. Oxford: Oxford University Press.
- Jacobs, Jonathan. Forthcoming. *Putting Powers to Work*. Oxford: Oxford University Press.
- Jaeger, Lydia. 2010a. "The Contingency of Laws of Nature in Science and Theology." *Foundations of Physics* 40(9):1611–24.
- . 2010b. "Nancy Cartwright's Rejection of Laws of Nature and the Divine Lawgiver." *Science and Christian Belief* 22(1):81–86.
- . 2012. "Laws of Nature." In *The Blackwell Companion to Science and Christianity*, ed. James B. Stump and Alan G. Padgett. Oxford: Blackwell.
- Johnson, Monte Ransome. 2005. *Aristotle on Teleology*. New York: Oxford University Press.
- Kuhlmann, Meinard. 2010. *The Ultimate Constituents of the Material World*. Frankfurt: Ontos Verlag.
- Ladyman, James, and Don Ross. 2007. *Every Thing Must Go*. New York: Oxford University Press.
- Lamont, John. 2007. "Fall and Rise of Aristotelian Metaphysics in the Philosophy of Science." *Science and Education* 18(6–7):861–84.
- Lange, Marc. 2000. *Natural Laws in Scientific Practice*. Oxford: Oxford University Press.
- Lehoun, Daryn. 2006. "Laws of Nature and Natural Laws." *Studies in History and Philosophy of Science* 37(4):527–49.
- Lisska, Anthony J. 1996. *Aquinas's Theory of Natural Law*. New York: Oxford University Press.
- Lowe, E. Jonathan. 2009. *More Kinds of Being*. Oxford: Wiley Blackwell.
- Loewer, Barry. 1996. "Humean Supervenience." *Philosophical Topics* 24(1):101–27.
- MacDonald, Scott. 1993. "Theory of Knowledge." In *The Cambridge Companion to Aquinas*, ed. Norman Kretzmann and Eleonore Stump. New York: Cambridge University Press.
- Makin, Stephen. 1989. "Aquinas, Natural Tendencies and Natural Kinds." *New Scholasticism* 63(3):253–74.
- Marmodoro, Anna. 2010. *The Metaphysics of Powers*. New York: Routledge.
- . Forthcoming. "Aristotelian Powers at Work: Reciprocity without Symmetry in Causation." In *Putting Powers to Work*, ed. Jonathan Jacobs. Oxford: Oxford University Press.
- Martin, Charles B. 2007. *The Mind in Nature*. New York: Oxford University Press.
- Martin, Charles B., and John Heil. 1999. "The Ontological Turn." *Midwest Studies in Philosophy* 23(1):34–60.
- Martin, Christopher F. J. 1997. *Thomas Aquinas: God and Explanations*. Edinburgh: Edinburgh University Press.
- McCann, Hugh J., and Jonathan L. Kvanvig. 1991. "The Occasionalist Proselytizer: A Modified Catechism." *Philosophical Perspectives* 5(1):587–615.
- McCracken, Charles J. 1983. *Malebranche and British Philosophy*. Oxford: Oxford University Press.
- Mellor, David H. 1974. "In Defense of Dispositions." *The Philosophical Review* 83(2):157–81.
- Mercier, Cardinal. 1917. *A Manual of Modern Scholastic Philosophy Vol 2*. London: Kegan Paul, Trench, Trubner & Co.
- Michon, Cyrille. 2007. "Opium's *Virtus Dormitiva*." In *Dispositions and Causal Powers*, ed. Max Kistler and Bruno Gnassounou. Farnham, UK: Ashgate.
- Milton, John R. 1998. "Laws of Nature." In *The Cambridge History of Seventeenth Century Philosophy*, ed. Daniel Garber and Michael Ayers. Cambridge: Cambridge University Press.
- Molnar, George. 2003. *Powers*. New York: Oxford University Press.
- Mumford, Stephen. 1998. *Dispositions*. New York: Oxford University Press.
- . 2004. *Laws in Nature*. New York: Routledge.
- . 2013. "The Power of Power." In *Powers and Capacities in Philosophy*, ed. Ruth Groff and John Greco. New York: Routledge.
- Mumford, Stephen, and Rani Lill Anjum. 2011. *Getting Causes from Powers*. New York: Oxford University Press.
- . 2014. "The Irreducibility of Dispositionality." In *New Scholasticism Meets Analytic Philosophy*, ed. Rafael Hüntelmann, and Johannes Hattler. Heusenstamm, Germany: Editiones Scholasticae.
- Oderberg, David. 2007. *Real Essentialism*. New York: Routledge.

- . 2008. "Teleology: Inorganic and Organic." In *Contemporary Perspectives on Natural Law*, ed. Ana Marta González. Aldershot, UK: Ashgate.
- . 2009. "The Non-Identity of the Categorical and the Dispositional." *Analysis* 69(4):677–84.
