

STEPHEN MUMFORD

## LAWS AND LAWLESSNESS

**ABSTRACT.** I develop a metaphysical position that is both lawless and anti-Humean. The position is called *realist lawlessness* and contrasts with both *Humean lawlessness* and *nomological realism* – the claim that there are laws in nature. While the Humean view also allows no laws, realist lawlessness is not Humean because it accepts some necessary connections in nature between distinct properties. Realism about laws, on the other hand, faces a central dilemma. Either laws govern the behaviour of properties from the outside or from the inside. If the former, an unacceptable quidditist view of properties follows. But no plausible account of laws within properties can be developed that permits a governing role specifically for laws. I conclude in favour of eliminativism about laws. At the conceptual core, the notion of a law in nature is misleading. It is suggestive of an otherwise static world in need of animation.

### 1. INTRODUCTION: PRIMITIVISM, REDUCTIONISM AND ELIMINATIVISM

Are there laws of nature of the sort discussed in much recent metaphysics?<sup>1</sup> While these discussions tend to disagree over the nature of such laws, they have in common a commitment to laws being an ineliminable part of an adequate metaphysics for our world. In this paper, I challenge that assumption. The question with which I began can be recast in ways that puts emphasis on the issue of eliminability. Do laws of nature deliver some feature to the world that would otherwise be lacking? Could a world be just like ours if it didn't have laws? Did God have to create laws once he had created all the other things, such as particulars and universals? And so on.

I aim to show that a metaphysics that lacks laws may nevertheless be a metaphysics fit for our world. It might even be a metaphysics fit for all worlds as, if my analysis of laws is correct, they may be so deeply problematic that they are fit for no world.

I would not be the first to deny a need for laws. Humean metaphysics contains exactly such a claim, as it is commonly understood. But a number of compelling reasons have been advanced for the inadequacies of Humean accounts of law, causation, and the whole metaphysic in general. This has led to the development of various metaphysics that could be described as broadly *realist*. I, too, have anti-Humean sympathies but, as I argue in this

paper, anti-Humeanism does not automatically lead to the acceptance of laws as a distinct and necessary category. I intend to show the space for a metaphysical position that is both lawless and anti-Humean. Accordingly, I will call this position *realist lawlessness* and contrast it with both *Humean lawlessness* and *nomological realism* – the claim that there are laws in nature. Realist lawlessness might, then, be called a mid-way position between the two main attitudes taken hitherto regarding the existence of laws.

In order to make room for this position, it might help by beginning with three general stances that could be taken about the existence of laws. These are primitivism, reductionism and eliminativism. Primitivism would be the position that laws are a distinct, irreducible and non-empty category of thing in our world. Carroll's (1994) position might be thought of in this way. Reductionism is the position in which there are laws but that they can be accounted for entirely by other things that are not laws. They can be reduced to those other things, without remainder. Brian Ellis's recent account (2001) is presented by its author in a way that supports a reductionist reading. Armstrong's (1983) well-known theory of laws has been given a reductionist and a primitivist reading by different commentators. Eliminativism is a rejection of both primitivism and reductionism. Laws are neither reducible to other categories and nor are they a distinct category in their own right. Realist lawlessness is to be classed as an eliminativist position. Humeanism might be classed as either eliminativist or reductionist depending on the interpretation of Hume's less than precise statement of his position. I will be offering reasons, therefore, why a distinctly eliminativist verdict, rather than reductionist, is preferred for the version of lawlessness being commended.

## 2. HISTORY

Given that the existence of laws in nature has been denied before, I have a duty to explain how realist lawlessness differs from other lawless philosophies. It differs in both substance and motivation.

It can be noted that previous lawless philosophies have had one of three primary motivations: either metaphysical, epistemological or, what might best be called, historical-scientific. Realist lawlessness is not an acceptance of the metaphysical or epistemological motivations as outlined by their advocates. The motivation I will advance is metaphysical but radically different from the pre-existing metaphysical argument against laws. Realist lawlessness is a position that might agree with the historical-scientific motivation for a lawless view but it does not accept that motivation as fully

compelling unless something is offered instead of laws. I will describe the three pre-existing motivations in more detail.

The existing metaphysical motivation for a lawless metaphysic is advanced by Hume and the neo-Humeans. Attributing this view to Hume has become more perilous since the important study of Hume's philosophy by Strawson (1989), which claims that Hume was a causal realist who allowed real but hidden powers in nature. Although this interpretation of Hume remains controversial, it might nevertheless be safest to attribute this lawless view to the Humeans who have followed the previously standard interpretation. Lewis (1973, 1986a) offers the best known such account. The metaphysical motivation can be summed up as a denial that there are necessary connections in nature. Lewis (1986a, ix) certainly thinks this commitment is attributable to Hume. However, it is no part of my realist lawless view.

