CHAPTER 13

ANTI-REDUCTIONISM

John W. Carroll

1. What is Anti-Reductionism?

Philosophers routinely seek a certain sort of analysis of causation. They have sought a completion of

(S) *c* caused *e* if and only if ...

showing what makes causal facts both true and accessible enough for us to have the knowledge of them that we ordinarily take ourselves to have.

Some current approaches to analyzing causation were once resisted. First, analyses that use the counterfactual conditional were viewed with suspicion because philosophers also sought (and still do seek) similar understanding of counterfactual facts. Since the same can be said for the other *nomic* concepts--causation, lawhood, explanation, chance, dispositions, and their conceptual kin--philosophy demonstrated a preference for non-nomic definitions of causation, analytic completions of (S) with no nomic terms in the analysans. Recently, however, philosophers have been less demanding regarding what terms may be used. Attention has been given to analyzing causation in terms of chance, the counterfactual conditional, and lawhood. If we reserve the term ‘causal’ for the terms and concepts that have extremely obvious connections

with causation (i.e., causation itself and its close nomic cousins (e.g., production, bringing about, and explanation)), we can say that, of late, philosophers have only demanded that (S) be completed using solely *non-causal* terms. Second, philosophers once insisted that the completion of (S) be analytic, that it be a definition of the verb, 'to cause'. Recently, however, they have only demanded that the analysis be a necessary truth. Some even hold that, so long as it can be maintained that the causal supervenes on the non-causal, concerns about the truth-makers for and our knowledge of causal facts would have been addressed.

Anti-reductionism is the view that causation cannot be analyzed non-nomically and, further, that causation still resists analysis even when the non-causal, nomic concepts are made available. In other words, the anti-reductionist maintains that there can be no non-causal analysis of causation. Indeed, some anti-reductionists hold that causation does not supervene on the non-causal facts. This chapter is an overview and defense of anti-reductionism. Section 1 is nearly complete. Section 2 locates anti-reductionism relative to some possible companion doctrines. Section 3 recounts the development of anti-reductionism. Arguments in favor of anti-reductionism are advanced in Section 4. Anti-reductionism and its supporting arguments are defended against objections in Section 5, before the chapter concludes in Section 6 with some ruminations about current and future work on causation.

2. Related Doctrines

Reducibility of Higher-Level Causation. The antithesis of anti-reductionism is reductionism, the view that there could be a necessarily true completion of (S) using only non-causal terms in the

analysans. Reductionism, however, needs to be distinguished from a view that goes by that same name or its minor variant *causal reductionism*. (See Chapter 31.) This other view might more revealingly be called *the reducibility of higher-level causation to lower-level causation.* It is the view that the causal claims of all higher-level sciences reduce to the causal claims of fundamental physics.

Singularism. It is standard to contrast single-case causal sentences (e.g., 'Mt. Vesuvius's erupting caused Pompeii's being destroyed') with what are sometimes called *general-case* or *property-level* causal sentences (e.g., 'Smoking causes cancer'). This distinction is important because there frequently is talk of *singularism* accompanying anti-reductionism even though several different doctrines go by that name. For example, it is natural to take singularism to maintain that general-case causal claims are not conceptually prior to single-case causal claims (cf., Cartwright 1989: 91-140; Carroll 1991, Lewis [1973a] 1986: 161-2). Some take singularism to hold that there could be causation in a world devoid of laws of nature and other uniformities (cf. Ducasse [1926] 1993: 129). Menzies (1999, 315) and (Armstrong 2004, 452-3) take singularism to include the view that the causal relation is an intrinsic relation. None of these forms of singularism entail or are entailed by anti-reductionism.

Primitivism. Sometimes anti-reductionism is labeled *primitivism*. That label, however, is better used for the view that causation is primitive. Such a view, unlike anti-reductionism, denies that there are *any* concepts more basic than causation. So, primitivism denies that the nature of causation can be revealed by an analysis of causation in terms of, say, explanation (e.g., Scriven 1975) or the bringing about relation (e.g., Gotshalk 1931). Furthermore, unlike anti-

reductionism, primitivism is bound to have some implications about our acquisition of the concept of causation (maybe that it is innate or arrives perceptually as a Humean impression) or about the epistemology of that concept (maybe that causation is knowable a priori or is directly experienced). Primitivism entails, but is not an entailment of, anti-reductionism.

Experience of Causation. Though it need not be, anti-reductionism is often associated with the view that we have direct perceptual or introspective access to causation. A weak version of this doctrine holds that some causal truths are trivially inferred from observable facts (e.g., Anscombe ([1971] 1981: 137) . For example, someone might see Marvin hit Tommy and thereby know that Marvin hit Tommy. From such knowledge, it could then be inferred that Marvin caused a change to Tommy. But the thesis that we experience causation takes other stronger forms. Some want to hold that there is something like an impression of causation, a causation sensation (e.g., Armstrong 1993). Usually the pertinent kind of experience is claimed either to be an inward sensation associated with the initiation of action or else the tactile sensation of pressure. (For further discussion, see Chapter 22.)

