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WAISMANN VERSUS EWING ON CAUSALITY

1. INTRODUCTION

Friedrich Waismann's typescript "Causality" (2010) dates from the late 1940s or early 1950s, and derives from lectures he gave at Oxford in 1947–8, where he was then university lecturer (and later reader in the philosophy of mathematics).¹ The typescript is divided into twelve sections, and Waismann devotes much of one section to an engagement with A. C. Ewing's paper "A Defence of Causality" (1933).

In this paper I look at Ewing's views and Waismann's criticisms of them, relating their exchange to recent developments of their differing viewpoints. As we shall see, Waismann's approach is typical of his logical positivist heritage, with its emphasis on what is observable and demanding a strong connection between the meaning of an assertion and its empirical verifiability. Ewing's views, which must have begun to look a little outdated to some in the 1930s, have recently had a significant revival, although the current discussions owe little directly to Ewing.

Ewing's principal aim is to argue against the regularity theory of causation, and at the centre of his argument is that claim that the regularity theory does not accommodate certain features central to the ordinary concept of causation. These are (Ewing 1933, 98; my headings):

- (1) *Intrinsic connection* "The effect is held to be continuous with, dependent on something in the cause so that the two do not merely happen in regular succession, but are intrinsically connected with each other."
- (2) *Explanation* "The cause is held to explain the effect, to answer not only the question—how?—but the question—why? so that the demand for causes is primarily a demand for reasons, which implies that there is a logical or quasi-logical connexion between the two such that the cause is at least part of the reason for the effect and helps to make the occurrence of the latter intelligible."
- (3) *Production* "The cause is held actively to produce or determine the effect in a sense in which the effect cannot be said to produce or determine the cause."
- (4) *Necessity* "Causality involves necessity. If there is a causal law connecting A and B, it is not only the case that B does follow, but that it must follow."

¹ For a detailed commentary on Waismann's typescript, see Marion (2010).

In the following, I shall discuss each of these points in turn, even though they raise closely related issues, together with Waismann's criticisms. To contrast with Waismann's regularity view, I call Ewing's view the *production* account. To conclude I shall show the contemporary *causal powers* view satisfies the most important claims expressed in the production account of the ordinary concept of cause.

2. INTRINSIC CONNECTEDNESS

Ewing's first-mentioned feature of the ordinary concept of cause asserts an 'intrinsic connection' between cause and effect. This claim is the one to which Waismann devotes least attention in his discussion. This may in part be because while Ewing repeats the point several times, he is unable to articulate what exactly he means by 'intrinsic'. Indeed, he admits that he cannot find a meaning for it other than 'logically implies', although he does acknowledge that others have a conception of an intrinsic relation that is distinct from any logical relation. If intrinsicness is a matter of a logical relation, then point (1) just becomes point (2).

There are two things that Ewing might mean by 'intrinsic':

- (a) property F is intrinsic to object **a** iff **a**'s being F is independent of the existence of any object fully distinct from **a**.
- (b) property F is intrinsic to object **a** iff F is essential to **a**.

Contemporary philosophy almost always limits use of 'intrinsic' to (a), although there are exceptions to this.² The idea in (b) is sometime expressed as the idea that being F is part of **a**'s nature, although that could well be understood as encompassing a wider extension than the essential properties of **a**. I shall examine that interpretation of Ewing's claim in Section 6.

That Ewing may have (a) in mind is suggested by the fact that he repeatedly contrasts the following as accounts of what it is for individual event A to cause individual event B:

- (I) A-type events are always followed by B-type events;
- (II) event A is intrinsically connected to event B;

The principal difference between these is the following. According to (II) the causal relationship between A and B depends only on those two events. Whereas according to (I) whether A and B are causally related depends on entities other than those events. For whether this event A causes that event B depends not only on whether A is followed by B but also on whether another A-type event, A', is followed by another B-type event, B', and so on for all other A-type events. If causality is an intrinsic relation between two events the fact that it holds between A and B depends only on how A and B are and not on any other event or entity. But

² See Humberstone (1996), Yablo (1999), Langton and Lewis (1998), and Weatherston (2006) for discussions of this conception of intrinsicness.

the regularity theory of causation does make it so depend. The idea of intrinsicness here is that idea that F is an intrinsic property of A if A's being F does not depend on the existence on object other than A, and a relation R between two objects A and B is intrinsic to that pair of objects if it does not require the existence of any third object.