Lewis has famously developed an account in which there are modal truths but no modal properties. Briefly, the truth or falsehood of claims about what is possible or necessary is fixed by the relations between our world and other causally isolated worlds that are similar to our world in varying degrees. There are, however, no *de re* modal features in the world itself, hence no necessary connections between distinct existences. A defining feature of realist lawlessness is that it accepts a number of things that Humeans deny. It allows that there are powers, dispositions, capacities and affordances – things that can collectively be called *modal* properties – and these can do much of the work that formerly it was thought laws must do. It is modal properties, properties whose existence is confined wholly to this world, that are the truthmakers of *de re* modal truths in this metaphysic.<sup>2</sup> It is also the acceptance of modal properties, in this metaphysic, that qualifies it as a variety of realism.

The epistemological motivation of lawlessness is developed by van Fraassen (1989). According to van Fraassen's *constructive empiricism*, laws are not something to be found in the world. To look for them in the world is to misunderstand the intent and ambition of theorizing in science. Science looks for models of the world that are empirically adequate rather than true. Laws are statements within such models that are central and important. But laws are not the most basic features of models. Symmetry principles are more basic.<sup>3</sup> It has been a mistake of metaphysics to shift from empirically adequate statements of a theory to something in the world itself. According to van Fraassen, "Descartes insisted that epistemology should precede metaphysics. He had a point" (pp. 186–187). We know of nothing which justifies the ascent from empirical adequacy to a metaphysical fact of the existence of laws. On the contrary, laws are "vestigial", and

“the concept of a law of nature is an anachronism, its proper life belonging to the 17th and 18th Centuries” (van Fraassen 1993, 411).

While a position of realist lawlessness might draw some support from van Fraassen’s attack, it does not claim that the epistemological motivation for lawlessness is sufficient. For one thing, some serious shortcomings of constructive empiricism have been identified (Ladyman 2004). But, more importantly for the present author, the claim that epistemology should precede, even dictate, metaphysics is anathema to all whose approach is realist (hence van Fraassen’s lawlessness cannot be called realist). As stated earlier, the motivation of realist lawlessness is primarily metaphysical and follows an understanding of metaphysics as First Philosophy, which descends from Aristotle. While this meta-philosophical point cannot be defended in depth, it depends in some degree on the point that all disciplines, epistemology included, have a metaphysical basis or underpinning. Lowe puts this point thus: “absolutely everything, including even the status and credentials of metaphysics itself, comes within the purview of the universal discipline which metaphysics claims to be” (2002, 4).<sup>4</sup> If we believe this, then we cannot say simply that epistemology precedes metaphysics.

I have indicated that realist lawlessness is at least consistent with a scientific-historical motivation. As the scientific-historical argument has been advanced thus far, however, notably by Giere (1995, 1999), it has not been adequate to motivate the kind of realist lawless position I am developing. A key text in this approach has been Ruby’s (1986) study of the origin of the concept of a law. Ruby documents how philosophy and science seemed to manage perfectly well before the modern concept of a law of nature was employed. That first modern use is usually attributed to Descartes (1644) though there are rare precedents in Roger Bacon’s optics (13th Century) and in the mathematics of Regiomontanus (15th Century). Giere’s argument is not just historical but, like van Fraassen, he argues that current science does not employ, or is not about, laws. To a degree, this argument is purely empirical as it professes to be an accurate description of the practice of current science. But for the same reason, it is not accepted as sufficient to determine the philosophical position realist lawlessness is intended to be. If the case for lawlessness rested just on the practice of science, then it would be open to empirical refutation. Nor, given that we seem not to have yet arrived at a final science, does it seem that we should assume that science has fully settled the place and role of laws. What goes for the lesson of current science applies even more so to the history of science. Many things were formerly thought not to be the case, by science, but now are. If we argued, for instance, that there is no DNA because science

managed perfectly well without it, prior to the 20th Century, few would be convinced. So while a follower of realist lawlessness might draw some comfort from history showing that science without laws is conceivable, and may even have been practiced at other times, such empirical claims cannot be accepted as conclusive.

This latter point illustrates the need for a philosophical theory of laws, or of there being no laws. Much of this debate is essentially metaphysical. Roberts (this volume) provides a compelling account of how laws are regarded by science and philosophy of science. There is an attempt to refrain from metaphysics as far as possible, in his meta-theoretic account. For this reason, it cannot be deemed at odds with realist lawlessness or other purely metaphysical accounts. The latter are searching for the metaphysical truth-makers, if any, for the law statements employed in science. The following is also a metaphysical account.

### 3. HUMEAN LAWLESSNESS

It has been noted that the best-known lawless view depended on metaphysical considerations that will not be endorsed here. In this section, those metaphysical principles will be considered in more depth. I will not offer any major argument against the Humean position as there has been so much discussion of it elsewhere.<sup>5</sup> My aim in this paper is to show that there is an alternative lawless position to the Humean one. The more limited aims of this section are to show explicitly that Humeanism is a lawless theory, contrary to the language of some of its proponents, and what the features and commitments are of this version of lawlessness. Readers will then see clearly the choice on offer between the Humean and anti-Humean versions of lawlessness.