Pluralism, Scientific Essentialism, and Anti-Realism. The present chapter is built on certain (plausible) assumptions. For example, it is assumed that there is a primary sense of ‘to cause’. *Pluralists* (see Chapter 16) argue that there are multiple causal relations, sometimes arguing that none is more central or primary or philosophically important than the others. For a second example, it is assumed that causation is a contingent relation--a cause could exist even if none of its effects existed. *Scientific essentialists* (e.g., Ellis 2002; also see Chapter 12) hold (i) that causation is the manifestation of the powers of objects, and (ii) that, if a cause occurs, its effects

occur as a matter of necessity. For a third example, it is assumed in this chapter that *realism* is true about causation, that there are some causal sentences that purport to, and succeed in, describing reality. Some anti-realists, *the eliminativists* (e.g., Russell 1912-13), hold that these sentences don't succeed in describing the world, and so also hold that, strictly speaking, nothing causes anything else. Others, *the projectivists* (e.g., Blackburn 1990, Price forthcoming) will utter sentences like 'The spark caused the fire', but are anti-realists in virtue of thinking that such utterances will project something about us rather than convey information about the way the world is independent of us.

Ostension, Theoretical Specification, and Theoretical Analysis. It is important to contrast three different ways one might complete (S) in a non-causal fashion, and still not obviously be in conflict with anti-reductionism.

> *Ostension*. Suppose that we sometimes have experiences of causation. Arguably, this would permit an ostensive specification of the causal relation. We could feel pressure from a strong wind, and specify that what we felt was causation. Once the relation was specified, it could be referred to in an analysis without using 'to cause' or any other causal terms. Think of the ostension as introducing a proper name for the causal relation, say 'C'. Then one could give the following analysis: *c* caused *e* if and only if *c* and *e* (in that order) instantiated C. 'C' is not a causal term. If the ostension was successful, if there really was a relation assigned to 'C' and it really was the causal relation, this completion of (S) would be true. Menzies and Price (1993: 194-5) adopt a version of this approach.

Theoretical specification. The specification need not be ostensive. Rather than pointing to the causal relation, the method of theoretical specification tries to pick it out theoretically. Suppose one had put together a theory consisting of some simple plausible claims about causation, claims like that causation is an intrinsic and transitive relation, that often causes stand to effects as means stand to ends, etc. One could specify that causation is the relation that makes the truisms true and then use a name to refer to that relation in the analysis (cf., Menzies 1996: 98-101 and Armstrong 2004: 453-5).

Theoretical Analysis. A third option is to incorporate the theoretical specification right into the completion of (S). One might maintain that *c* caused *e* if and only if *c* and *e* (in that order) instantiate the relation that satisfies the truisms (cf., Tooley 1984, 1987, 1990ab, 2003). This approach could turn out to be only a notational variant of the theoretical-specification approach. Whether it does so depends on how the relation that the specification *actually* picks out compares to the relation that would be picked out *in other possible worlds*. (Remember that analyses are expected to at least be necessary truths.) If the specification picks out the same relation in all possible worlds, then there is no difference of consequence between the two approaches. A rigid designator like the name ‘C’ can’t help but pick out the same relation in all worlds.

Indeed, these *three* reductive approaches might be essentially equivalent to each other and not

interestingly different from anti-reductionism. There would be significant agreement between the three manners of reducing causation if the relation picked out by the ostensive specification is the same relation as the one picked out by the theoretical specification, and the theoretical specification picks out the same relation in all possible worlds. There would be significant agreement with anti-reductionism if, in addition, the relation picked out by the ostension and the theoretical specification was *the very same relation that the anti-reductionist takes to be irreducible*. This potential agreement may explain why Armstrong, Menzies, Tooley, and the anti-reductionists sometimes employ similar arguments. Keep in mind, however, that an actual accord with anti-reductionism depends on the success of the ostensive or theoretical specification. Neither the ostension nor the decision about which of the so-called truisms to include in a theoretical specification is a trivial matter. If it turned out that the preferred attempt at specification picked out *nothing* or picked out the *wrong* relation--say, the is-adjacent-to relation--then all three of these reductive approaches would lose their appeal though anti-reductionism would be unblemished.