In this sense an intrinsic relation between A and B does not entail any logical relation between A and B. This may be too weak an understanding of intrinsicness for Ewing's purposes. For in this sense the fact that London and Vienna are 1,233km apart is an intrinsic relation, for that relationship can hold independently of what else exists. But the distance of two entities can vary too easily for that relation to model what Ewing has in mind by intrinsicness. Ewing (1933, 99) mentions that "there might be different views on the point, e.g., Prof. [Samuel] Alexander, when he speaks of the cause as 'passing into' the effect, might possibly be interpreted as asserting intrinsic connexion, and yet he emphatically denies that causality involves any sort of logical connexion." This suggests that the intrinsic connection between A and B depends only on A, that is, the relation is not intrinsic to A and B together but intrinsic to A alone.

There is a problem with such an idea. If the relation is intrinsic to A then it ought not depend on the existence of any other object. But clearly the causal relation between A and B depends on B's existence. If B is distinct from A then A should be able to exist without B existing. So the causal relation between A and B cannot be intrinsic to A if A and B are distinct events.

So the claim of intrinsicness can be maintained if we deny that A and B are really distinct—B is a part of A. If B is part of A then the relationship between them can be intrinsic to A. The action of my clenching my fist is a relationship between me and my fist and is intrinsic to me, because my fist is part of me.

This response leads to monism. For if every effect is not distinct from its cause but is a part of it, then there is really only one big event.³ Although Waismann does not consider monism, he does repeatedly insist on the distinctness of cause and effect. Ewing does refer to an "exaggerated monism" that was a feature of the earlier view against which Russell and others were reacting. In his view that reaction has produced an opposite (and, Ewing seems to imply, greater) evil to the one it rejected.

A different response notes that the idea of intrinsicness runs into difficulty when dealing with entities that are necessarily related. Let us say that the existence of object A necessarily implies the existence of (non-overlapping) object B. Then *none* of A's properties will be intrinsic to it, because for any such property F, A's being F will require (necessarily imply) the existence of B. But that seems not a good reason for denying that A can have intrinsic properties. One might think that the singleton set of Socrates has some intrinsic properties, such as having Socrates

3 There could be more than one big event, if there are parts of the universe that are completely causally isolated from other parts, with no common causes or effects. Current physics suggests that this is not in fact the case. This monism suggests that all current events are merely parts of the Big Bang.

as a member, even though singleton Socrates entails the existence of Socrates.⁴ So one might adjust the notion of intrinsicness to apply to a property F of X such that: there is no object Y such that X's being F requires the existence of Y and X's existence does not require the existence of Y. So A's being a cause of B might be thought to be an intrinsic property of A, so long as A necessitates the existence of B.

This reference to necessitation relates feature (1), intrinsic connection, to feature (4), necessity. We will consider (4) in due course. We obtain a relation to (2), Ewing's understanding of explanation, if all necessity is logical necessity. That would be a point of view that he would share with Waismann. But note that he refers to a 'quasi-logical' connexion. What that might be is not clear, although the part-whole relation might be regarded as quasi-logical. But note also that he does not reject Alexander's idea out of hand—if that is a form of necessitating, then it seems the Ewing does not immediately reject the idea of non-logical necessary connections.

For this solution to be different from monism requires that distinct existences can be necessarily connected. This is to deny another Humean dictum to which Waismann would be committed. It is true that the related idea the elementary propositions are logically independent is one of the first elements of the *Tractatus* that Wittgenstein was willing to drop. But nonetheless Wittgenstein and Waismann retained the thought that all necessity is logical necessity, where 'logical necessity' includes the rules of grammar.

3. EXPLANATION

Ewing bundles several features together under the label of explanation:

- the cause explains the effect;
- causes answer 'why?' questions as well as 'how?' questions;
- the demand for causes is a demand for reasons—a cause is a reason for its effect occurring;
- causes make the occurrence of the effect intelligible;
- there is a logical or quasi-logical connection between cause and effect.

Ewing doesn't make clear what all these requirements amount to, nor how they connect together. However, a connection can be made if we think of causation as akin to agency. For when seeking the explanation of an action, we are typically looking for someone's reasons for acting, to cite a reason is to explain *why* they did something, and such an explanation should make the action intelligible in a certain special way, a case of understanding—*Verstehen*—that comes with the hermeneutic or interpretative approach to explanation. Furthermore, it is often

⁴ This claim of necessary connection between distinct entities assumes that to be a member of a set is not to be part of it.

thought that there is something akin to a logical relation between a reason and the action it explains. A reason in this sense must be appreciated as rationalizing the action for any rational being.

