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Causation and Circularity in Dispositionalism

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CIRCULARITY AND CAUSATION IN DISPOSITIONALISM

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Dedication

To Kathryn and Richard Flores.

The world has never looked so complex and so fascinating. It was your education and inspiration that led to the path that I know walk. And for this I am ever grateful.

CIRCULARITY AND CAUSATION IN DISPOSITIONALISM

by

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THESIS

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Preface

I became interested in dispositions while taking a course on Emergence. Toward the end of that course we read a book titled *Natures Metaphysics: Laws and Properties* by Alexander Bird. The notions of laws and causation have perplexed me since I first began studying philosophy and I successfully put off any serious study of laws and causation for nearly a decade. But with Bird's book, I saw a vision of the universe that sparked my curiosity and allowed me to take a stab at possibly answering the question *are laws real, and what role does causation play in accounting for nature?* This thesis doesn't not attempt to answer this questions, however. Rather, in Bird and, later, Stephen Mumford, I discovered an interesting set of arguments directed toward solving an apparent *argumentum ad infinitum* that arises when discussing dispositions and their causal efficacy. So, Bird:

So for both Armstrong and Lewis the possession of specific properties by things is entirely consistent with there being no laws that govern those properties. But what then differentiates the properties from one another? Such a world is allegedly full of things with different properties, but no thing is causing any other thing to happen. [...] Such a world seemed to me hardly to be a genuine possibility. But at the time, the accounts of law provided by Lewis and Armstrong were the two principle contenders in the field. There was something wrong with both, in the divorce between what properties are and what properties do. The behaviour, or rather the tendency towards certain patters of behaviour, should be built into the properties ...¹

Given such an account that the properties of things themselves should have a causal role in the metaphysics of nature brings with it a very special set of problems. If, on the one hand, some

property, P_1 , is the cause of another property, P_2 , and P_2 is a further cause for property, P_3 , and so on $P_1 \dots P_n$, then a genuine case of an infinite regress arises. On the other hand, if property P_n becomes a cause for the original property P_1 , then there is a case of circularity. Neither case seems satisfactory.

The point of dispositionalism is to give an account of nature in terms of relational properties, i.e., dispositions, that captures objects' tendencies toward certain behaviors. This is not simply a metaphysical account of things; it is a way of looking at the world in a way that relates to the way that we seem to experience it. This is a rare combination. But this intuition that our metaphysics and epistemology are or should be concomitant with each other is too striking of an idea to simply let go. The behaviorists hit on this idea and used it to its fullest extent until its spectacular fall in the 1960s. The behaviorists wanted to give an account of things by translating our language of mentality, e.g., belief, desire, hope, think, etc. – the so called propositional attitudes, into behaviorist language. Thus being hungry (a mental state) would have been translated into 'being disposed to eat while in the presence of food.' This avoided the problem of interaction that comes from talking about the mind (nonextended substance) causally influencing the body (extended substance) while at the same time giving an account of how some states of affairs of the world interact with other states of affairs. The added advantage was that not only was the mind/body problem seemingly bypassed but the behaviorist account of things fit nicely with the very real way that we experience the world by tracking patterns of behavior.

This idea of relational properties is, of course, not new. John Duns Scotus gives just such an account in his discussion of time. As Turetzky puts it, "Potential time exists even in the absence of any movement at all. Were nature to exist without actual change, Scotus avers, it still would have the potential to act in definite ways."² In other words, part of what characterizes the

natural world is that it tends to behave in regular ways, but it need not actually do anything; it only need to be able to behave in such and such way. Thus what is doing the work in nature is the potential to change. This seems to be a very early account of what we would call today dispositionalism. Things are what they are in virtue of their dispositional character: a rubber band is a rubber band because it is disposed to stretch when pulled, but it need not actually be pulled in order to have the disposition of elasticity. Likewise, for Scotus the world is disposed toward various behaviors, in this case, change. By appealing to nature's potential to act – to change – Scotus is positing a way to explain change; after all, things that undergo change must have the potential to change otherwise change would be inexplicable. And so Scotus attempts to give not just a metaphysical view of change, but, I think, plays into the very common sense epistemological notion we have that things that cannot change don't; things change if for no other reason than because they are capable of changing.

This idea of potential change comes from Scotus' discussion of place and movement and Scotus' notion of *haecceitas*. First, when referring to an object, there is a 'thisness' about the object. For example, if I point to the pan on my stove and say "this pan" what I am referring to is that object's 'panness' – that something about the pan that individuates it from the seeming identical pan on the stove next to it, or the pan in the lower cabinet, or the pan that my neighbor has. What individuates that pan is its haecceity, in other words. Further, the nature of the pan and its haecceity are inseparable; the pan's 'panness' and the physical nature of the pan are inextricably linked. In fact, this distinction is not a real one but, rather, a *distinctio formalis a parte rei* – a formal objective distinction made by the intellect. In other words, there are no universal essences apart from the existence of the objects. This is so because if there were some universal essence that the pan participated in, then it would be impossible, even meaningless, to

talk of individual pans or any other object for that matter since they would all share the same nature – this pan and that pan would be essentially the same. Therefore, although form and matter are separable (since one matter can take different forms), a thing is what it is due to its physical nature and haecceity, or individuating principle.³

Now,⁴ when bodies and their parts are taken together, Scotus notices the *loci* (place) and *ubi* (the location within place). We can think in terms of containers, here. A container, e.g., the universe, implies that something is contained – something’s *ubi*; the container is the place in which things are located – the *ubi*’s *loci*. Concerning the organization of the part of the whole, Scotus posits the *positio* (translated in Duhem as “disposition”). According to Duhem, the disposition refers to the order of the parts of the body, say, all of the planets within the universe, in relation to the different positions of the place. Concerning movement of bodies we finally come to an account of time that seems strikingly similar to our account of dispositions. Scotus writes, “Even if no movement existed, there can still exist a rest, properly speaking; in fact, even if no body is in movement, a body can always behave in the same fashion, while being naturally capable of behaving in one fashion or another.”⁵ What Scotus is talking about here is the potential of bodies to move and rest. Whether a body is at rest or in movement indicates only an actual state of affairs (what we will be calling a manifestation of a disposition). What is important for Scotus, it seems, is that an object be *able* to move or be at rest, do this or do that. It is difficult not to see this account as a dispositional one. This is, of course, a brief account of Scotus’ notion of time and potentiality. Nevertheless, the point here was to show not just the similarity between the accounts, but to point out that a dispositional account of nature seems to be an important metaphysical problem to flesh out.