The Ramsey–Lewis theory (some say Mill–Ramsey–Lewis), also called the best systems theory, is the most sophisticated Humean theory of laws.<sup>6</sup> More importantly, for current purposes, it is a Humean theory that has had its metaphysical basis articulated explicitly.<sup>7</sup> Lewis calls this metaphysics Humean supervenience. However, some supporters of the Ramsey–Lewis theory speak as if it is a theory *of* laws, which is something I deny. John Earman, for example, argues against van Fraassen that there must be laws if science is to be made any sense of (1993, 414). But, remarkably, he then goes on to say that his own preferred theory of laws is the Ramsey–Lewis account (p. 416). A reminder of the key features of Humean supervenience should demonstrate the difficulty of combining these two claims. There are no laws *in* nature in the Ramsey–Lewis theory.

Lewis's metaphysic of Humean supervenience has the following features: (1) the total history of the world is a four-dimensional history of events; (2) those events that are fundamental or basic – the subvenient base events – are 'local': point-sized qualities instantiated at points; (3) best science would tell us what these qualities are; (4) everything else, we hope, supervenes on these base events: all chances, all dispositions, all laws; and (5) all events are modally unconnected, with no intrinsic modal features in the world ("the world is a vast mosaic of local matters of particular fact, just one little thing and then another", Lewis 1986a, ix). The 'laws' of Humean supervenience hardly deserve the name; indeed, I take them to be only the surrogates of laws. These surrogate 'laws' supervene on the Humean base, characterised in (1)–(5), by being the axioms or theorems in (all) the best possible systematisation(s) of the Humean base, where best is defined in terms of the system's simplicity and strength.

Now according to the development of this theory by Lewis and his followers, this need not make laws mind-dependent in any way, as we may be able to construe the strength and simplicity of a system as objective features: perhaps strength and simplicity from a God's-eye view. So laws might be objective, supervenient, features of the Ramsey–Lewis view. But further consideration of some of the features of the metaphysic show that these are not proper laws.

That there are laws *in* nature is a strong claim and Humeans can claim there are laws in nature only if they considerably weaken their sense of law. Real laws must have some regulating, determining or necessitating role, if they are to do any work at all. Humean laws cannot have such a role. Though they are construed either as patterns of regularities or axioms of systematisations, they have no role at all in determining any event. They supervene on such events and there are no connections at all between any of the subvenient events. The world's events just fall as they do, with no cause. The vast mosaic can be compared to the output of a random number generator or the indeterministic scattering of coloured dots. Patterns may be perceivable. A long string of random numbers may contain the discernible sequence [1, 2, 3, 4, 5] on a dozen occasions. But there is nothing that has determined [5] to follow [1, 2, 3, 4] in any instance.<sup>8</sup> Where we have laws worthy of the name, they play a part in determining events. They can determine regular sequences and thereby ground rational expectation. They provide, or at least earn their metaphysical keep if they provide, precisely the necessary connections between distinct states that Humeanism denies.

This far from settles the dispute between Humeanism and realism about laws, however. It is only an attempt to make that distinction. Indeed,

resolving this debate is no easy matter. Some standard criticisms of the Humean view – either a regularity view of laws or a best systems account – seem to miss the mark. Claims are sometimes made to the effect that the regularity view says that such and such is a law when clearly it is not: perhaps it is only an accidental regularity. But this itself assumes the very distinction between lawful and accidental regularities for which Humeanism has no place. No sense can be made of laws metaphysically stronger than theirs, say Humeans. There is a certain incommensurability between Humeanism and nomological realism, therefore. This incommensurability resides in differing metaphysical bases and a resolution seems likely only through an evaluation of those bases. I have aimed, in this section, to show what the metaphysical basis of Humeanism is. I will next do the same for nomological realism.

#### 4. NOMOLOGICAL REALISM

Nomological realists think that there are metaphysically real laws. Often this is motivated by a dislike of the regularity view of laws or the best system view. It is hard, however, for this to form an argument for nomological realism because, as has just been explained, the counterexamples to the Humean account often presuppose a realist sense of law that Humeanism denies. Is there any better argument for nomological realism? There seems to be an argument but, as I shall argue, it is not a persuasive one and, indeed, will be seen as the first step towards the position I will call realist lawlessness.

The argument for laws, I will call the Nomological Argument (NA), which can be characterised thus:

- A. There is a set *S* of features in the world.
- B. There is *S* because there are laws of nature.

No one has explicitly advanced NA as the cornerstone of their nomological realism, so I will not attribute it to any particular philosopher. Implicit deployment of NA is not hard to find, however, though it may not have been advanced as an attempt at proof.<sup>9</sup> Nevertheless, NA still has a useful dialectical role in the current context.