The model of rational action for causation is one that is at the heart of what Ewing is saying, but without him saying so explicitly, and it is correspondingly this feature that figures centrally in Waismann's rejection of the view. While Waismann would agree that the above requirements form part of a satisfactory account of reasons, he strongly rejects any connection between reasons and causes. Waismann makes a three-way distinction between motive, reason, and cause. Waismann agrees that citing a reason (or ground) provides a logical connection between reason and action: for example, someone might explain their utterance of 'red' when looking at a red light by declaring that the colour of the light is that which is called 'red', and in so doing refers to the ostensive definition of the term he uttered. This Waismann contrasts with a *causal* explanation of the same utterance: that in childhood he went through a process of conditioning that associates the sound "red" with the colour through neural pathways, which thus established a habit that disposes towards the utterance "red" when in the presence of a salient red object. In this case there is no logical connection between the cause and the effect. This distinction and the distinction between these two (cause, reason) and motive form a major part of the rest of Waismann's typescript. For example, the final section rejects Russell's causal account of desire. Whereas Russell wants to assimilate the explanation of action to causal explanation, Ewing, in effect wants to do the reverse, to regard the explanation of action by reasons as a model for causal explanation. Waismann wants to reject both views by keeping causes and reasons firmly apart.

The view that Russell promotes, that desires are causes of actions, is now the dominant view in the philosophy of mind, especially after Davidson's 'Actions, Reasons and Causes' (1963) in which he argues that reason-giving (and motive-citing) explanations are causal explanations, thus bundling together the three kinds of explanation Waismann is keen to differentiate. The Russell–Davidson view is resisted by Wittgensteinians, among others, for much the same reason as Waismann, that there is a logical (or 'internal') connection between reasons and actions whereas the relation between cause and effect is hypothetical.⁵ Davidson argues that this distinction depends on how the events are described. Causal theories of the mind (Smart 1959; Lewis 1966; Armstrong 1968) explicitly identify reason-giving attributes and causal states. Ewing however, seems to be arguing in the opposite direction: not so much thinking of reasons as like non-mental causes, but rather thinking of causes as like mental reasons. Although this would therefore seem going quite against the flow of contemporary thinking about causes and their relation to reasons, in Section 6 we shall see that this is not entirely the case.

⁵ See Wittgenstein's *Blue and Brown Books* (1958) for his articulation of the distinction between reasons and causes; Schroeder (2001) and Tanney (1995, 2009) among others provide a defence of the Wittgensteinian point of view.

Ewing's demand for a cause to explain its effect is also a demand, as he articulates it, for there to be a logical or quasi-logical connection between that cause and the effect. The relationship that Ewing sees between explanation and a logic connection would be established by adopting something like the deductive nomological model of explanation. According to the latter, the relationship between explanans and explanandum is one of deduction: the explanans provides a combination of laws and conditions from which the explanandum is deducible. Consider a case where the volume of gas in a syringe is halved, under isothermal conditions, and the pressure consequently doubles. The following is the explanation of the increased pressure:

$$\frac{PV = nRT(\text{law}); V \text{ is reduced by } 50\% \text{ (condition); } n, T \text{ are constant (condition)}}{P \text{ is increased by } 100\%}$$

Although the D-N model provides a link between explanation and a logical relation, it does place a strong requirement on what it is to be a cause. For a plausible, first-pass account of causation would claim that to be a cause is to be a (non-redundant) condition in a D-N explanation, not the whole explanans. For example, in the above D-N explanation, we might say that the cause of the increase in pressure was the reduction in volume, i.e. just the fact that V was reduced by 50%. One might argue that the constant temperature and quantity of gas are causally relevant and so part of some total cause (a point that Mill makes). But it would be unusual to regard the *law* also as a cause.

It is an interesting feature of the debate between Ewing and Waismann that neither is particularly concerned to make a sharp distinction between cause and law. For one might think that a regularity account of causation was always going to be a non-starter. Consider the claim that the Treaty of Versailles caused the rise of the far right in Germany; or that the damp odour in the study in February was caused by the blocking of the gutter on the roof in November. The plausibility of such claims is not undermined by there being no regularities of which these are instances, nor by the fact that there is no logical connection between the causes and effects. Furthermore, in both cases there is no contiguity, spatial or temporal, between cause and effect. But neither Waismann nor Ewing regard the Humean claims of contiguity to be refuted for that reason. Waismann does regard the contiguity claim as problematic, but for more sophisticated reasons concerning the divisibility of space, as he discusses in his section on "The Scientific Scheme of Causality". He quotes Georg Simmel as proposing to loosen the connection between cause and law, exemplifying a position he rejects. When Ewing says that he is concerned with the common sense idea of causality, he does not mean that he is interested in providing a precise, extensionally correct analysis of our ordinary concept of cause. Rather, he is interested in capturing the common sense idea of what metaphysical characteristics causation involves. And to a large extent the same is true of Waismann. Neither man was interested in providing necessary and sufficient conditions for the truth of statements of the form 'A caused B'. Rather both men were interested in what sorts of metaphysical features the world must have in order to make such statements true. Of course, Waismann would not have

liked the term ‘metaphysical’, but that is a terminological point. He has a minimalist metaphysics, seeking to make do with just what Lewis would later call the ‘Humean mosaic’. From this perspective the distinction between laws and causes is not especially germane, for the underlying metaphysics, one might suppose, will be the same for both.