Most recently David Armstrong and David Lewis have argued for different versions of what dispositions are. This is not the place for a discussion of their arguments. What is important, however, is what they agree on. For both Armstrong and Lewis dispositions are categorical as opposed to essential. The difference can be put as follows. If properties such as fragility and elasticity are essentially dispositional, then those properties exist regardless of whether fragility or elasticity manifest, are instantiated. And when fragility or elasticity do manifest, they do so out of necessity; that is, there is a causal connection between a stimulus, the disposition, and the manifestation of the disposition. This is not the case if a disposition is categorical (henceforth *categoricalism*). Bird:

Properties are categorical in the following sense: they have no essential or other non-trivial modal character. For example, and in particular, properties do not, essentially or necessarily, have or confer any dispositional character or power. Being made of rubber confers elasticity on an object, but it does not do so necessarily. Being negatively charged confers on objects the power to repel other negatively charged objects, but not necessarily. In other possible worlds rubber objects are not elastic, negatively charged objects attract rather than repel one another. The essential properties of a natural property are limited to its essentially being itself and not some distinct property.⁶

For a dispositionalist the disposition *fragility* is autonomous and universal. An object is essentially dispositional if it participates in the following (causal) subjunctive conditional structure: *an object is disposed to break if, when the appropriate stimulus is applied, it breaks*. And, barring masks or mimics (see Section I), this would hold in any possible world – fragility is conferred necessarily. For a categoricalist fragility is an internal property of an object and is not

necessary: in some states of affairs, glass confers fragility and in others rigidity; in some states of affairs, rubber confers elasticity and in others brightness. In such cases, dispositions are contingent and owe their character and existence to an object's internal structure, e.g., an object's molecular structure, states of affairs of the world, or what have you.

The problem with essential dispositions as Armstrong and Lewis see it is the threat of circularity and regress as mentioned above. In what follows, I wish to present a narrow discussion of Bird's and Mumford's basic positions on their versions of dispositionalism. I think that they are correct to point to the threat of circularity and regress but I do not believe that they have successfully argued away the problem. I begin by offering a very brief account of dispositions and three general criticisms. The goal is to show that causation is central to a satisfactory account of dispositionalism. Next, I outline Mumford's and then Bird's general positions on dispositions. What this will show is the importance of the regress/circularity objection. Both philosophers understand the importance of the regress/circularity objection in talk of dispositions and do their best to answer it. Mumford's answer to the regress/circularity objection rests on everyday knowledge of the world. Bird's answer depends on an argument for supervenience. My claim is that neither succeeds. I conclude by reiterating that for an account of dispositions to be meaningful one must successfully answer the regress/circularity objection.

Major Section – I

In a recent article,⁷ Stephen Mumford argues for a position called “pandispositionalism.”⁸ His aim is to give an account as to the nature and structure of causation in terms of powers or dispositions.⁹ Specifically, Mumford wishes to argue that powers are causes of their manifestations – a cause *is* a manifestation of power and, thus, that causation is a universal that is instantiated when a power is manifested. Nevertheless, even when a power is manifested, it is neither a necessary nor contingent fact that the manifestation exist. As such, a proper account of causation must include “bundles of powers” whereby more than one power “contributes” to the manifestation of power. And though according to Armstrong and others, this leads to the passing around of powers from which obvious problems of circularity and *ad infinitum* regress arise, Mumford sees this as an attractive character for a dispositional account of causation and, in fact, he sees this as support that the identity of powers can only be determined in relation to its place in a complex structure (of powers).

Alexander Bird¹⁰ also holds that the identity of properties are determined not just by their relation to other properties, but to the relationships of manifestations, or manifestation relations, between properties and other properties. (This will be discussed below, especially in section IV.) Bird, however, sees the constraint that, elsewhere¹¹ Mumford’s metaphysics does not allow the possibility for laws of nature as too strong and claims that he has not “done enough” to warrant the adoption of a lawless metaphysics of dispositions. Mumford’s idea is that given that laws are supposed to govern the regularities of nature and since powers, i.e., dispositions, are doing all of the (causal) work, laws are not a necessary component of the metaphysics of nature. Rather, Bird argues that laws do not necessarily have to govern, i.e., do any causal work, and that laws do

supervene on potencies, but, rather than serving a governance role over them, are derived from them. Thus Bird suggests a lawful, relational metaphysics of nature.

I begin by offering a very brief account of dispositions and three general criticisms. The goal is to show that causation is central to a satisfactory account of dispositionalism. Next, I outline Mumford's and then Bird's general positions on dispositions. Although this discussion includes talk of laws in nature, this will not be the focus of this paper. Here, talk of laws is meant to give a broader understanding of what is at stake in talk of dispositions and is a way to focus attention on what dispositions do. What I wish to show is the importance of giving a robust account of circularity/regress in dispositionalism. Both philosophers understand this importance and do their best to answer the challenge of circularity/regress. Thus, since my focus is specifically with the nature of circularity/regress in talk of dispositions, I will not need to address the issue of whether laws in nature are real.

Mumford's answer to the circularity/regress objection rests on everyday knowledge of the world and is, thus, epistemic. I will argue that Mumford's position is unsatisfactory based on the reasoning that if one is looking to give a metaphysical account of nature, that account cannot be based on epistemological grounds since epistemic claims can't tell us what is there in the world. Bird's answer is metaphysical and rests on a supervenience claim. I will argue that Bird's response to circularity/regress is likewise unsatisfactory since supervenience claims are not explanatory. I conclude by reiterating that for an account of dispositions to be meaningful one must successfully answer the circularity/regress objection.