The simplest form of the argument is along the lines that there is regularity and, therefore, predictability in the world, so there must be laws of nature. This is the simplest form of NA because it takes the set *S*, of features in the world, to be constituted by regularity alone, which is the metaphysical feature grounding the epistemological feature

of predictability. Serious discussions of laws make *S* a more complicated matter, however. On a sophisticated theory, it might be that:

$$S = \{ \text{regularity, universality, objectivity, immanence, invariance, centrality, measurability, contingency, natural necessity} \}$$

and laws are that which delivers all these features to the world. Again, I will not attribute this version of *S* to any particular author. Can a single thing deliver the whole of *S*, whatever *S* may be?

Having already classed the Ramsey–Lewis view as a lawless theory, I will consider, instead, three important realist theories of laws: Carroll’s primitivism, the Dretske, Tooley, Armstrong (DTA) view and Ellis’s recent scientific essentialism.

Carroll’s account is worth noting as he is one of the few philosophers to have seriously and explicitly held a primitivist position (1987, 1994): his laws are ‘primitive and irreducible’ (1987, 267). The problem with Carroll’s account is, in his own words, that his “discussion is shaped . . . by three fundamental convictions. The first is that all laws are true” (1994, 21). Carroll’s laws are (true) statements, hence not properly the subject of the present paper, which is the metaphysical truthmakers, if any, of the true law statements. However, his primitivist position is that such statements are unanalysable. As they have no further analysis, they have no truthmakers. Carroll has a reason, therefore, for limiting his study to statements rather than, as with the metaphysical approaches, the truthmakers of law statements. This illustrates the most unsettling aspect of a primitivist position (which might also apply to *any* primitivism about anything). The position is that no further analysis or even explanation can be given. This gives laws a mystery we might prefer dispelled. At the very least, we might say that we would want a very good reason for accepting a primitivist position. But Carroll’s reason seems to be that reductions attempted in the best systems and DTA approaches have failed so the only remaining option is primitivism.<sup>10</sup> If primitivism is a last resort, then I think there are other positions to be considered first, including realist lawlessness.

The theory that takes laws to be relations of natural necessitation between universals was developed simultaneously and independently by Dretske (1977), Tooley (1977) and Armstrong (1978, 1983). In Armstrong’s developed version of the theory, the correct logical form of a law statement is to be represented as  $N(F, G)$  because there is a law when the second-order relation *N*, of natural necessitation, holds between the first-order universals *F* and *G*. What makes it that everything that is *F* is also *G* is that there is a necessitation relation between the universals *F* and *G* that first-order particulars instantiate. Hence  $N(F, G)$  entails  $\forall x(Fx \rightarrow$

$Gx$ ) but is not entailed by it. The problems that have arisen from Humean accounts, and any account based on regularity, is that they attempt to make a law out of a universal quantification over particulars, . . . ,  $x, y, z$ . But this ignores the strong intuition that every particular that is  $F$  might be  $G$  but so only accidentally. The insight that solves this difficulty is that laws concern the relation between universals directly, and the particulars that instantiate those universals only indirectly.

Armstrong attempts to solve the problem of accidental regularities by making the nomic relation one of *natural necessitation*. This is seen by many as the downfall of the theory. Armstrong wants to preserve the contingency of laws: the laws of nature could have been otherwise. The way he does this is by saying that, when  $N$  relates  $F$  and  $G$ , it entails that  $\forall x(Fx \rightarrow Gx)$ , but it is contingent which universals are so related. So it might not have been that  $N(F, G)$  and another law,  $N(F, H)$ , might have been that is in fact not. But all we really know of the relation is that it is that which entails the regularity  $\forall x(Fx \rightarrow Gx)$ . For this reason, Mellor has wondered whether natural necessitation relations are *sui generis* and “*ad hoc* because there is nothing more to them than what they are defined to do” (1991, 168). Lewis has said that calling the relation natural necessitation no more makes it so than “one can have mighty biceps just by being called ‘Armstrong’” (1999, 40).<sup>11</sup> For this, and other reasons, the DTA theory has not been accepted as the final word on laws.

A radically new theory has been advanced by Brian Ellis (2001, 2002). Laws are descriptions of the essential properties of natural kinds. For instance, up quarks have charge of  $2/3$ . Sometimes, such essential properties are dispositional or causal powers. Causal laws, the laws most often discussed by philosophers, “just describe the natural kinds of process involved in [a causal power’s] display” (2001, 4). Because laws concern essential properties, they are distinguished from mere accidental truths and regularities. All up quarks must have charge  $2/3$ . Up quarks are an infimic species: there is an exact identity of qualities among all species members. Therefore, there is no accident, in laws, that every  $F$  is a  $G$ . The natural necessity has been explained in terms of the property being essential.

Ellis’s theory has the implication, easily seen, that the laws of nature are strongly necessary. They do not have a weakened form of contingent necessity, as in Armstrong’s natural necessitation. The necessity is as strong as any other kind of necessity but it is metaphysical *de re* necessity, which means it is grounded in features of the world. It contrasts with analytic necessity, which is grounded in meaning, and logical necessity, which is grounded in form.