3. The Development of Anti-Reductionism

In the late 19th century and early 20th century, there are statements of anti-reductionism recognizable as the precursors to contemporary anti-reductionisms. So, for example, Peterson concludes:

> If now the reader asks me what causation is, I reply that I think it is simple,

> unanalyzable relation, not derived from anything nor resolvable into anything else.... Of course, any man is free to analyze the relation if he can, but it is not likely that any one hereafter will succeed where thinkers so able as Hume and Mill conspicuously failed. (1898: 61)

For a second example, there is Lamprecht. After providing numerous examples supporting 'the empirical status of necessity or compulsion in events' (193), he goes on to say:

> We can state the genus of causality: it is a relation. But we cannot give the essential difference of the causal relation except in some question-begging synonym. We can say that causality is a *necessary* relation between cause and effect, or that it is the character of the process in which one thing *produces* another, or that it is *efficacious* control of one thing over another. These assertions are true; but they are not adequate as formal definitions. They do not advance the discussion one whit; they would not explain causality to any one who did not already know what we were talking about (1929: 193, also see Lamprecht 1930).

Embracing the non-reductive element of his own analysis, Gotshalk points out that '...every formal definition of a term is in the end nothing but this term joined to a set of terms which have a meaning more or less equivalent to the essential meaning of the original' (1931: 475; also see Gotshalk 1930: 241). Broad (1925: 453-6) also shows sympathy to anti-reductionism.

Perhaps due to the influence of positivism, clear and forceful statements of anti-reductionism are hard to find from the mid-1930's until the mid-1960's. But, from the mid-1960's

through the mid-1970's, we find the views of Scriven ('We can explain the relation between causal and non-causal language, but not by showing that one is built out of the other' (1966: 241, also see 239, and 1971: 51)), Taylor ('To say of anything, then, that it was the cause of something else, means simply and solely that it was the cause of the thing in question, and there is absolutely no other conceptually clearer way of putting the matter except by the introduction of near synonyms for causation' (1966: 40)), and Brand ('I shall consider the case of causation and show how in a programmatic way, a non-reductive analysis of causation is required' (1975: 151; also see Brand 1976)). Anscombe endorses anti-reductionism in a paragraph where she defends the observability of causation: '...if we care to imagine languages in which no special causal concepts are represented, then no description of the use of a word in such languages will be able to present it as meaning *cause*' ([1971] 1981: 137). During this period, the arguments for irreducibility began to be more sophisticated. Indeed, all the primary contemporary arguments for anti-reductionism are anticipated during these years (and will be cited when they are presented in Section 4). Nevertheless, there was little development of the views beyond the rejection of extant analyses. There was also little reaction from the reductionist community.

So, who are the contemporary anti-reductionists? Woodward (1990ab, 1994, 2003) and Carroll (1994, forthcoming) are examples. Their positions are in the spirit of Scriven, Taylor, Anscombe, and Brand in that there is not the appearance of providing a reduction. Like these earlier advocates, Woodward and Carroll present counterexamples to extant Humean/regularity analyses. But, more in line with reductionists like Tooley and Armstrong, they explicitly and emphatically challenge supervenience. Woodward (1990a: 554, 557-9) and Carroll (1994: 161-81; forthcoming) distance themselves from Tooley and Armstrong by making clear their disagreement regarding the need for a reductive analysis of nomic facts. Neither Woodward nor

Carroll is out to reveal the reductive truth-makers for causal facts.

4. Arguments for Anti-Reductionism

4.1. Reductive Failures

A primary motivation for anti-reductionism is the repeated failures of reductive analyses, and rightfully so. That no successful non-causal analysis of causation exists ought to lead us to consider the possibility that there cannot be one. Many chapters of this handbook chronicle the attempted analyses and why they fail.

4.2 The Sparse Base

Consider perception. Though it is not counted as a causal concept, it has something to do with causation. The same goes for notions like action, reference, and persistence. We might say that they are non-causal concepts that nevertheless do have *causal commitments*. The range of concepts with causal commitments is impressive: Nothing is a table unless it has a disposition to cause objects not to fall from its surface. Some have thought that colors are some sort of disposition to produce certain visual appearances. We have reasoned only if a judgment is caused by other of our mental states. For something to be material it must be impenetrable, it must be disposed to cause a sufficiently wide range of objects that may collide with it to be stopped without penetrating it.

From a reductionist perspective, because all these concepts do have causal commitments, they are ill-suited to provide a legitimizing analysis of causation. So, from this perspective, all the concepts with a causal commitment should be off-limits. But are there any concepts free of causal commitment? Arguably, there are. The truth-functional concepts, standard mathematical concepts (e.g., being prime), and logical necessity are examples. It may be that spatial and temporal relations lack causal commitment. (See Chapter 20.) This is more controversial because many are tempted to analyze temporal relations in causal terms. In any case, what is important to notice is that, even if we are generous by placing spatiotemporal relations in the class of concepts lacking causal commitment, this class still is quite barren.