Major Section – II

Are dispositions real? If so, what do they do? How is it, for example, that what is essential for *that* rubber band is its disposition toward elasticity even if it never manifests? One analysis of dispositions deals with counterfactual analysis. If the counterfactual conditional

COUNTERFACTUAL ANALYSIS *if the rubber band does not manifest elasticity when stretched, then the rubber band does not have the disposition of elasticity*

is true, then it seems that the conditional

CONDITIONAL ANALYSIS *if a rubber band is elastic, then it will stretch when pulled*

must be true. As it turns out, though, this is not the case since dispositions can be masked or mimicked by any number of conditions that either don't let a disposition manifest, e.g., an antidote to a poison, or that mimic the supposed causal relationship between stimulus and disposition manifestation, e.g., the glass appeared to break when struck, but what really happened was that the microphysical structure of the glass deteriorated coincidentally at the same time it was struck thus giving the appearance that it was the striking that caused the manifestation.¹² So what do dispositions do, especially in cases involving masks and mimics?

We might reason as follows. To do something an entity must be real. To be real is to have causal influence. To do something, then, is to cause (or be caused). A fire that didn't do anything, e.g., heat, boil water, ignite various materials, would hardly count as being real. I'll take the foregoing as assumptions. I point out only that it seems that if dispositions did not do anything, then it would be pointless to talk about them.¹³

It is standard to talk of dispositions as participating in the causal push and pull of the world; but it is also standard to talk of dispositions as not needing to be manifested in order to be real. If conditional and counterfactual analyses fail to account for this, we might look to supervenience. If supervenience is taken to mean

SUPERVENIENCE *if object o has property P , then for any microphysically identical duplicates $o_1 \dots o_n$, then $o_1 \dots o_n$ would also have property P ,*

then we would identify the glass' disposition to be fragile with its microphysical structure and likewise for other instances of fragility. This is nothing less than a categoricist position. Although categoricist arguments do not to my knowledge expressly argue for supervenience, supervenience claims share with categoricism the reliance on the internal structure of an object to attain its identity. Assume, for example, that some statue S is beautiful. If a microphysical duplicate of S was made, say, S^* , then if S is beautiful, then S^* would be beautiful as well since what conferred beauty upon S is the same thing that would confer beauty upon S^* , namely its microphysical structure. This would, however, only defeat the purpose of dispositions talk since what is *doing the work* is the physical structure of the glass and the statue.

The focus lay in the relationship between an unmanifested disposition and its manifestation. Barring masks and mimics, we notice that for a glass to break it must have the disposition to break. Things that aren't fragile don't break. It further seems that there must be a relationship between the stimulus, disposition, and manifestation (S-D-M). So, when the glass breaks, it does so because some stimulus was introduced, the disposition (fragility) manifested, and, therefore, the disposition must have been there – it is real. This might lead us to conclude that what is being discussed is not just the S-D-M relation, but the causal interaction (if any) between the stimulus and disposition which results in the manifestation of the disposition.

There are three problems with this interactionist position. First, one only shifts the location of the cause from a disposition to the interaction and only delays an explanation. Second, one introduces another element that needs to be explained aside from the disposition. And, finally, one defeats the purpose of talking about dispositions if one talks in terms of interaction doing the causal work. The point of having a view of disposition is to say that they are metaphysically primitive. If we take the foregoing seriously, then there is good reason to think that an account of dispositions will have to have an account of causation.

Major Section – III

Mumford accounts for causation in terms of powers, specifically, bundles of powers. In doing so, he wishes to give an account that offers insight into the structure and nature of causation. Powers are for an effect; they are for something. The power for fragility manifests when the vase shatters; the power for the fire to warm bodies manifests when a body is warmed by the fire. However, even when powers do manifest, it is not out of necessity since something could have prevented the manifestation. The vase could have been caught before it hit the ground or, perhaps, not shattered when it did hit the ground. A body could be too far for the fire to warm, or there could be an obstruction between the fire and the body. Thus, “powers do not necessitate their manifestations.” Yet, neither are powers contingent since they are *for* something. To be real, then, according to Mumford, is to be powerful. Under this view, properties are bundles of powers and are real since powers tend toward their manifestation. As Mumford sees it, “Powers bring to the world an irreducible *sui generis* variety of modality that I think is at the heart of our causal thinking. The modal force of a power is neither entirely necessary nor entirely contingent but something in between and which cannot be analysed away in non-power terms ...”¹⁴ In this sense, powers are primitive and are for some effect. The power of fragility, for example, is for the breaking of the glass, and so on.

There are three main objections to a dispositional account of causation as Mumford sees it.¹⁵ Notice that when fragility manifests, the glass of the vase no longer has the disposition of fragility; neither does it have the disposition to hold water, nor any other disposition that a vase would have. But the pieces that were once the vase now have powers: to cut, to be carried in a pocket, used as art, etc ... This is the so-called “shifting potencies objection.”

“The first version of the shifting potencies objection,” writes Mumford, “is that this is an unsatisfactory view of causation. Every power is a power for a further power, and so on. Armstrong certainly thinks this a difficulty, saying that ‘Causality becomes the mere passing around of powers from particulars to further particulars’.” The objection is that if a disposition is a disposition for other dispositions, then the explanation is an *ad infinitum* regress. Mumford does not see this as a problem, though. Rather, the redistribution of powers is attractive because 1) it captures our everyday observations of the world, and 2) it captures our theoretical notions about the way the world is. For instance, we notice that when a fire warms a body, that body now has the ability to warm other bodies; a computer infected with a virus has the ability to infect other computers; and so on. This is a real feature of the world that the passing around of powers thesis captures. Assuming a causally closed universe, things just get shuffled around which, again, is what the passing around of powers thesis claims.