One mark of positivism is that it rejects the demand for explanation, Comte (1892) regarded this as a feature of the second, metaphysical stage of human intellectual development, which would be eliminated in its third, positivistic stage. In the sense that Comte rejected explanation, it signifies a relationship of a certain kind. Alternatively, one can attempt a reduction of explanation. And indeed Hempel’s D-N model is part of such a reduction when one understand the notion of law that it employs in a regularity way. Taking laws and causes to be regularities allows them to be understood in a positivistically acceptable way. Likewise, that fact together with the D-N model allow explanation to be understood in a positivistically acceptable way. Although the D-N model meets Ewing’s demands for a logical or quasi-logical connection between explanans and explanandum, it is clear that he requires more from explanation than it plus the regularity theory can supply.

Waismann’s conjecture concerning animism

Before considering Ewing’s claims concerning the productive nature of causation, I shall consider Waismann’s explanation of how it is that the theory he criticizes came to have any attraction for philosophers. His account, justified by what Ewing says about the explanatory aspect of causation, is that we take our voluntary acting as a prototype for all causation. In effect, we naturally take an animist approach to causation, seeing agency in all causal relations between things. Waismann adduces two pieces of evidence for this: the fact that children impute agency and moral culpability to inanimate objects, and the fact that primitive people have animist beliefs. Waismann says that this is reflected in the fact that we use active verbs with inanimate objects, whereas, he supposes (2010), the grammatical distinction between the active and passive voices of verbs was “intended to distinguish what is really active from what is merely passive.”

Whatever the plausibility (or otherwise) of this hypothesis, there is an internal problem for Waismann with this proposal. For, he says, the case of first person agency does *not* reveal itself as a special case of causation, one where we can see production/necessitation at work. Waismann quotes the famous passage from the *Treatise* where Hume denies that we are able to perceive any connection between ‘an act of volition and a motion of the body’, citing the fact an amputee will find himself trying to use his lost limb. Waismann also quotes passages from Mill and Hamilton to the same effect. But if Waismann, Hume, Mill, and Hamilton are right, then we cannot suppose that we impute productive power to causation in general by extrapolating from the particular case of voluntary action, because even the latter is not a case where we detect productive power.

One might save Waismann's hypothesis by claiming that while we do not perceive any productive power in the case of first person voluntary action, this is nonetheless the case where we first make the error of finding productive (or 'active') power, and then we extrapolate to the other cases. But then Waismann is left with still need to explain why we make the error in the first person case. Perhaps Hume's account in terms of habit may be appealed to here, but we would then ask why that account cannot be applied directly to the case of inanimate objects as explaining the source of our fallaciously seeing active power in objects.

4. PRODUCTION

In introducing the idea of *production*, Ewing points to an asymmetry between cause and effect. Causes produce their effect, but effects do not produce their causes. One might respond by noting that cause and effect are logically asymmetric on the regularity account: if A causes B, then A is always (or usually) followed by B, but the converse does not hold. And this asymmetry might be responsible for the asymmetry found in intuitions concerning production.

Oddly, that asymmetry is not one that Ewing dwells on. For he quotes Russell as declaring that to say C causes E "means simply that C is a set of conditions such that whenever they are all fulfilled E happens and whenever E happens they have all been fulfilled." And goes on himself to say "An alternative formulation that I should prefer would be that E can be analyzed into a set of factors each of which is always, wherever it occurs, preceded by some factor in C." Waismann, on the other hand, is clear that the *logical* regularity in causation is always from cause to effect, not vice versa.

Ewing's point has some force, even if we acknowledge the logical asymmetry. For one could introduce a concept of causality*, such that A causes* B is like A causes B, except that the (universal) logical implication is reverse: instead of 'whenever A, B also' ($\forall x[Ax \rightarrow Bx]$) we have 'whenever B, A also' ($\forall x[Bx \rightarrow Ax]$). So causality* holds between A and B when A is followed by B and B-like events are always *preceded* by A-like events. If the asymmetry of production were the asymmetry of material implication then we would want to say that just as in causality A produces B, in causality* B produces A. But that is clearly not correct, which suggests that the production idea is not related to the asymmetry of material implication.