The theory requires one to accept an ontological landscape dominated by natural kinds and their essential properties.<sup>12</sup> But even if one does so, the problem of laws may not be solved and might better be described as dissolved. Ellis presents his account as a theory of laws yet such laws seem entirely secondary, if not redundant, because this is a reductionist theory. Kinds and their essential properties do all the work. They deliver all the world's *de re* necessity. Laws are, therefore, a superfluous part of his metaphysic: they give no addition of being. God did not have to create them in addition to kinds and properties.

We might further think the problem of laws dissolved because Ellis's account gives up entirely the contingency of laws. We saw that Armstrong's theory found trouble when it attempted to keep laws contingent but give them more force than the merely accidental. But is that the only strategy that will keep within the received concept of a law of nature? Laws were supposed to be the things that determined or regulated the behaviour of inert and otherwise unconnected events. They could have been different. They could have determined different behaviour for the very same particulars. Discovery of the laws would tell us which of the many possibilities was the actual way in which the behaviour of particulars was regulated. If we give up the contingency of laws, it seems we give up their reason for being. Concepts can be revised in the light of better understanding. But they can also be given up on the grounds of having no useful purpose. It is this latter option, I suggest, which can be classed as the eliminativist option.

##### 5. REALIST LAWLESSNESS

The logical space for the realist lawless position can be shown if we refer back to the Nomological Argument: that *A*, there is a set *S* of features in the world, and *B*, there is *S* because there are laws of nature. Nomological realism accepts *A* and that *B* follows from *A*. With some caveats, we might say that Humean lawlessness does not even accept *A*. Humeans acknowledge the regularity component of *S*, but they will admit few, if any, of the other features of *S* that are needed to make laws something more than regularities. There would be no immanent, objective, natural necessity, for instance. Realist lawlessness accepts *A* but not *B*. *A* is true but *B* does not follow from *A* and is, indeed, false.

How is such a position possible? The realism of the position comes in the acceptance of *A*. The world does contain natural, *de re* necessities. It also contains universal truths as opposed to universal quantification over particular truths. It contains objective, central facts that play a role in

determining the world's events. It might also be found to have regularities, of some kind, and therefore be predictable. But there is not a single and distinct kind of thing, called laws, that delivers all these features by imposing them on top of an otherwise lawless reality. *B* is rejected, therefore. The position is nomological anti-realist.

Nancy Cartwright has used a term that nicely illustrates what is at stake. Our opponents begin with a world of 'demodalized' occurrences (1993, 425). Recall that Lewis allows modal truth but no modal properties that might be their truthmakers. His is the Humean demodalized world. The problem with nomological realism is that it accepts the demodalized world as its starting point. It sees the world as still containing no modal properties and therefore needing the imposition of laws to make the world active and dynamic. Our world self-evidently is active and dynamic,<sup>13</sup> but are laws the best explanation of the source of such dynamism? If we accept what can be called, broadly, modal properties, we see that laws were never needed to begin with. Arguably, the reason why Aristotle and others, prior to Descartes, got by without them was that their world was already an active world that required no further animation (Cartwright 1993a). Aristotle's world-view contrasts sharply with Newton's. Because Newton's constituent particulars were essentially passive, laws still had plenty of work to do.

While, at the end of the last section, it was argued that necessary laws, whose necessity resided in natural kinds, were redundant, the foregoing consideration shows also the inadequacy of contingent laws and their supposed governance of 'categorical' properties. Where the laws of nature are contingent, it would be allowed that because of the laws  $L_1, L_2, L_3 \dots L_n$ , a property  $P_1$  had a causal role typified by causes  $C\alpha - C\acute{\omega}$  and effects  $E\alpha - E\acute{\omega}$ . This view then allows that the very same property  $P_1$  could have had (or there is a possible world where it does have) a different causal role,  $C\alpha^* - C\acute{\omega}^*$ ,  $E\alpha^* - E\acute{\omega}^*$ , if the laws differed from  $L_1, L_2, L_3 \dots L_n$ . Some important considerations raised by Shoemaker and by Robert Black suggest that this is not a real possibility.<sup>14</sup> Shoemaker develops a view that properties are causal powers. More precisely, he says: 'what makes a property the property it is, what determines its identity, is its potential for contributing to the causal powers of the things that have it' (1980, 212). Black makes a related claim that properties must be world-bound and, therefore, subject only to actual laws. Attempted reference to properties that have different causal roles to their actual roles would invoke the wholly unacceptable principle of quidditism: that properties have an individual essence, a *quidditas*, over and above their causal role. Only with such a

*quidditas* could we say that it was this very same property that, in another world, had a different causal role because of a difference of laws.