But this leads to a second criticism. If the manifestations of powers are nothing more than the manifestation of potency, then only potencies get passed around and, thus, “the world never passes from potency to act ... *nothing ever happens*.”¹⁶ As Mumford points out, though, it is not that causation gets passed around, but possibilities and, indeed, if that were the case the criticism might hold because the passing around of possibilities is meaningless. But for Mumford, the passing around (of whatever) is an event or events and are as real a phenomena as one could want. The assumption, Mumford points out, is that potencies are “nothing real, nothing actual”. But, according to Mumford, the passing around is an event and events, since they are as real a phenomena as one could wish, are certainly something:

But by potency, a dispositionalist does not mean a mere possibility that becomes real only in its manifestation or act. By a potency, a powers theorist means a real

potentiality and thinks that Armstrong is wrong to say that these are not real. The dispositionalist takes them to be real in their own right, so they do not require to be actualized in their manifestations in order to themselves attain actuality. [...] What more is there needed to be real than to be potent? How could something be potent without being real? How could it have power?¹⁷

When the dispositionalist talks about the passing around of powers, she does not mean the passing around of possibilities but of real potentialities.

The last objection stems from the perceived regress in dispositional accounts: A is a disposition for B, and B for C, and C for D, and so on. If this is so, then, as the objection has it, either we end up back where we started (circularity), or there is a true infinite regress. Though this is not clearly shown in either Bird or Mumford, the objection is that we can never specify dispositions because we can't know what a disposition is a disposition for. "This is indeed a problem," says Mumford, "but what it shows ... is that properties are indeed interrelated. The nature and identity of a property cannot be determined alone ... but is determined by its place in a complex structurally related whole." The supposed circularity is acceptable since "We experience powers acting upon ourselves and we also sometimes exercise our own powers. This gives us a starting point in terms of which other powers become meaningful to us." Our experience of powers gives us a way into the circle; our everyday understanding of the way the world works is our starting point for understanding what powers do. If an account of nature is going to be given in terms of disposition, then we must be able to talk about them in terms of being real – being causally influential. As Mumford sees it, talk of dispositions *is* talk of causation.

Major Section – IV

Bird and Mumford are on par with each other as far as the disposition-manifestation relation goes: talk of dispositions is talk of causation and the world is essentially dispositional. To paraphrase Bird,¹⁸ if what we are looking for in discussing causation is a reduction of causation to simpler terms, then as we saw, CONDITIONAL ANALYSIS simply won't work. A dispositional analysis, thus, seems trivial. But for Bird, the insight that a dispositional analysis gives us is that causation is the S-D-M relation and is, therefore, irreducible and unanalyzable to a further concept.

Consider Bird's example. SPELL is a law that says *the first SPELL cast on a given day is enacted at 2400 hrs. At 1200 Merlin casts a SPELL to turn the prince into a frog and at 1800 Morgana casts a SPELL also to turn the prince into a frog. At 2400 the prince becomes a frog.* There is nothing in the law that lets one distinguish between Merlin's and Morgana's SPELL. COUNTERFACTUAL ANALYSIS fails since "it is false that had Merlin not cast his SPELL, the prince would not have become a frog (since Morgana's SPELL would have done the job)." Finally, what SPELL shows is a manifestation of a disposition without any true causation. Again, a metaphysics of dispositions seems bound to fail since there seems to be nothing actual happening.

We can understand this last point in more concrete and familiar terms. COFFEE POT is a law that says that at 2400 on a given day the coffee pot will brew a pot of coffee given the proper stimulus. At 1200 Merlin pulls a lever which is known to activate the coffee pot. At 1800 Morgana pulls an adjacent lever known to activate the same coffee pot. At 2400 the coffee pot begins brewing. And as in the case of SPELL above one cannot tell which lever activated the

coffee pot for either one would have done the job. Now if it is said that the levers were disposed to start the coffee pot, then it is unclear which disposition is causally influencing the coffee pot.

Bird points out, though, that in the case of SPELL the disposition to turn the prince into a frog might be a property of the person reciting the SPELL as well as a property belonging to the prince of being turned into a frog. Both are possible. What Bird thinks is important about this is that:

...there is a difference between in fact being the manifestation-token of that disposition-token and merely being an event of the manifestation-type in terms of counterfactual or subjunctive conditionals. Likewise, there is a difference between a disposition being manifested in response to this stimulus-token rather than that stimulus-token, so that only one really stimulates the disposition. ... SPELL shows that we cannot account for such differences in terms of counterfactual or subjunctive conditionals. The conclusion we must draw ... is that the relation 'Mx is the manifestation of disposition Dx in response to stimulus Sx' is ontologically basic and is not reducible.¹⁹

Thus, causation is the "stimulation and manifestation of a disposition." Bird's analysis of dispositions is relational. And where in Mumford's metaphysics dispositions themselves are primitive, Bird holds the S-D-M relation as primitive.²⁰ What is important here is Bird's identification of causation with the S-D-M relation. But this is going to cause a problem for Bird in terms of the governing role that laws play in the fundamental metaphysics of nature, as we will see below.

Objecting to Mumford's lawless metaphysics, Bird asks that we consider Mumford's disjunctive argument.²¹ If laws really existed, then they would do something, i.e., they would

play a genuine governing role in nature. But if they do govern, then they are either external to the properties they govern or they are internal to them. On the one hand, if one accepts that laws are external to the properties they govern, then one is committed to quidditism (or categorical monism). Quidditism is the view that whatever properties turn out to be, i.e., whether or not they turn out to be causally powerful, confer identity upon an object, etc ..., those properties of objects are contingent. In other words, if object *o* has property P in possible world W_1 , then this is so only contingently; object *o* might have property P* or property M or no property at all in world W_2 . If this is the case, then it is unclear not only what role that properties would play in nature, but also whether or not we could even, in principle, identify them. Quidditism fails, then, due to this unusually robust form of skepticism. As Bird points out:

Lewis accepts and indeed argues for the thesis that quidditism entails Humility, where Humility is the claim that we cannot know about the fundamental properties of nature. Lewis may have been content to accept both quidditism and Humility. But this skeptical consequence of Humility is, I suggest, a very high price to pay for the Humean metaphysic.