This is a serious problem for reductionism (cf., Scriven 1966: 240-1, Carroll 1994: 3-13). On the one hand, it is the distinction between the concepts with causal commitments and those without, not the causal/non-causal or the nomic/non-nomic distinction, that is metaphysically significant. By the lights of the reductionist, only an analysis of causation that uses solely terms free of causal commitment should be acceptable. On the other hand, restrictions on the available vocabulary decrease the likelihood of success. Here, where we should be forced to restrict the vocabulary to terms free of causal commitment, it looks as if the likelihood of success is minuscule. The class of concepts that is truly autonomous, even if it is non-empty, is not rich enough to permit the desired analysis.

4.3 Directionality of Causation

Since Russell (1912-1913: 13-14), philosophers have wondered what supplies the directionality that is evidently crucial to causation. Except in some special cases, causes precede their effects

in time. For this same range of cases, causation is also an asymmetric relation. Russell believed that our world was deterministic, that the complete state of our world at any one time together with the laws of nature determined its state at all earlier times and at all later times. So, though he allowed that the laws of nature might account for a connection between two events, Russell thought there was nothing that could determine which of the two was the cause and which was the effect. Advances in physics question whether our universe is deterministic. But, as far as the question of reducibility is concerned, that does not matter. In order to succeed, an analysis needs to be necessarily true. So, the mere possibility of a deterministic world raises just as serious issues about the viability of a non-causal analysis.

It is tempting for the reductionist to put forward that time provides the requisite directionality by building into an analysis that *c* caused *e* only if the time of *c* is earlier than the time of *e*. Tooley (2003: 398) and others reject this move (and other temporal restrictions on causation) because it would compel one to be an anti-reductionist about time; with causation analyzed in terms of time, there would then be no non-circular way of reducing directionality of time using only non-temporal terms. Another serious problem with this move is that it would rule out plausible cases of simultaneous causation: Suppose there is a perfectly rigid seesaw--when one end of the bar moves up or down, the other end moves in the opposite direction. You push down on one side. Then, it seems that your side simultaneously caused the other side to go up. The reductionist does no better by instead building into the analysis only that the time of *c* is not after the time of *e*. This weaker restriction does correctly say that the side you pushed down caused the other side to rise, but that is not enough. It incorrectly allows that the other side's going up caused your side to go down (cf., Taylor 1966: 35-40; von Wright 1971, 74-75; [1973] 1993: 118; and 1974: 63-68; Carroll 1994: 141-7).

It is no objection to the seesaw example to point out that a perfectly rigid seesaw is physically impossible. It surely is: That there is a perfectly rigid seesaw contradicts that no signals travel faster than light. But all that really matters is that the seesaw case be possible. Also keep in mind that physicists take seriously the possibility of backwards-directed time-travel and the accompanying backwards-directed causation. It is taken as established that there are solutions to the equations of general relativity that include this sort of time-travel. (See Gott 2001, 76-130.) Any temporal restriction on causation denying that an effect may precede one of its causes would be seriously at odds with this important aspect of theoretical physics.

4.4. Deterministic Causation: Focus on Preemption

Many anti-reductionists have cited cases of causation under determinism that make trouble for Humean analyses. Among these, epiphenomena cases have played a central role. The basic problem all of these cases present is that analyses are prone to count as cause and effect two events that, in fact, only share a common cause. (See Scriven 1966: 259 and Carroll 1994: 127-34.) In recent discussions of deterministic causation, however, preemption cases have garnered tremendous attention. It is a good time to advance a new argument for anti-reductionism that builds on a preemption case.

> The starting point will be one of Schaffer's (2000b) cases of *trumping preemption*: It is a law of magic that the first spell cast on a given day match the enchantment that midnight. Suppose that at noon Merlin casts a spell (the first of the day) to turn the prince into a frog, that at 6:00 pm Morgana casts a spell (the only other

> that day) to turn the prince into a frog, and at midnight the prince becomes a frog (Schaffer 2000b: 165; also see McDermott 1995: 530, Menzies 1996: 95, and Ehring 1997: 21-31).

A simple counterfactual analysis holding that *c* caused *e* if and only if *e* wouldn't have occurred if *c* hadn't occurred has the mistaken consequence that Merlin's casting the spell did not turn the prince into a frog. The standard way for counterfactual theories to try to sidestep problems with preemption--an appeal to the intermediate chain of events--does not help with this case. The sticking point is that there is no intermediate event between Merlin's spell and the enchantment--the spell acts directly.[1] The problems presented by preemption cases extend in a straightforward way to many other kinds of reductive analysis. These kinds of cases are the basis for Ehring's (1997: 18-49) rejection of a wide range of reductive analyses of causation.