The other source of asymmetry in the regularity account is the temporal asymmetry, that causes always precede their effects. Could this be the source of whatever intuitive force there is in the production idea? It is difficult to show that it is not, except to observe that temporal precedence on its own doesn't imply anything about production. It does not seem that we say: A produced B because B followed A; rather, B followed A because A produced B. Insofar as there is a temporal asymmetry in causality, that asymmetry is not part of a definition of causality, but rather follows, if at all, from the nature of causality.

Waismann rejects the production idea. Insofar as there is anything to it, it can be regarded as a near synonym for ‘cause’. One might distinguish the notion by relating it to the idea of ‘activity’. But the latter term cannot be understood in the sense that implies volition. Furthermore, empirical investigation does not reveal to us anything like activity or production, just regular succession, as Waismann (2010) holds is shown by the following thought experiment:

Suppose there was a region of the world, say A, in which everything held good that Ewing and other philosophers of the same school tell us—that is, in which the events were “intrinsically” connected with each other, so that the cause “actively produced” the effect; imagine another region of the world B in which the events merely follow each other, without being connected in this way; and imagine that the observable laws are the same in A as in B. What then, I ask, could be the difference between these two regions of the world, as far as their causal structure is concerned? Or how can we tell whether this world of ours is more like the part A or the part B? There is no way in which we can tell; for there is no conceivable observation which is relevant to establishing the existence of such a relation. The two worlds which we have described would appear exactly alike in all respects to any observer: what, then, is the dispute about?

Here Waismann appeals to the verification principle; as he says here “A statement has meaning for us only if it makes some kind of difference to us whether it is true or false”. (In *The Principles of Linguistic Philosophy* (1965, 326) he holds that a verification principle can be used to determine meaninglessness. Ewing rejects this in his paper “Meaninglessness” (1937), where he introduces the now well-known criticism that the verification principle, in a strong formulation, shows itself to be meaningless, or, in a weak formulation, cannot be used to reject metaphysics, as the positivists intend.)⁶ The proposal that “A produces B” has significance that goes beyond “A is regularly followed by B” implies, according to verificationism, that there is some investigation or experience that would distinguish between a case of the former and a case of the latter and so would provide evidence for one or the other. But in this case there is no perceptible difference, and so there cannot be any difference in meaning.

5. NECESSITY

Ewing suggests that while the regularity account takes A causes B to be a matter of A simply being followed by B (and likewise for other A-type events), our common sense idea of causation takes it to be the case that A *must* be followed by B. The force, however, of this *must* is unclear. It is logical or metaphysical necessity? Or is there some other kind of relation between two events that has some kind of modal character that is short of metaphysical necessity?

⁶ Waismann articulates his version of the principle in further detail his (1945) although rejects a natural formulation—‘There is no more to the content of a statement than the total evidence which would warrant its assertion’—suggested and criticized by D. M. Mckinnon (1945).

The idea of necessity, in some form or other, crops up in the preceding three alleged elements of the common sense notion of cause. We considered that (1), intrinsicness, might refer to the fact that the effect is part of the essence of the cause, to which we will return in Section 6. We looked at intrinsicness as referring to the ability of the relation to hold independently of what else exists. But this needs supplementing to do the work Ewing wants it to do, and the natural supplementation, I suggested, was that the existence of the cause entails the existence of the effect. The idea of a cause explaining its effect, as Ewing articulates it, involves a logical or quasi-logical connection. One way to achieve that would be to appeal to the D-N model of explanation (although Waismann would be able to argue that the D-N model makes explanation a logical relation even for the positivist). All these kinds of necessity are metaphysical or stronger.

The idea of production, however, does not of itself suggest metaphysical necessity. Indeed Waismann's challenge it to show how it differs at all from regularity. The fact that we distinguish mere regularity from causal relations suggests that there is indeed a difference between, but does not show whether that difference has a modal character.

It is worth noting that in the contemporary discussions of causation, the distinction is sometimes made between difference-making views of causation and production views of causation. Indeed, Ned Hall (2004) thinks that there are two concepts of causation, a difference-making concept and a production concept. Difference-making views, of which David Lewis's (1973) account is the best known, are those that take 'A causes B' to be founded on the counterfactual relation:

$$\neg A \Box \rightarrow \neg B$$

While the modality of difference-making is clear, the nature of production has not been articulated nearly as clearly. However, a natural alternative is to consider the subjunctive conditional:

$$A \Box \rightarrow B$$

This relationship between A and B we may call *subjunctive sufficiency*. The virtues of the subjunctive account of causation have not been satisfactorily explored. One reason is that since causation is factive ('A causes B' entails 'A exists/occurs' and 'B exists/occurs'), the subjunctive account implies that every fact causes every other fact, under the standard Lewis–Stalnaker interpretation of ' $\Box \rightarrow$ '. However, that is not the only interpretation of ' $\Box \rightarrow$ ', and one can understand the subjunctive relation in a way that drops Lewis's centering requirement:

$$A \wedge B \Rightarrow A \Box \rightarrow B$$

Without the centering requirement we are free to understand ' $\Box \rightarrow$ ' thus:

$$A \Box \rightarrow B \text{ iff in all the nearby worlds where A occurs, B occurs.}$$