We do not want our metaphysics of properties to condemn us to a necessary ignorance of them.²²

On the other hand, if one accepts that laws are internal to the properties they govern, then one must be able to give an explanation of how it is that “something that is internal to properties and kinds can govern them.” The inconsistency comes from the seeming self-referential nature of such an explanation. If, for example, laws govern properties and properties are intrinsic to objects, then it would seem that to reference a law would amount to the same thing as reference to the property to which the law governs and to reference a property would simply be to

reference the law that the property is governed by. Put another way: if both laws and properties are intrinsic to objects, then there would appear to be no way to know which one one would be referring to – if laws and properties are intrinsic, then our epistemic access to nature is blocked. Such an explanation, therefore, cannot be given. We are thus committed to the second disjunct of the argument, namely, that laws do not govern.

Bird motivates his objection to Mumford with the following:

Mumford's argument is particularly pressing since he and I largely agree on nature's underlying metaphysics ... the existence and nature of essentially dispositional properties. Mumford's view is that the efficacy of potencies in this regard shows that laws are otiose. I instead regard potencies as explaining what laws are. Mumford think[s] that potencies eliminate laws since they usurp the role laws were supposed to fill. ... laws are supposed to explain the existence of regularities and so forth. But if potencies do this, then we may eliminate laws.²³

Bird thinks that Mumford has not done enough to show that a realist view of laws concerning “modally laden properties” is inconsistent. In particular, Mumford's primary assumption is that laws actually fill a governing role. This isn't the case according to Bird. Our injunction that laws govern stems from misconceived ideas about explanation and a weak analogy to legal notions of laws. For instance, for some set, *S*, in the universe *S* exists because there are laws. Thus, the best explanation for *S* is the existence of laws. This is so because, as the thinking goes, if one is a realist about laws, then laws should do something (play some governing role) in the world. This view commits one to the thesis that “laws explain their instances,” i.e., that laws have a legitimate explanatory function. But if one accepts this view, then one could just as well accept the thesis that potencies (dispositions/powers) govern. For:

1. The world contains *S* (premise);
2. If there are potencies, then laws supervene on them (premise);
3. The best explanation of *S* is that there are potencies (premise);
4. There are potencies (from (1) and (3));
5. There are laws (from (2) and (4)).²⁴

So, this argument may commit one to the view that potencies also govern without accepting that laws govern since the potencies are obviously doing the work. In any case:

Even if we permit ourselves a metaphysics of governance, we may be able to acquiesce to (VI)²⁵ without accepting that laws govern. For example, let *Ys* supervene on *Xs*. If any change in *Xs* yield a significant difference in the world, then a change in *Ys* will also yield a significant difference in the world (since a change in *Ys* must involve a change in *Xs*). Now imagine that *Xs* ‘govern’ the world and *Ys* supervene on *Xs*. We could identify *Ys* with the laws and (VI) would still be true. In this set-up *Xs* govern the world; would one want to say that the supervening *Ys* also govern the world? It is far from clear that one would ...”²⁶

So, for Bird, then, laws may still supervene on the world but in a non-governing way. His proof is as follows. Imagine that *F* does not supervene on *G*, but it nevertheless determines it. Now take the (mereological) sum of *F* and *G*. In this case, *F* does supervene on *G* and partly determines the sum. Thus, according to Bird, the particular dispositions do the governing and laws do the supervening, and Mumford’s claim that there can be no real laws is resisted.²⁷

The point here has been to suggest what is at stake regarding a discussion of dispositions. On the one hand, laws of nature are invoked all of the time as having some sort of causal efficacy in the world. Newton’s Law of Universal Gravity holds that $F=Gm_1m_2/d^2$ where the gravitational

constant G can be measured by dividing the mass of one object time the mass of another object by the distance squared between them. Laws of biological inheritance explain the diversity of life on Earth. Laws of electromagnetism explain why magnets attract as well as certain perturbations in the atmosphere. On the other hand, if the story about dispositions (that they are causally powerful) is correct, then our understanding of the world would seem to be in need of a serious overhaul – explanations of the world might come in the form of dispositions rather than referring to laws.

Major Section – V

Bird doesn't give a robust account of what he means by "govern" in terms of laws. For properties to govern, Bird would say that properties have to do something – our familiar mantra thus far. Properties are real and present even when the properties are not manifested. A vase is fragile whether or not it ever breaks. For Bird a manifestation relation is the relation that holds between a property and the manifestation of the property²⁸ – it is the relation that holds between the vase (the object) and the property of fragility. But the shattered vase is nothing but pieces of glass or whatever. As will be show in greater detail below, it is the case for Bird that the S-D-M relation is a supervenient relationship and laws are real for Bird in the sense that they participate in the causal push and pull of the world. Again, this will be come much clearer in the following section. However, consider for a moment an initial argument for a supervenient relationship between objects and properties (or laws).

Mumford claims that laws are otiose because dispositions do all of the work. But Bird seems to be pointing to an explanation as to why laws do whatever they do. We could identify Bird's manifestation relations as laws of nature because if the S-D-M relation were to supervene on objects or properties then they would seem to play a governing role from a metaphysical standpoint. And this seems so because if there were a change in the S-D-M relation, then there would be a change in the world. Thus, if the S-D-M relation does supervene, then it does so in a metaphysically governing manner. It might, then, be the case that we could conceive of laws as those second-order relational properties (manifestation relations) that supervene on the regular operation of the elements of some system, i.e., nature, where if any element of that system (properties, manifestation relations, objects) changed, then the system would change. Laws in this sense would play a part in the governance of the natural world while not holding complete

causal hegemony over it since nature can change, but, nevertheless, allowing for our metaphysical intuitions about regularities in nature. And, in fact, this is exactly what Bird does. But as will be shown below, this account is doomed to fail because of the failure of supervenience as a satisfactory explanation of the world.