Schaffer's case appears to leave a little room for the reductionist to maneuver. There are differences in the non-causal facts that seem to determine that it is Merlin's spell that is the cause. The seemingly pertinent non-causal facts are that Merlin's spell was the first spell cast that day, Morgana's spell was not the first cast that day, and that it is a law that the first spell cast on any given day matches the enchantment that midnight. But do these differences really determine the causal facts? That is not clear: There is nothing causal about Schaffer's law of magic; that law does not say that the first spell cast on a given day *causes* the enchantment at midnight--it only says that the first spell *matches* the enchantment at midnight. This observation

[1]Scriven (1966) invokes preemption cases in his defense of anti-reductionism. About an appeal to intermediate links, he says, 'This test does not apply where no such links are known, and since it is not logically necessary that there be any ... the test is not part of the meaning, of course' (1966: 259-60).

is no objection to Schaffer's example. As Schaffer tells the story, we naturally assume that it is a law that (only) the first spell cast on a given day causes the enchantment at midnight. Nothing seems problematic about that natural assumption. So, we correctly conclude that Merlin turned the prince into a frog. The point of the observation is that philosophers have failed to recognize just how powerful the example is. Yes, it could be a law that only the *first* spell cast on a given day causes the enchantment at midnight. That is consistent and a natural thing to assume given Schaffer's description of the example. But, it is also consistent with Schaffer's description that instead it be a causal law that only the *last* spell cast causes the enchantment at midnight. Nature might work on a principal of least effort: Why use the spell requiring the action from the greater temporal distance when a closer one is available? If this were the case, then what we should conclude is that it was Morgana's spell, not Merlin's, that turned the prince into a frog. There is nothing more suspicious about this alternate way of filling in the details than the way that Schaffer actually had in mind.

The difference between the possible world in which Morgana's spell did the trick and the one in which Merlin's spell did the trick is a difference in the *causal* laws. What we have here is our first underdetermination example, two possible worlds that agree on their non-causal facts but disagree about what causes what. Given only the non-causal facts of Schaffer's case, it surely could be that Merlin did the trick. But, if one is prepared to accept this judgment, it seems that one should also be prepared to accept that, given only the non-causal facts of Schaffer's original case, it could also be that it was Morgana who did the trick. The anti-reductionist will be happy to employ trumping-style preemption cases as Schaffer, Ehring, and others do against counterfactual and other reductive analyses of causation. But the anti-reductionist should take the next step by concluding that causation does not supervene on the non-causal facts.

4.5 Indeterministic Causation

Schaffer has another useful magical example, one involving chance:

> Imagine that Merlin casts a spell with a .5 chance of turning the king and prince into frogs, that Morgana casts a spell with a (probabilistically independent) .5 chance of turning the prince and queen into frogs, and that the king and prince, but not the queen, then turn into frogs (2000a: 40).

This is labeled a case of overlapping because the effects intended by Morgana and Merlin overlap--the sorceress and the sorcerer are both trying to turn the prince into a frog. The overlap is partial, though. Through her single spell, Morgana wants to also turn the queen into a frog; while through his single spell, Merlin also means to turn the king into a frog. It is assumed that, when they work, spells work directly, not through any intermediate events.

The causal facts about this case seem to be pretty straightforward. Since it was the king and the prince, and not the queen and prince, that became amphibians, it was Merlin's spell that was effective; Merlin, not Morgana, caused the prince to be a frog. But, these facts cut to the heart of the standard ways of dealing with probabilistic causation. If we consider a simple conditional-probabilities account, we will pick up on the fact that Morgana's spell raises the probability that the prince meets the amphibious fate. If we consider a simple counterfactual probabilistic account, what will be relevant is the fact that, if Morgana had not cast her spell, then the chance that the prince would become a frog would have been significantly less than it

actually was. These analyses get the case wrong; they say Morgana's spell was effective.

Matters can be taken one step further. Suppose Merlin and Morgana both cast spells with a fifty-fifty chance of turning the prince into a frog. Neither is concerned with anyone else; they are both just after the prince. Like the previous case, this case involves overlapping; it is just that now the overlap is complete. What happens is that the prince turns into a frog (Schaffer 2000a: 45). Did Morgana turn the prince into a frog? Or was it Merlin? There seem to be at least two possibilities. The first is that Merlin did and that Morgana did not. The second is that Morgana did and Merlin did not. Nothing non-causal about the situation determines which is the case. The case is structurally similar to cases endorsed by Scriven (1971: 62-64), Mackie (1974: 42-43), Foster (1979: 169-70), Armstrong 1983: 133, 1997: 203), Tooley (1984: 108-10, 1987: 199-202; 1990a: 274-8; 1990b: 225-8), Woodward (1990b: 214-6) and Carroll (1994: 137-8).