Once one does this, as Robert Nozick (1981) does in his account of knowledge, one gets an account of causation that is roughly this:

A causes B iff in all the nearby worlds where A occurs, B occurs.

Whatever deficiencies this view has, it might be held to provide the sense of ‘must’ that Ewing is looking for—while also accounting for the idea of production. It is weaker than the implausibly strong idea that causes entail (i.e. metaphysically necessitate) their effects, but rather stronger than simple regularity.

6. CAUSAL POWERS

In this section I show Ewing’s view might be updated and rendered rather more plausible than he himself presented it, Ewing contrasts the regularity view of laws and causes with a predecessor which he characterizes thus:

The older schools of philosophy almost invariably assumed that the connexion between cause and effect was identical with or closely allied to that between ground and consequent; and from this it would follow that, since everything in the world we know is, directly or indirectly, causally related to everything else, the world was in some marked degree a logically intelligible system and the nature of any one thing taken by itself was incomplete and internally incoherent apart from the system on which it depended. On that view different things by their very essence belong together, and their connexion is capable of a rational explanation deducible *a priori*, if not by our mind, at any rate by a mind which possessed real insight into their nature.

Although Ewing notes that the regularity account is a reaction against certain unjustifiable excesses of this view, such as its tendency to monism, it is clear that it is not far from his own preference. While the reference to ‘ground and consequent’ indicates Kantian views on causality, also notable in this account is the reference to things being connected via their essences and the claim that such connections are in principle knowable by someone who has insight into their natures. While such things were anathema for much of the twentieth century, it is significant that since the 1970s they have become a familiar part of the discourse, thanks to Saul Kripke (1980), Kit Fine (1994), and others. Turning to causation in particular, Mathieu Marion (2010, 14) rightly remarks “One should note that the view here is not completely unrelated with recent views about ‘causal powers’ or ‘capacities’.”⁷ In this section I shall explore Marion’s suggestion. According to such causal powers views, the source of causality and nomicity is to be found in the essential natures of natural properties. Such natures are sometimes said to be dispositional or have the character of capacities. For example, it is part of the essence of the property *charge* that oppositely charged bodies are disposed to exert an attractive force on one another.

⁷ Marion refers to Harré and Madden 1975, which is a minor irony, given that Harré was the editor of Waismann’s best known work, *The Principles of Linguistic Philosophy*. Marion also cites Cartwright (1989), although it is unclear whether Cartwright supplies the modal features that Ewing requires. Developments of this view are found in Shoemaker (1980), Ellis and Lierse (1994), and Bird (2007).

The general form of a causal relation on this view will be as follows. An object **a** will possess some natural property P, which will have a dispositional nature, $D_{S,M}$ —the disposition to yield manifestation M in response to stimulus S; **a** receives stimulus S, activating the disposition; consequently manifestation M occurs. While this may characterize the metaphysics underlying causation, it is a further question whether the *cause* of M should be regarded as **a**'s possessing $D_{S,M}$, or **a**'s receiving stimulus S, or both together. Stephen Mumford prefers the former, while I prefer the latter. Different cases may seem to go in either direction:

- (a) the balloon's being positively charged caused it to stick to the wall

supports the former, whereas

- (b) the striking of the (fragile) glass caused it to break

supports the latter. However, either way we are referring *only* to the objects involved and their properties or the events involving them.

The following features of the view are worth noting:

- (i) It is a matter of essence, and so of necessity, that one property is related to another by causal law.
- (ii) Consequently, the laws of nature are metaphysically necessary.
- (iii) It is possible to identify the necessity that is associated with causation with this necessity.
- (iv) However, that necessity can be reconciled with the idea that causal laws are sometimes *ceteris paribus*.

How well does this view meet Ewing's requirements? And how well does it resist Waismann's criticisms?

Intrinsic connection On the causal power view, it can be the case that causes and effects are intrinsically connected in that the relation need not depend on the existence of further entities. When two charged objects cause one another to accelerate, that can hold independently of what else exists. Of course, that cannot always be the case, for example, when there are causal intermediaries. But in contrast to Waismann's regularity account, what is significant is finding any case of causation that is intrinsic.