It was pointed out in an earlier section that Mumford addresses the regress/circularity objection. Mumford's answer is that circularity is acceptable since we have epistemic access into the circle; talk of dispositions captures not just our theoretical conceptions about the world, but also our everyday experience of the way the world is. My everyday intuitions about the causal influences of, say, fire, i.e, that fire can burn a house down or cook a steak, are not wrong and my experience of this world only augments support for these intuitions. Nevertheless, it just seems bad reasoning to use our intuitions about the way the world is to qualify our scientific (either physical or metaphysical) claims. While I may not have reason to doubt that the fire is real, I could nevertheless be wrong. If our way into the metaphysical circle of dispositions is epistemic, then we are treading a narrow entrance if indeed it is one.

The other problem I see with Mumford's assessment of the acceptability of circularity is that it is exceedingly *ad hoc*. In his *Laws in Nature*,²⁹ Mumford goes to great lengths to argue for the important role that metaphysics plays in our understanding of nature (and the laws of nature in particular). So, for instance, Mumford argues:³⁰ 1) scientific revolutions periodically change our understanding of the physical world and how to proceed doing science. It is the case, therefore, that empirical science gives us no more indubitable results than does metaphysics; 2) "Even in credible theories of science ... it is by no means obvious ... that the ideas of laws of nature is better understood in science than it is in metaphysics." Questions of what laws do are themselves philosophical questions. An understanding of science is incomplete without

philosophical investigation; and 3) if science is the study of the empirical and metaphysics the more general study of what exists, then science cannot tell us whether laws exist whereas metaphysics can. Mumford concludes, therefore, that metaphysics is indispensable to proper science.

Considering his argument for the indispensability of metaphysics, I find it troubling that, when doing metaphysics, Mumford abdicates metaphysical explanation favoring epistemological explanation. My feeling is that this is due to the intractable problem of logical circularity. If, *qua* philosopher, one is after truth through reasoning and the presentation and refutation of valid arguments, then to accept circularity or regress is an absurdity. It only seems natural that one would make an appeal to one's everyday experience of the world to support one's claims. When one is running out of explanations, if appeal to epistemological explanation is the last hand that one has, then that is the hand that one plays. But unless we risk confusing epistemology with metaphysics, then we should conclude Mumford's appeal to everyday experience as unacceptable.

The problem of circularity/regress is not just Mumford's problem, though. Bird must also contend with the regress/circularity objection. Here is Bird's presentation of the regress/circularity objection:

I shall follow Aristotle in taking the essence of an entity to be that whereby a thing is what it is (*Metaph.*, VII, 7). Thus we should expect the essence of a property, its dispositional character if it is an essentially dispositional property, to determine the identity of the property. According to the dispositional essentialist therefore, the essence of such a property is determined by its relations to other properties. And ... if one is a dispositional *monist* then those other properties also

have dispositional essences. Consequently the identity of any property is determined by its relations to other properties. Hence, either there is an infinity of properties or there is circularity in this relationship of identities.³¹

The problem is that Bird switches from talk of causation to talk of identity and later to talk of supervenience. As he sees it the regress/circularity objection in its most important form is couched in terms of identity rather than causation: “the focus on identity does raise what I take to be the fourth and most important version of the circularity objection ...”³² My initial objection, then, will be to say that resisting the regress/circularity objection in terms of identity still leaves the dispositionalist helpless in addressing causation – one must still resist causal circularity; and if, as noted earlier and as Mumford points out, if dispositions are for something, then they must at least be disposed to tend toward their manifestation – they must have causal influence. Fixing identity does not fix an entity’s causal powers.

The problem, as Bird sees it, stems from Aristotle’s idea that essences fix identity. Bird continues, “If essences fix identity, as Aristotle says, then the identity of a property is determinate only if the properties to which its essence relates it themselves have determinate identity. And that is just what is ruled out by circularity.”³³ The problem for the dispositionalist is that the essence of dispositions is relational. As we saw in the section above, dispositions are characterized in terms of the S-D-M relation. But if a disposition’s essence depends relationally on another disposition, and that disposition depends relationally on another, then circularity ensues in which case one can never say what a disposition is a disposition for; or, in other words, one can never identify a disposition. Aristotle, it seems, must be correct at least in terms of there being some determinate identity upon which all other identities can be determined and Bird is right to take the objection seriously.

His response comes in graph theoretical terms. A graph is considered to be a non-trivial automorphism if, when rotated 180° , the structure remains unchanged, but some vertices map onto other vertices. This means that the structure of the graph does not determine the identity of the individual vertices since two different vertices occupy the same space (though at two different times) after consecutive rotations. Vertex *a* rotates to vertex *c*'s position, vertex *b* rotates to vertex *d*'s position, and *c*'s to *a*'s, and *d*'s to *b*'s. By virtue of their location on the graph, vertex *a* is indistinguishable from vertex *c* and, thus, identity cannot be determined by the structure of a non-trivial automorphic graph. An asymmetric graph, on the other hand, is a graph whereby, when rotated, the structure remains, but so do the identities of the vertices since no vertex is ever mapped onto any other vertex and, hence, the structure of the graph determines the identity of the vertices.