If this result is correct, properties could not have causal roles other than their actual ones, and it shows that there is something fundamentally mistaken about the very notion of laws. The mistake is the idea that there could be things that are external to properties but that nevertheless determine the behaviour of properties (and thereby the behaviour of the particulars that instantiate those properties). The desire to bring laws into nature was a first attempt to vindicate the concept of a law that had a supernatural beginning as the prescriptions of God.<sup>15</sup> But as recently as Armstrong's (1983) account<sup>16</sup> laws were immanent in the world but still extra to, outside of, the properties they governed.<sup>17</sup>

It seems I have set up a dilemma for the nomological realist. Either the laws are outside the properties that they govern. They have no essential connection with those properties and could have been otherwise. How they might issue or exercise their prescriptions on properties, we can barely begin to conceive. But the main problem of this view is that it seems to commit us to the possibility of the very same properties having different causal roles to their actual causal roles if the laws happened to be different. This is highly implausible if one thinks that the identity of a property is fixed by its causal role. But the second horn of the dilemma is little better. Ellis has tried to bring laws into the properties that they 'govern', so the properties are essentially connected to their causal role. But it then appears that the properties and kinds alone are doing all the work, that laws are superfluous. Without playing some role, it is doubtful that we have real laws in nature so it is doubtful that this is an acceptable form of nomological realism. Essentialism<sup>18</sup> effectively robs laws of a governing role. Why have a law that necessarily cannot be disobeyed?

## 6. REDUCTION, REVISION OR ELIMINATION

A claim of eliminativism is a strong claim. The reason I conclude in its favour is that there are models of successful elimination and, I think, the concept of a law has enough in common with such cases. The concept of a witch has been near-enough eliminated in Western societies, for instance. Why was the concept eliminated rather than merely revised or reduced to something more acceptable and 'scientific'? One reason might be that the concept contained a central connotation that was harmful or misleading, such as being in command of magical forces and using them for evil ends. We do not think there is magic or supernatural evil. Revision of the concept would not be possible because any such acceptable revision must involve

losing the concept's central connotations. But, in so doing, it would have ceased to be the concept that it was. There must, after all, be some constraints on what can and cannot change about a concept, even when we allow the possibility of some conceptual evolution.

What, then, of laws? I have tried to show that neither the reduction nor revision of the concept of law is achievable. There is something unacceptable about the concept core of the notion of a law in nature. It suggests that the world's properties are governed externally. There has still been no acceptable account of how this might occur or how it would avoid the prospect of quidditism. That laws are embodied within the properties of the world is a more acceptable metaphysic, I think, but it foregoes the central connotation of the concept of a law as used throughout modern and contemporary philosophy. In attempting to embody laws within properties, the idea of governance seems to vanish.

## 7. CONCLUSION

Having given an indication of why eliminativism about laws is preferred, the case for the position I call realist lawlessness should now be clearer. The position is realist about items that are unacceptable in Humean versions of lawlessness. These items can be called collectively modal properties. But the position does not endorse realism as it specifically concerns laws. It remains to be seen whether a convincing argument for the existence of laws can be made. The nomological argument would not be sufficient as it involves the as yet unsubstantiated claim that laws, and laws alone, can account for a collection of so-called nomological features in the world. We can accept that some, perhaps all, of these features are really in the world without accepting that it must be laws that ground them. The acceptance of modal properties sets up one horn of a dilemma for the nomological realist. If modal connections are inherent within the connected properties, then there is no job left for laws to do. The other horn of the dilemma is that laws that are not inherent in properties are little understood but also are suggestive of a misleading picture of reality, requiring external governance. Given these problems for nomological realism, I prefer the position that is anti-realist specifically about laws but accepts a broadly anti-Humean metaphysic by allowing, what Humeans deny, necessary connections in nature.

It might be objected that I have scrutinised laws and rejected them but am accepting something else, modal properties, that are far less understood. I can concede this, in part. The positive programme will still require much work, though it is already underway.<sup>19</sup> However, the main aim of this

paper was to show that there is an unexplored third alternative between the metaphysics of Humean lawlessness and nomological realism. I hope this aim has been achieved.

#### ACKNOWLEDGEMENTS

Earlier versions of this paper were presented at the ‘Metaphysics in Science’ Conference at the University of Edinburgh and at the Universities of Bristol, Lund and Oxford (Jowett Society). A number of people have contributed to its development either through questions, discussion, or correspondence. For such, I thank David Armstrong, Candace Upton, Brian Ellis, Alexander Bird, Alice Drewery, Stathis Psillos, Jennifer McKittrick, Marc Lange, Peter Clark, James Ladyman, Alessandra Tanesini, Nancy Cartwright, and Johannes Persson. Any remaining errors are all my own work.

#### NOTES

<sup>1</sup> For detailed studies, and a range of theories, see Armstrong (1983, pp. 122–131), Carroll (1994), Lange (2000), Lewis (1973, pp. 72–77; 1986a).

<sup>2</sup> *Logically* necessary truths may need a different account. For more on de re truthmakers of de re modal truths, see Molnar (2003, Chap. 12). For a competing account, see Armstrong (2003).