Our discussion moved on to a further proposal, that the cause necessitates the existence of the effect. This can be accommodated if one includes both the disposition and the stimulus as components of the cause. Let **a** be part of the essence of P and hence necessary that P involves the disposition $D_{S,M}$ to manifest M in response to stimulus S:

- (I) $\square (Pa \leftrightarrow D_{S,M}a)$

Let us assume for argument's sake that the conditional analysis of dispositions is necessarily correct:

$$(II) \quad \Box D_{S,M}a \leftrightarrow S \Box \rightarrow M$$

From the above follows:

$$(III) \quad \Box ((Pa \wedge S) \rightarrow M)$$

Thus *necessarilys* if **a** has the causal property P and receive stimulus S it will bring about the effect M.

I earlier noted that sometimes ‘intrinsic property’ is used to refer to an essential property. Sometimes the term is used to refer to what is part of something’s nature in contrast to what is an accidental change, as when, for example, it is asked whether people are intrinsically good or bad. Although a thing’s essence and its nature need not be identified, it is a common part of the new essentialism to do so. When he refers to an intrinsic connection, it might well be that Ewing has something like ‘essence’ in mind. In which case (i) immediately supplies that connection as regards the properties involved in the causal relation. That does not mean that it is part of the essence of some particular cause than it does in fact have its particular effect. However, if the cause is an event of fact of the kind (a), which involves the dispositional property itself, then it will be essential to that event/fact that it would have that effect, were certain circumstances also to occur (e.g. in the case of (a), that the balloon is placed in contact with the wall).

Explanation The dispositional explanations (a) and (b) given above are clearly adequate explanations. As we have just seen, the cause, considered as the disposition plus its stimulus necessitate the effect. Furthermore, if, in Ewing’s words, one has insight into the (dispositional) nature of the property P, then one will know the truth of (I), and one can deduce that the effect will occur, as he suggests. That does not make causal relations all apriori, because such insight is not generally available apriori. Waismann is quite right that there is no logical knowledge of causal powers. Waismann concludes that there are two things to which we might apply the term ‘insight’. The first is logical knowledge, and this does not tell us anything about powers. The second is a knowledge of causal chains and process, which may be gained by experiment and observation of correlation, and this is entirely consistent with the regularity theory. Nonetheless, there is arguably a third kind of insight, which is a *conditional* insight into essences. Kripke argues that we know apriori that if water is H₂O, then water is necessarily H₂O. To detach the necessity, we must first have purely empirical knowledge that water is H₂O.

Note, additionally, that although on this account the total cause necessitates the effect (as we saw above), it does so without having to include, implausibly, within the total cause, the law of nature as a distinct component. Of course, laws of nature are present implicitly, since they are reflections (consequences) of the dispositional natures of the natural properties. (Mumford (2004) argues that this view shows that laws of nature may be eliminated.)

Ewing’s view that the regularity account fails to allow for adequate explanation by laws and causes has something to be said for it. Consider a D-N explanation employing the law that As are Bs ($\forall x[Ax \rightarrow Bx]$), to explain why if some particu-

lar object \mathbf{o} is A it is also B ($\mathbf{Ao} \rightarrow \mathbf{Bo}$). The explanandum here is deducible from the law as the D-N model requires, and the law is a regularity, as the regularity theory requires. Now let us accept Wittgenstein's equation of universal generalization with conjunction. In which case the explanans, $\forall x[Ax \rightarrow Bx]$, is equivalent to $\dots [\mathbf{Am} \rightarrow \mathbf{Bm}] \wedge [\mathbf{An} \rightarrow \mathbf{Bn}] \wedge [\mathbf{Ao} \rightarrow \mathbf{Bo}] \wedge [\mathbf{Ap} \rightarrow \mathbf{Bp}] \dots$. Note that the explanandum is one of these conjuncts. However, nothing may explain itself, so the conjunct $[\mathbf{Ao} \rightarrow \mathbf{Bo}]$ doesn't explain the explanandum. But if this conjunct doesn't explain the explanandum concerning \mathbf{o} , how can any of the other conjuncts, which concern other objects, explain that explanandum? Nor, in this case, can we see how these conjuncts working together can explain what they cannot explain individually. So, the conjunction does not explain the explanandum, and so neither does the law with which it is equivalent—according to the regularity theory. Consequently, if the regularity theory is correct, a law cannot explain without violating the requirement that nothing can explain itself.⁸