One more, devilishly simple, underdetermination case: Suppose that there is an event, *k*, that immediately follows an event, *j*. Events like *k* have a certain small probability of occurring at any time or place. There need not be any event or set of conditions that precedes the occurrence of this type of event; sometimes they just happen. *k*-type events do, however, tend to pop up more often just after a *j*-type event occurs. Remember there are lots and lots of *k*-type events that occur nowhere near any *j*-type events. Indeed, most of the *k*-type events occur without any connection to a *j*-type event. Still, in a high percentage of the cases, when a *j*-type event occurs a *k*-type event occurs immediately thereafter. (See Tooley 1990a: 278-9, 1990b: 229-30, 2003: 401-3; Woodward 1990b: 217; Carroll 1994: 140; and Armstrong 1999: 178-9, [2001] 2004: 449-50.) As already noted, what happens in our case is that *j* occurs and *k* occurs immediately thereafter. Question: Did *j* cause *k*? There are two possibilities. The first is that *j* did cause *k* and the second is that *j* had nothing to do with *k*--that *k* occurred uncaused as *k*-type

events often do.

These cases are a serious challenge to the possibility of analyzing causation. In the partial overlap case, there was the fact that the king turned into a frog that made it clear that it was Merlin's spell, not Morgana's, that was effective. The presence of that fact gives some hope to those who want to reduce causation. There is at least a symptom indicating that there might be some underlying truth-maker for the causal facts. The complete overlap case offers no hope at all, and neither does the subsequent case with an event that had a chance of being uncaused. With the sorcerers, there are no non-causal facts that determine whether Merlin was the cause. With *j* and *k*, there are none that determine whether *j* caused *k*.

5. Reactions to the Arguments

5.1 Anti-Reductionism is Uninformative

Ehring has this to say about causation and non-supervenience:

> One positive reason to reject, or at least not to quickly embrace, nonsupervenience is its relative lack of informativeness. Reductionist programs, if successful, are more philosophically enlightening. With reductionist accounts, we gain philosophical understanding into the nature of causation and its link with other important aspects of the world. Nonsupervenience cannot offer this. Hence, unless there are fairly strong arguments for nonsupervenience, we ought to pursue

a reductionist program (1997: 62).

The point of analysis is to provide illumination about causation. Ehring finds anti-reductionism disappointing in what it can do toward attaining this goal.

This concern, however, is mistaken in presupposing that the ways in which anti-reductionism is uninformative do anything to establish a presumption in favor of reductionism. The anti-reductionist denies that there is any interesting answer to the question of how causes bring about their effects in suitably basic interactions (cf., Broad 1925: 453-4). But failure to answer that question cannot count against the anti-reductionist and in favor of the reductionist without begging the question. As the anti-reductionist sees it, the reductionist commits as serious a transgression by providing an answer to a question that does not have one. Furthermore, this reaction to the anti-reductionist's arguments underestimates the explanatory value of anti-reductionism. Indeed it does so in two ways. First, establishing anti-reductionism is itself to reveal something informative about causation. Second, there are analyses available to anti-reductionists that provide additional illumination. Analyses of causation in causal terms need not be trivial; they can make substantive and informative claims. (See Woodward 2003: 20-22.)

The bit of truth in this concern about uninformativeness rests in the fact that, unlike many reductionists, anti-reductionists have no built-in story to tell about certain paradoxical or puzzling features of causation. As will be discussed in Section 6, there are some puzzling issues about causation that really do cry out for attention. For example, there is the issue of whether causation is transitive. Paradoxically, there is reason to think it is transitive and reason to think it is not. Often, by endorsing a particular analysis, philosophers commit themselves to a position on the transitivity of the causal relation or on another puzzling issue. Since the thesis of anti-

reductionism itself does not commit one even indirectly to any position about what the causal relation is like, that thesis is silent on the puzzling issues. Especially insofar as the issues generate paradoxes, something more needs to be said about them by the anti-reductionist, especially if the anti-reductionist hopes to remain a realist about causation.

5.2 Anti-Reductionism Courts Skepticism

This concern is that we must lack causal knowledge we ordinarily presume ourselves to have if there is no non-causal analysis of causation. The idea is that, since causation is not directly experienced, without a non-causal analysis there is no way we could have that knowledge. The lack of an analysis, or worse the failure of causation to supervene on the non-causal, blocks any inferential path to the causal knowledge.

Though a full response to this concern is not possible here, it is clear that anti-reductionism is not at stake. The demand for either direct access to causation or an analysis in experiential terms is a dangerous one. Berkeley's route to idealism about material objects, a view few take seriously, is the prime example of the trouble such reasoning brings. In this regard, it is helpful to keep in mind the similarities between our knowledge of material objects and our knowledge of causation. It is plausible that certain causal facts and certain facts with causal commitments are directly observable, at least in the weak sense described in Section 2. In this, causal facts are no different from facts about material objects and events. And, of course, this way of attaining causal knowledge is open to skeptical attacks. But, in this regard, causal knowledge is no different from any of our other knowledge. There are skeptical arguments that seem to show we do not know much of *anything*; evil demon and other relevant-alternative

arguments are the most frustrating of the bunch. As important as skeptical reasoning is for philosophical investigation, it is doubtful that it could have any distinctive consequences about causation, since it is as compelling about material objects, events, and many concepts as it is about causation.