Bird concludes the following. Using graphs is a way to represent the S-D-M relation and in so doing it becomes clear that as the identity of the vertices supervenes on each iteration of an asymmetric graph, so does the identity of dispositions and the S-D-M relation supervene on the manifestations of the dispositions. Thus even though the argument for dispositionalism is circular, it can nevertheless be accounted for:

For the dispositional monist identity of properties is dependent on something else, rather than being primitive³⁴ ... The something else is the pattern of manifestation relations. The question may be phrased then, Can the identity of potencies supervene on the pattern of their manifestation relations? The answer is that it can. If we represent the manifestation relation by edges of a graph and the potencies by its vertices [...] Nonetheless ... it remains the case that there are graphs that represent possible structures of pure potencies that have the property

that the identity and distinctness of the vertices supervene on the structure of manifestation and stimulus relations. We may confidently conclude therefore that the regress objection can be answered.³⁵

I do not believe that Bird has succeeded. I believe this for two reasons. The first has to do with the explanatory role of supervenience. Anybody familiar with supervenience will admit that supervenience claims are not themselves any sort of explanation. At best they are claims that some higher-order properties covary with some physical state of affairs in the world without being physically reduced to those states of affairs; in Jaegwon Kim's words, "mind-body supervenience itself is not an *explanatory theory*; it merely states a pattern of property covariation between the mental and the physical and points to the existence of a dependency relation between the two. Yet supervenience is silent on the nature of the dependence relation that might explain why the mental supervenes on the physical."³⁶

Bird presents a sophisticated argument in support of the supervenience relationship. But then again, one could be a naïve realist and come to the same conclusion – that objects in the world form my experience of it and, furthermore, my experience of those objects leads me to the fact that my identity, in some sense, is dependent upon where I happen to be, i.e., I am individuated by the fact that I don't share the exact location in space and time with my neighbor, or the tree, or any other object. But this is, after all, Bird's conclusion – structure determines identity. But, as Kim noted, the work that needs to be done is to show what that dependency relation is. Bird doesn't do this since the supervenience thesis is nonexplanatory.

Furthermore, what I think is at issue here is that even if the supervenience argument succeeded, the supervenience relation is not a causal relation. Thus, proving supervenience does not prove causation. But, as I claimed earlier, if being real depends on participating in causal

relationships, and if supervenience (even if true) does not entail causation, then proving supervenience relationships does not prove that the entities that stand within the supervenience relationship are real. This, however, runs contrary to what Bird wants to do in the first place. Recall from an earlier section that Bird identifies causation with the S-D-M relation. He generalizes that “We know ... what causation *is* – it is the stimulation and manifestation of a disposition.”³⁷ In other words, a dispositional analysis is not a conceptual analysis but is a “substantive metaphysical thesis. In which case the appearance of modal concepts such as ‘cause’ in the analysis of ‘disposition’ may not be so worrying.”³⁸ But, of course, as we just saw, Bird identifies talk of disposition with talk of causation. And what this means in the end is that Bird has delayed an explanation of circular causation and the regress/circularity objection goes unanswered.

Major Section – VI

What I have hoped to show is that Stephen Mumford and Alexander Bird have not given a successful account of circularity. It is my claim that until the regress/circularity objection is answered, there can be little conceptual or metaphysical progress for talk of dispositions. A dispositional account of things may well be circular and Mumford's and Bird's intuitions about circularity not being an issue are interesting and need to be further explored. But their arguments do not work. The new direction for dispositions should focus on the nature of circularity and the role that it plays in a causally closed universe.

What such an account of circularity would look like, however, I am unsure of. There are some promising leads, though. Remember that for both Bird and Mumford, especially Mumford, a metaphysics of dispositions is supposed to capture not just our theoretical notions of the universe, but our everyday experience of the universe as well. That is, it is important to note that the starting place for talk of dispositions begins at the point of our experience of the world. It is important because it sometimes does appear that there is a kind of circularity to the world.

When one studies the morphology of animals, for example, one notices what are called homologous structures that are, simply, shared structures between species. Humans, cats, whales, and bats all have the following bone structure for arms and legs: phalanges, metacarpals, carpals, radius and ulna, and a humerus. In humans and monkeys, the phalanges are the bones that form the fingers. The metacarpals are the bones that come between the wrist and the fingers, the carpals are the bones that make up the wrist, the radius and ulna bones are those of the forearm, and the humerus is the large bone of the upper arm. Now, whereas monkeys and humans use their phalanges in similar ways, whales and cats do not. Similarly, whereas whales and bats use their phalanges in similar ways, humans and cats do not. And so on. The point here is to notice

that there is in nature a seeming cyclical use of structures. Nature relies on the structure that is there and adapts it as necessary according to evolutionary pressures. This, it seems, is precisely one kind of circularity that Mumford alludes to in his account of dispositions. On the one hand, there is the circularity involved in the reuse of structure; on the other hand, there is the circularity of the powers or dispositions that account for what it is that those various structures do and can do. This is merely an initial sketch (and a brief one at that), but by thinking in terms of homologous structures it might be possible to begin a sketch of dispositions that accounts for circularity in the nature world – the world of experience.

But there are theoretical issues of circularity and regress as well. In Set Theory, paradoxes arise when considering, for example, power sets (abbreviated here as $P(s)$) and subsets of infinite sets. For instance, for the set $\{\alpha, \delta, \varphi\}$ the power set is $P(s)\{\{\}, \{\alpha\}, \{\delta\}, \{\varphi\}, \{\alpha, \delta\}, \{\alpha, \varphi\}, \{\delta, \varphi\}, \{\alpha, \delta, \varphi\}\}$. The paradox comes from the recognition that power sets are cardinally higher than the set they represent as can be seen from the example just given. But this is also true of infinite sets! In other words, given an infinite set $\{\dots, -1, 0, 1, \dots\}$ there is a power set that includes all subsets including the original set; but this would be a finite set of an infinite set which seems absurd and, hence, paradoxical. However, non-wellfounded set theory deals precisely with sets which contain themselves as members and, hence, accepts circularity as fundamental. Perhaps, if the circularity and regresses found in the theory of dispositions can be couched in terms of non-wellfounded set theory, then, especially given a biological account as suggested above, there might be a way of providing a suitable account of circularity and regress thereby lending the necessary theoretical support to dispositions. This is, of course, highly speculative, but is nevertheless an area worth exploring.