My discussion of Ewing on explanation started by suggesting that he had in mind something like the assimilation of causation to agency. This aspect is absent from my characterization of the causal powers view. It is not, however, absent from all discussions of the causal powers view. Several philosophers regard dispositions as having something akin to the intentionality of desires and beliefs. This is because a causal power 'points to' its possible manifestation: the fragility of a glass indicates its possible breaking; the positive charge on a proton holds within it the possibility of attraction to a negatively charged object. There are held to be very close to the way in which a desire points to the things that is desired. Thus U. T. Place (1996) reframes Brentano's dictum that intentionality is the mark of the mental to state that intentionality is the mark of the dispositional. Brian Ellis (2002) thinks that 'physical intentionality' of causal powers helps reconcile the manifest and scientific images. David Armstrong (1997) also sees intentionality in powers, and takes this to be a reason to reject their existence. I, on the other hand, do not think that causal powers have anything like intentionality; nor would it be explanatorily helpful if they did (Bird 2007, 114–31). So Waismann was correct, in my view, to reject the agency aspect of Ewing's view of causation. But not because reasons and causes cannot be the same, but because powers, despite superficial appearances, do not have anything like intentionality.

Production If it is part of the essence of charge, as this view holds, that oppositely charged bodies are disposed to attract one another, then it is a small step to arguing that it is the charge on these bodies and their being brought into proximity that produced their attraction to one another. It was part of their pre-existing state that they were disposed so to do, and this was triggered by their being brought together. And clearly this is a conception of production that is not equivalent to regularity.

We saw that Waismann rejected the idea of production because the difference between regularity and production would lead to no observable difference and so

⁸ See Armstrong (1983) for an argument of this kind against the regularity theory of laws, and also Bird (2007).

cannot constitute a real difference at all. One response to this objection would be to reject the verificationism on which this objection rests. Another would be to reject just part of it, the claim that the evidence to distinguish the propositions must be observational in nature. This equation of evidence and observation (or experience or perception) is one of the components of logical empiricism that has lasted the longest. Nonetheless, it too is open to objection. If one sees a sequence of As followed by Bs, one might accept that this is just a coincidence. One might also think that that this arises because A produces B. These are competing, incompatible hypotheses. As the number of As increases, each time followed by a B, then so one shifts one's epistemic preference away from the coincidence hypothesis towards the production hypothesis. Thus a purely coincidental relationship between As and Bs and a productive relationship between As and Bs may predict exactly the same experiences, but they are nonetheless epistemically distinct. Indeed, distinguishing such hypotheses is a common feature of science, and for many kinds of data, can be formalised by significance tests. A significance test estimates how likely it is that a certain statistic (such as the mean value of a measured parameter) comes about purely by chance. If an outcome is significant at the $p=0.05$ level, then the evidence favours the causal hypothesis over the chance hypothesis by a factor of 19 to 1.

This point may be expanded in a way that draws upon Ewing's preceding point about explanation. Why is it that the productive, causal hypothesis is better supported by the evidence of regular succession than the coincidence hypothesis? The simple answer is that the former provides a better explanation of the evidence than the latter. Of course, such explanationist epistemology would be rejected by Waismann and the positivists. Yet it is today very much at the heart of scientific epistemology, challenged only by Bayesian thinking.

Necessity We have seen that the total cause necessitates the effect. Let us now consider the view that only part thereof needs to be regarded as a cause, as in (b) above for example. There the striking is the cause, and the fragility of the glass, though causally relevant, is not itself a cause. Can the cause thus restricted still necessitate its effect? Yes it can, but not in the sense of (III) above.

Above I suggested that a suitable sense of necessity, that would provide some formal content to the notion of 'production' is subjunctive sufficiency. We can see immediately that the causal powers view gives us a relationship of subjunctive sufficiency between cause and effect. Consider a case of an object with some disposition $D_{S,M}$. According to (II) the following is true (but not necessarily true):

$$S \square \rightarrow M$$

which, as we discussed above, suffices to provide an account of necessitation weaker than entailment.

7. CONCLUSION

Waismann is reported to have said, “Poor Causality, to have Ewing for her defender.” It is difficult to not contrast Waismann’s clear and cogent criticisms of Ewing’s views and exposition of the regularity alternative with the vague and impressionistic articulation of the production view presented by Ewing. As far as their exchange is concerned, Waismann may be held to have come out ahead. Nonetheless, it is possible to reconstruct an account of causality that meets many of Ewing’s requirements and which can respond well to Waismann’s criticism.

It is sometimes said that philosophy does not make progress.⁹ Insofar as the Waismann–Ewing debate continues today without a definitive resolution, that opinion appears to be confirmed. At the same time, our understanding of the issues is now so much more sophisticated than it was in the 1930s–40s that it cannot be denied that we now know much better what is involved in adhering to one side of the or other other.

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⁹ See Gerber (1973) for a discussion.

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