5.3 The Crucial Intuitions are Feeble and Foggy

Reductionists will acknowledge that the argument from sparseness (Section 4.2) and the argument from directionality (Section 4.3) are serious issues, though they still believe that a reductive analysis is possible--they insist that the non-causal base is rich enough to account for the directionality and the other features of causation. They can take this stance because the sparseness and directionality arguments do not deductively establish the anti-reductive conclusion.

The underdetermination examples from Sections 4.4 and 4.5 are a different matter. If the possible worlds described really are possible, then anti-reductionism follows validly. What have reductionists had to say about these kinds of examples? Not as much as one might expect, but they have found the intuitions behind the cases to be sufficiently weak to warrant taking the issue to be a "don't-care question" (Woodward 2003: 383n):

> The suggestion I want to make is that to the extent that commonsense causal judgments are unclear, equivocal, or disputed, it is better to focus directly on the patterns of counterfactual dependence that lie behind them--the patterns of counterfactual dependence are, as it were, the "objective core" that lies behind our

> particular causal judgments, and it is such patterns that are the real objects of scientific and practical interest (2003: 85).[2]

Nevertheless, the don't-care attitude is not warranted. The pre-theoretical intuitions are decidedly strong and clear. What is unclear is how the pre-theoretical intuitions are to be accommodated theoretically within favored analyses, and it is this that leads reductionists to contend that the intuitions are inconsequential. At the very least, the anti-reductionist is owed an account of why the intuitions arise if they are not accurate.

Schaffer has recently taken the cases seriously. That is not surprising given the similarity of the underdetermination examples to his own partial overlap and trumping cases, and his desire to maintain supervenience. Schaffer recognizes the intuitions, but reports having strong countervailing intuitions that causal facts cannot float free. He also says what he thinks is really going on causally in a minor variation of the complete overlap case, one where it is clear that Merlin and Morgana did not both transform the prince:

> In such a case, I would answer that one of the spells caused the prince to transform, though it is ontologically indeterminate as to which. In some cases, there simply is no fact of the matter (forthcoming).

(Also see Hitchcock 2004: 406-8.) Schaffer then offers an explanation of the intuitions that the

[2]Woodward tentatively recommends taking this attitude toward trumping preemption. He does not even tentatively recommend it be taken toward any of his underdetermination cases. Nevertheless, the quotation voices well the kind of attitude many philosophers have taken toward the underdetermination examples.

anti-reductionist wants to take at face-value.

> The reductionist can offer an intuitively plausible account of why the intuitions of distinct possibilities arise, via the conceptual error of *reification*. Reification occurs when a concept of a thing is mistaken for a thing itself. Our causal vocabulary allows us ... different modes of description, and this leaves us prone to reifying these descriptive differences, confusing them with ontological differences (forthcoming).

We can *say* that Merlin caused the transformation and Morgana did not. We can *say* that Morgana caused the transformation and Merlin did not. But, Schaffer claims, our ability to report (and conceptualize) in this way mistakenly leads us to think that there are genuine possibilities corresponding to those differences, that there could be something in nature that makes exactly one of these two conjunctive causal statements true.

Despite what Schaffer says, it is the can't-float-free intuition that has an easy explanation. It stems from the ubiquity of the reductive stance throughout contemporary analytic philosophy (and a possible reification of causation as an entity--see Section 5.4). Also, Schaffer's intuition is what we might call a theoretical or higher-order intuition; it is not as straightforward as an intuition about the application of an ordinary concept to a hypothetical case. Other things being equal, we should trust the latter sort of judgments much more than we do the former. Furthermore, the anti-reductionist is likely to have his/her own higher-order intuitions about the applicability of our concepts--that a world could not be such that one of the two spells caused the transformation though it is not true that the first one did and it is also not

true that the second one did.

5.4 Anti-Reductionism is Ontologically Extravagant

There is something else behind Schaffer's can't-float-free intuition and the subsequent conflict with the anti-reductionist intuitions. He says:

> even if there is some residual intuitiveness to the argument from causal differences, surely it is not sufficiently powerful to overturn *the push for an economical ... theory.* After all, such a highly questionable intuition hardly seems sufficient to generate the sort of necessity needed to blunt Occam's Razor (forthcoming).

Lewis says something similar about an overlap case and 'a metaphysical burden quite out of proportion to its intuitive appeal' (1986: 180). The worry is that if there really is something about the world that determines whether it was Merlin or Morgana that caused the transformation, then the world has some mighty funny things in it: hidden features that we otherwise had no reason to posit. The idea is that we can avoid the ontological commitment merely by ignoring the intuitive judgments and adopting a different stance on the underdetermination cases. Here it is ontological concern that drives the reductionist.