<sup>3</sup> Some similarity can be noted between this account and that of Roberts (this volume). In Roberts’ meta-theoretic account, laws are among the fundamental statements of a theory whose test of adequacy is not simply empirical adequacy but measurability.

<sup>4</sup> Lowe follows this with a comment pertinent to van Fraassen’s attack: “We are all metaphysicians whether we like it or not, and whether we know it or not” (op. cit, p. 5).

<sup>5</sup> See Armstrong (1983, Part I) and Psillos (2002, Chap. 5).

<sup>6</sup> For the versions of the theory prior to Lewis, see Mill (1843, Book III, Chaps. 4 and 5) and Ramsey (1928, 1929).

<sup>7</sup> For the most thorough account, see Lewis (1986).

<sup>8</sup> Some neo-Humeans are very open about their lawless metaphysics: see Beebe’s (2004) ‘What Holds the World Together?’, to which her answer is, in a word, nothing.

<sup>9</sup> For a non-philosopher arguing straight from ‘patterns’ in nature to laws, see Stevens (1974). In a definitive philosophy reference book (Honderich (ed.) 1995), under ‘Necessity, Nomic’ we read “underlying the contingent happenstances of existence there seems to be order and regularity. The world runs according to rules or laws”.

<sup>10</sup> Psillos (2002, p. 176), denies that the DTA account is reductive. The relation of nomic necessitation might be understood as irreducible.

<sup>11</sup> This difficulty, of understanding the nomic necessitation relation, certainly follows if the DTA theory is given Psillos’s primitivist interpretation.

<sup>12</sup> I prefer the view, suggested in Mellor (1977) and Dupré (1993), that while there are natural kinds it has not been demonstrated that there are essences.

<sup>13</sup> See Harré (2001) for a discussion of this claim.

<sup>14</sup> I have also heard Alexander Bird make the same point though without invoking Shoemaker or Black. Bird draws a different conclusion, from the same point, as he argues that laws must be necessary.

<sup>15</sup> See Ruby (1986, p. 289).

<sup>16</sup> Also see Armstrong (2004).

<sup>17</sup> The account of Armstrong, this volume, may avoid this critique, depending on what precisely is meant by “direct relations between the universals” and what follows.

<sup>18</sup> See also Swoyer (1982) and Bird (2001, 2002).

<sup>19</sup> See Molnar (2003), for instance, on an ontology for powers and, for an alternative view, my own (1998, 2004, 2004a).

## REFERENCES

- Armstrong, D. M.: 1978, *A Theory of Universals*, Cambridge University Press, Cambridge.
- Armstrong, D. M.: 1983, *What is a Law of Nature?*, Cambridge University Press, Cambridge.
- Armstrong, D. M.: 1997, *A World of States of Affairs*, Cambridge University Press, Cambridge.
- Armstrong, D. M.: 2003, ‘Truthmakers for Modal Truths’ in H. Lillehammer and G. Rodriguez-Pereyra (eds.), *Real Metaphysics: Essays in Honour of D. H. Mellor*, Routledge, London, pp. 12–24.
- Armstrong, D. M.: 2004, ‘Combinatorialism Revisited’, in J.-M. Monnoyer (ed.), *La structure du monde*, Vrin, Paris (forthcoming).
- Armstrong, D. M.: 2005, ‘Four Disputes about Properties’ *Synthese* **144**, 309–320.
- Beebe, H.: 2004, ‘What Holds the World Together?’, *Synthese* (forthcoming).
- Bird, A.: 2001, ‘Necessarily, Salt Dissolves in Water’, *Analysis* **61**, 267–274.
- Bird, A.: 2002, ‘On Whether Some Laws are Necessary’, *Analysis* **62**, 257–270.
- Black, R.: 2000, ‘Against Quidditism’, *Australasian Journal of Philosophy* **78**, 87–104.
- Carroll, J.: 1987, ‘Ontology and the Laws of Nature’, *Australasian Journal of Philosophy* **65**, 261–276.
- Carroll, J.: 1994, *Laws of Nature*, Cambridge University Press, Cambridge.
- Cartwright, N.: 1993, ‘In Defence of “This Worldly” Causality: Comments on van Fraassen’s *Laws and Symmetry*’, *Philosophy and Phenomenological Research* **53**, 423–429.
- Cartwright, N.: 1993a, ‘Aristotelian Natures and the Modern Experimental Method’, in J. Earman (ed.), *Inference, Explanation and Other Philosophical Frustrations*, University of California Press, Los Angeles, pp. 44–71.
- Descartes, R.: 1644, *Principia Philosophiae*, in J. Cottingham, R. Stoothoff and D. Murdoch (trans.), ‘Principles of Philosophy’, *The Philosophical Writings of Descartes*, Vol. I, Cambridge University Press, Cambridge, 1985, pp. 177–291.
- Dretske, F.: 1977, ‘Laws of Nature’, *Philosophy of Science* **44**, 248–268.
- Dupré, J.: 1993, *The Disorder of Things*, Harvard University Press, Cambridge, MA.
- Earman, J.: 1993, ‘In Defense of Laws: Reflections on Bas van Fraassen’s *Laws and Symmetry*’, *Philosophy and Phenomenological Research* **53**, 413–419.