Finally, there is one issue that needs to be addressed. Throughout this thesis the concern has been to focus on circularity and regress. Typically, it is not the regress that is a problem to understand. As we saw earlier, if A is a disposition for B, and B for C, and C for D, and so on, then it would seem that in either direction there would be some case for thinking that a regress was be present. What is important, here, is that the problem of regress is fairly easy to see. It is not so easy in the case of circularity. Circularity has been an issue and Bird and Mumford try to overcome the objection. However, that circularity would, in fact, follow from a dispositional account of things has never clearly been shown. I have followed along with Bird and Mumford in the assumption that circularity would be a problem without explicating what this circularity would look like (theoretically or empirically). I did this because even though no such account is clearly given, it need not have been given in order to show that Bird's and Mumford's answers to the supposed circularity/regress problem are inadequate. Nevertheless, a clear picture of the nature of the circularity problem in dispositionalism must be articulated before the line of investigation suggested above can continue.

Notes

1. Bird, Alexander. 2007. *Nature's Metaphysics: Laws and Properties*. Oxford: OUP. P. vii.
2. Turetzky, Philip. 1998. *Time*. London: Routledge. P. 65.
3. There is much literature on this. But see Copleston's discussion: Ch. 47, "Scotus – III: Metaphysics." This position is very close to categoricism which will be discussed in more detail below.
4. For the following discussion, see Pierre Duhem's excellent book *Medieval Cosmology* and his discussions of John Duns Scotus throughout.
5. *Ibid.*, p. 296.
6. Bird 2007, p. 67.
7. Mumford, Stephen. "Passing Powers Around." *The Monist* (2009) 92:1; 94-111.
8. C.f., Molnar, George. 2003. *Powers: a Study in Metaphysics*. Oxford: OUP.
9. The terms "power" and "dispositions" are used synonymously. There are many words used synonymously for "disposition": power, property, potential, and so on – "power" is Mumford's preferred term. I shall try to use "power" for the sake of consistency, though it will be necessary to refer to variant forms of "dispositions," e.g., dispositionalism, etc...
10. Bird 2007.
11. Stephen Mumford. 2004. *Laws in Nature*. London: Routledge.
12. Bird 2010. "Causation and the manifestation of powers." In *Powers. Their Grounding and their Manifestations*. Ed. Anna Marmodoro. London: Routledge.
13. Mumford, 2009. C.f., esp., Section 3. *Properties and Causes*. It has been suggested to me that this line of reasoning is itself question begging since I am assuming that dispositions do something in the first place in order to prove that dispositions are real. And were this

actually the case, then I would agree. However, given the context of the account I am trying to lay down, the examples of fire and poison are assumed to be the kinds of things that dispositions would be; I am not claiming that they are. While the argument is perhaps *ad hoc*, it is not question begging. The point is to bring to the forefront the importance of causal reality.

14. Mumford 2009.

15. *Ibid.*

16. Armstrong, David. "Four disputes about properties." *Synthese* (2005) 144; 309-320. In Mumford 2009.

17. Mumford 2009

18. Bird 2010.

19. *Ibid.*

20. By "primitive" I mean something like ontologically irreducible. Bird's use of the term speaks of the categoriclist position where a property is intrinsic and, thus, contingent. Nevertheless, the S-M-D relationship is what constitutes the world and in this context my use of the word "primitive" is consistent with Bird's position. See p. 44 of Bird's 2007, for example.

21. Bird 2007, pp. 190-191.

22. *Ibid.*, p. 78. C.f. pp. 76-79 & 100-104.

23. *Ibid.*, p. 189.

24. *Ibid.*, p. 192.

25. *Ibid.*, p. 193. “(IV) Laws must add something to nature such that the world would be significantly different were they not there. According to the realist position, a world that lacked laws would be a very different world from ours.” C.f., esp., Mumford 2004, p. 145
26. *Ibid.*, pp. 193-194.
27. *Ibid.*, p. 196.
28. *Ibid.*, p. 139.
29. 2004.
30. *Ibid.*, pp. 4-7.
31. Bird 2007, pp. 136-137.
32. *Ibid.*, p. 136.
33. *Ibid.*, p. 137.
34. C.f., note 20 above.
35. Bird 2007, p. 146.
36. Jaegwon Kim. *Mind in a Physical World*. MIT Press: Mass. (1997). P. 14. See also: John Symons. “Supervenience.” in *Encyclopedic Reference of Neuroscience*. New York: Springer, 2008. And Brian McLaughlin & Karen Bennett’s “Supervenience.” Stanford Encyclopedia of Philosophy. (2005) <http://plato.stanford.edu/entries/supervenience/#3.6>
37. Bird 2010.
38. Bird 2007, p. 38.

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Vita

Daniel Flores graduated from UTEP with a Bachelor's degree in Philosophy in 2002. He then began the Master's program in Interdisciplinary Studies at UTEP in 2003 where he focused on the study of philosophy. In the spring semester of 2006, Daniel began teaching at New Mexico State University (NMSU) where he taught the Art of Wondering, Existentialism, and Business Ethics courses. In fall of 2006, Daniel took his M.A.I.S degree from UTEP with a thesis titled "Mememes." Daniel taught a subsequent spring semester at NMSU in 2007. He began teaching as an Adjunct Instructor of Philosophy at El Paso Community College in the summer of 2008 where he continues to teach courses on the Introduction to Philosophy and Ethics. In April of 2008, Daniel became (and continues to be) the Webmaster and Archivist of the New Mexico West Texas Philosophical Society (NMWT). At the 2009 meeting of the NMWT Daniel was elected as the Society's Vice President and the Managing Editor of the Society's journal, *Southwest Philosophical Studies*. Daniel is currently the Society's President and continues his position as Managing Editor for the journal. Daniel's philosophical interests figure around causality and circularity and the presumptions that we make about causality in doing science. A recent study on Time (see Turetzky in References) has greatly informed Daniel's thinking on the nature of causality and the role that philosophers of science should play in developing a proper account (if, indeed, there is one to be had) of time especially as it would be elucidatory to a coherent discussion of causality. Other philosophical interests include (but are not limited to) Philosophy of Biology (evolutionary and complex systems), Metaphysics (general), Philosophy of Religion and Atheism (as an atheist), and Philosophy and Education specifically considering the role that philosophers should play as public educators in terms of our duties and responsibilities to the population at large.

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