The anti-reductionist, however, is not committed to a mysterious ontology. The ontology of causation is independent of the issue of the supervenience and analyzability of causation. Reification is a reductionist mistake. That the eruption of Mt. Vesuvius caused the destruction of

Pompeii, that Marvin hit Tommy, and that Merlin turned the prince into a frog, prima facie, bring no ontological commitment to anything beyond the eruption, the destruction, Marvin, Tommy, Merlin, the prince, and a frog. All these facts commit us to are events and objects, not anything anyone should be worried about. Even truths expressed by fact-causation sentences and states-of-affairs-causation sentences present no problem. These sentences can be rendered ontologically innocuous: 'That Merlin cast his spell caused the prince to turn into a frog' only says 'The prince turned into a frog because Merlin cast his spell'. 'Vesuvious's erupting caused Pompeii's being destroyed' only says 'Pompeii was destroyed because Vesuvius erupted'. So, prima facie, ontologically speaking, we are only committed to Merlin, the prince, a frog, a spell, Vesuvius, and Pompeii. An austere anti-reductionism is not a non-starter.[3] More importantly, even if it were, there is certainly nothing about the anti-reductionist's intuitive judgments *regarding the underdetermination examples* that is ontologically reckless. Any arguments showing that causal facts commit us to something over and above objects and events would surely in the first instance show that we are committed to the added ontology by the more ordinary cases of causation just mentioned. How could Merlin's causing the prince to turn into a frog commit us ontologically to something besides Merlin, the prince, and a frog, and Vesuvius's causing Pompeii to be destroyed not commit us to something besides Vesuvius and Pompeii?

[3]Is this too quick? Doesn't the fact that Vesuvius caused the destruction commit us to Vesuvius, the destruction, *and the causal relation between them*? No, it doesn't. Predications do not commit us to the existence of any properties or relations so long as we resist the urge to give some fully general analysis of predication. (The same goes for our use of sentential connectives like 'because', 'before', 'and', ...) For the judicious metaphysician, it is the singular terms and the quantifications that are the threat to overpopulate an ontology. See Quine (1948); also see Devitt (1980).

6. Conclusion

There have emerged in the recent literature numerous interesting issues about causation that transcend reductionism versus anti-reductionism.

The best example of such an issue is the matter of the transitivity of causation. Is causation transitive? It is natural to assume that it is: Causation is making happen. How can an event make another event happen and that second event make a third event happen and it not be that the first also made the third happen? Isn't it bound to be true that the first event made the third event happen by making the second event happen? But there are also examples that suggest the opposite: Suppose Sally places a bomb outside Ralph's door and lights the fuse. Once Sally leaves, Melissa happens to arrive at Ralph's place. Seeing the bomb and being a friend of Ralph's, she defuses the bomb, rendering it harmless. It seems that Sally's placing the bomb in front of Ralph's door caused Melissa to defuse it. It also seems that Melissa's defusing the bomb caused Ralph not to be killed. But, it seems false that Sally's placing the bomb caused Ralph not to be killed. Transitivity is hardly the only example. Other issues that are transcendent in the same way include overdetermination, the difference between causes and conditions, the efficacy of omissions, and also the features of the language we use to express causal truths.

The prominence of these transcendent issues bodes well. More and more, philosophers are not digging in their heels defending their favorite reductive analysis, holding whatever convenient position will facilitate their defense. Rather they are, somewhat independently of any specific analysis, revisiting these fundamental issues in an open-minded and provocative manner. The questions are not: What is wrong with this analysis? Is there any way of revising

the analysis to avoid the problem? Instead the questions are: Is causation transitive? What causes what in cases of overdetermination? Are conditions causes? Do omissions have effects? Is there something about how the verb 'to cause' works in our language that sheds light on these puzzling issues? The preceding questions are all engaging and important. As was mentioned in Section 5.2, since the thesis of anti-reductionism itself does not commit one to any particular views on these matters, and especially since some of the issues may generate paradoxes, these questions may be crucial for the anti-reductionist. Fortunately, the anti-reductionist is also in a good position to address them, not having biases stemming from some favored (and evidently false!) non-causal analysis of causation.[4]

[4]Thank you to David Armstrong, Helen Beebee, John Heil, Doug Jesseph, Jeff Kasser, Ann Rives, David Robb, Jonathan Schaffer, and Barry Ward for helpful conversations as this chapter was being prepared.

Suggested Reading

The place to begin a study of anti-reductionism is with Woodward 1990b. Additional arguments in support of the view can be found in Carroll 1994. Though they include sophisticated sorts of reductions of causation, the views of Armstrong and Tooley were central to the most recent development of anti-reductionism. Armstrong's (2004) and Tooley's (1990b) are nicely refined presentations of their views. Scriven (1971) is an underappreciated gem of a paper. Schaffer (forthcoming) provides the most interesting critical discussion to date of the underdetermination examples.

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