- Ellis, B.: 2001, *Scientific Essentialism*, Cambridge University Press, Cambridge.
- Ellis, B.: 2002, *The Philosophy of Nature: A Guide to the New Essentialism*, Acumen, Chesham.
- Giere, R.: 1995, 'The Sceptical Perspective: Science without Laws of Nature', in F. Weinert (ed.), *Laws of Nature: Essays on the Philosophical, Scientific and Historical Dimensions*, de Gruyter, Berlin, 1995, pp. 120–138.
- Giere, R.: 1999, *Science Without Laws*, University of Chicago Press, Chicago.
- Harré, R. 2001, 'Active Powers and Powerful Actors', *Philosophy* **48**, 91–109.
- Honderich, T. (ed.): 1995, *The Oxford Dictionary of Philosophy*, Oxford University Press, Oxford.
- Ladyman, J.: 2004, 'The Epistemology of Constructive Empiricism', in P. Clark and R. Young (eds.), *Van Fraassen's Philosophy of Science*, Oxford University Press, Oxford (forthcoming).
- Lange, M.: 2000, *Natural Laws in Scientific Practice*, Oxford University Press, Oxford.
- Lewis, D.: 1973, *Counterfactuals*, Blackwell, Oxford.
- Lewis, D.: 1986, *On The Plurality of Worlds*, Blackwell, Oxford.
- Lewis, D.: 1986a, *Philosophical Papers*, II, Oxford University Press, Oxford.
- Lewis, D.: 1999, *Papers in Metaphysics and Epistemology*, Cambridge University Press, Cambridge.
- Lowe, E. J.: 2002, *A Survey of Metaphysics*, Oxford University Press, Oxford.
- Mellor, D. H.: 1977, 'Natural Kinds', in D. H. Mellor, *Matters of Metaphysics*, Cambridge University Press, Cambridge, 1991, pp. 123–135.
- Mellor, D. H.: 1991, *Matters of Metaphysics*, Cambridge University Press, Cambridge.
- Mill, J. S.: 1843, *A System of Logic: Ratiocinative and Inductive*, Longmans, London.
- Molnar, G.: 2003, *Powers: A Study in Metaphysics*, S. Mumford (ed.), Oxford University Press, Oxford.
- Mumford, S.: 1998, *Dispositions*, Oxford University Press, Oxford.
- Mumford, S.: 2004, 'The Nomological Argument', *Synthèse* (forthcoming).
- Mumford, S.: 2004a 'Filled in Space', in B. Gnassounou and M. Kistler (eds.), *Dispositions et pouvoirs causaux*, Vrin, Paris (forthcoming).
- Psillos, S.: 2002, *Causation and Explanation*, Acumen, Chesham.
- Ramsey, F. P. 1928, 'Universals of Law and of Fact', in H. Mellor (ed.), *Philosophical Papers*, Cambridge University Press, Cambridge, 1990, pp. 140–144.
- Ramsey, F. P. 1929, 'General Propositions and Causality', in H. Mellor (ed.), *Philosophical Papers*, Cambridge University Press, Cambridge, 1990, pp. 145–163.
- Roberts, J.: 2005, 'Measurability and Laws of Nature', *Synthese* **144**, 433–447.
- Ruby, J.: 1986, 'The Origins of Scientific "Law"', in F. Weinert (ed.), *Laws of Nature: Essays on the Philosophical, Scientific and Historical Dimensions*, de Gruyter, Berlin, 1995, pp. 289–315.
- Shoemaker, S.: 1980, 'Causality and Properties', in *Identity, Cause, and Mind*, Cambridge University Press, Cambridge, 1982.
- Stevens, P. S.: 1974, *Patterns in Nature*, Penguin, London.
- Strawson, G.: 1989, *The Secret Connexion: Causation, Realism and David Hume*, Clarendon Press, Oxford.
- Swoyer, C.: 1982, 'The Nature of Natural Laws', *Australasian Journal of Philosophy* **60**, 203–223.
- Tooley, M.: 'The Nature of Laws', *Canadian Journal of Philosophy* **7**, 667–698.
- van Fraassen, B.: 1989, *Laws and Symmetry*, Oxford University Press, Oxford.

1993, 'Précis of Laws and Symmetry', *Philosophy and Phenomenological Research* **53**, 411–412.

Weinert, F. (ed.): 1995, *Laws of Nature: Essays on the Philosophical, Scientific and Historical Dimensions*, de Gruyter, Berlin.

Department of Philosophy

University Park

Nottingham, NG7 2RD

U.K.

E-mail: [stephen.mumford@nottingham.ac.uk](mailto:stephen.mumford@nottingham.ac.uk)