- . 2010a. "Whatever Is Changing Is Being Changed by Something Else': A Reappraisal of Premise One of the First Way." In *Mind, Method and Morality*, ed. John Cottingham and Peter Hacker. New York: Oxford University Press.
- . 2010b. "The Metaphysical Foundations of Natural Law." In *Natural Moral Law in Contemporary Society*, ed. Holger Zaborowski. Washington, DC: Catholic University of America Press.
- . Forthcoming. "Finality Revived: Powers and Intentionality."
- Ott, Walter. 2008. "Causation, Intentionality, and the Case for Occasionalism." *Archiv für Geschichte der Philosophie* 90(2):165–87.
- . 2009. *Causation and Laws of Nature in Early Modern Philosophy*. Oxford: Oxford University Press.
- Pasnau, Robert. 2002. *Thomas Aquinas on Human Nature*. New York: Cambridge University Press.
- Phillips, Richard P. 1934. *Modern Thomistic Philosophy Vol. 1*. London: Burns Oates & Washbourne.
- Plantinga, Alvin. 2011. *Where the Conflict Really Lies*. New York: Oxford University Press.
- Pruss, Alexander. 2013. *One Body*. Notre Dame, IN: University of Notre Dame Press.
- Rogers, Katherin A. 2000. *Perfect Being Theology*. Edinburgh: Edinburgh University Press.
- . 2001. "What's Wrong with Occasionalism." *American Catholic Philosophical Quarterly* 75(3):345–69.
- Rosental, Creighton. 2011. *Lessons from Aquinas*. Macon, GA: Mercer University Press.
- Ruby, Jane E. 1986. "The Origins of Scientific 'Law'." *Journal of the History of Ideas*, 47(3):341–59.
- Shanley, Brian J. 1998. "Divine Causation and Human Freedom in Aquinas." *American Catholic Philosophical Quarterly* 72(1):99–122.
- Shapiro, James. 2011. *Evolution: A View from the 21st Century*. Upper Saddle River, NJ: FT Press Science.
- Sheldrake, Rupert. 1991. *The Rebirth of Nature*. London: Rider Books.
- Shoemaker, Sydney. 1980. "Causality and Properties." In *Time and Cause*, ed. P. van Inwagen. Dordrecht: D. Reidel.
- Silva, Ignacio. 2013a. "Thomas Aquinas Holds Fast: Objections to Aquinas within Today's Debate on Divine Action." *The Heythrop Journal* 54(4):658–67.
- . 2013b. "Werner Heisenberg and Thomas Aquinas on Natural Indeterminism." *New Blackfriars* 94 (1054):635–53.
- . 2014. "Revisiting Aquinas on Providence and Rising to the Challenge of Divine Action in Nature." *The Journal of Religion* 94(3):277–91.
- Smith, Vincent E. 1958. *The General Science of Nature*. Milwaukee, WI: The Bruce Publishing Company.
- Stove, David. 1995. *Darwinian Fairytales*. New York: Encounter Books.
- Suárez, Mauricio. 2004. "Causal Processes and Propensities in Quantum Mechanics." *Theoria* 19(3):271–300.
- . 2007. "Quantum Propensities." *Studies in History and Philosophy of Modern Physics* 38(2):418–38.
- Tabaczek, Mariusz. 2013. "The Metaphysics of Downward Causation: Rediscovering the Formal Cause." *Zygon: Journal of Religion and Science* 48:380–404.
- Tooley, Michael. 1977. "The Nature of Laws." *Canadian Journal of Philosophy* 7(4):667–98.
- Vallicella, William F. 1996. "Concurrentism or Occasionalism?" *American Catholic Philosophical Quarterly* 70(3):339–59.
- . 2002. *A Paradigm Theory of Existence*. Dordrecht: Kluwer Academic Publishers.
- Vetter, Barbara. 2015. *Potentiality: From Dispositions to Modality*. New York: Oxford University Press.
- Wallace, William. 1996. *The Modelling of Nature*. Washington, DC: Catholic University of America Press.

- Walsh, Denis. 2008. "Teleology." In *The Oxford Handbook of Philosophy of Biology*, ed. Michael Ruse. New York: Oxford University Press.
- Weinert, Friedel. 1995. "Laws of Nature – Laws of Science." In *Laws of Nature*, ed. Friedel Weinert. Berlin: Walter de Gruyter.
- Williams, Neil. 2010. "Dispositions and the Argument from Science." *Australasian Journal of Philosophy* 89(1):71–90.
- Wilson, Alastair. 2012. "Schaffer on Laws of Nature." *Philosophical Studies* 164(3):653–67.
- Witt, Charlotte. 2008. "Aristotelian Powers." In *Revitalizing Causality*, ed. R. Groff. New York: Routledge.