A fundamental problem of causation (with no solution)[i]

Among many other things, Peter Gärdenfors has attempted to explore the nature of causal beliefs. The idea in *Knowledge in Flux* is that - by looking at the contraction with respect to the cause of the given epistemic state - we can apply the simple criterion that the occurrence of *C* raises the probability of the occurrence of *E*.[2] Gärdenfors's analysis is thus rooted in a tradition governed by the idea that causation is to be understood in terms of causes and effects. Within this tradition one problem is to determine the nature of the relation between cause and effect, and to identify the relata of causation is thought to be another fundamental problem of causation. In this paper we discuss a cluster of problems with the cause-effect view.[3] Combining some classical arguments lead us to the conclusion that we should give up thinking of causation in the traditional way. As a result some other persistent problems of causation seem to dissolve. The conclusions we draw are negative and we will not present a constructive alternative to the traditional theories. However, to see clearly what cannot be done provides a solid basis of future theoretical developments.

OBJECTS, EVENTS, OR FACTS?

Sometimes causation links billiard-balls. We agree with David Hume: "This is as perfect an instance of cause and effect as any which we know, either by sensation or reflection."[4]

Billiard-balls are objects. People are objects too. And there is a myriad of other objects that can serve as the relata of causation: matches, cars, spades, cameras, stones, trees, electrons…

But are objects the only relata of causation?[5] If they are, there have to be a lot more of them than we first apprehend. A man falls because he stumbles. Which are the causally related objects? Understood as a relation, causation requires *at least* two objects. But here we only seem to have one - the man. Our stock of objects needs to be expanded with the man's fall and his stumbling. These "objects" are events, not things.

There are differences between "ordinary" objects and events. They are both particulars, but not of the same sort. A battle is an event, a helmet is an object. (Objects are often given names, and are sometimes burnished; events are seldom named, and are polished only in a metaphorical sense.) Causation understood as a link between objects requires events.[6]

It would be a mistake, however, to conclude that events can provide for all causation between objects. For instance, Hume had the idea that causation was the source of the "relations of interest and duty, by which men influence each other in society, and are plac'd in the ties of government and subordination."[7] What interests us is his observation that objects can be causally related not only when one actually affects the other, but also when it has that power.[8] (A merely possible scenario is very important for many social relations.) Powers that are not exercised, or dispositions that are not manifested, can easily inhere in objects, such as the head of a certain department, but can they also be properties of events, such as a man's fall? It seems that events manifest their properties while objects need not.

Moreover, there is a strong argument showing that events cannot function as the primary relata of causation. To use one of Hugh Mellor's pregnant examples:[9] Don manages to hang on when his rope breaks, and so does not die, because he does not fall. This looks as causal as when (a week later) Don dies because he falls. The problem for the event-causation view obviously is that while "Don does not die because he does not fall" reports an instance of causation, it also seems to assert that the non-existence of one event is produced by the non-existence of another. Note that this argument is also

effective against object-causation. In fact it can be used to throw out most types of particulars as the relata of causation. Of course, it may be assumed that there is a "hidden" chain of events involved in this case.[10] Sometimes there are such hidden chains and sometimes there is not. Here we assume that there is none. Perhaps we are wrong about this. There might be a perfectly good description of this process in terms of existing events. In that case the example is badly chosen. Nonetheless it would serve its most important purpose, namely to show that we are as happy to use "negative" and "positive" causal reports. Both *look* exactly similar. To rely on the idea that they mean radically different things seems simply misguided.

The battle we sketch is one where the choice of relata is central to the construction of a theory of causation; and where the multiplicity of causally related phenomena sets a level of acceptability. Given that "Don does not die because he does not fall" is as causal a report as "The second billiard-ball moved because the first ball hit it," neither events nor objects can do the trick. What then can the relata of causation be?

Don does not die because he does not fall. In other words, the fact that Don survives is caused by the fact that he manages to hang on. However, a week later poor Don dies because he falls, i.e., the fact that he does not survive is caused by the fact that he does not manage to hang on when the rope breaks. Are facts what we are looking for? Are they the relata of causation? While neither Hume's objects nor Davidson's events[11] handle the difficulty with "negative" causal reports, the fact-view apparently does.[12]

So far so good. But unfortunately not good enough. There is reason to closely examine this argument in favour of the fact-view. Part of the idea behind it is easy to accept. We agree that "Don does not die, because he does not fall" is a causal report. For instance, to prevent or hinder something frequently involves as hard work as producing it. Now, Ramsey's classical argument against "complex universals"[13] shows that negative properties do not exist, and hence that a property-view[14] cannot handle this kind of report. In

short: If there were complex properties (negative, disjunctive, conjunctive) like ...Rb and aR... then instead of one fact, aRb, we would have three: aRb, a(Rb) and (aR)b. But this would be an absurd position, so there is only aRb. That is, there are no complex properties. Now, why aRb rather than one of the others? Ramsey does not explicitly say, but the answer is found in the consequences of the alternatives. Regardless of which alternative we settle for similar problems emerge. If the choice is any of ...Rb or aR..., it has to be assumed (i) that R, the relation, does not exist (to rule out aRb) and (ii) that only one of aR and Rb exists (to stop the two facts (aR)b and a(Rb) from existing). With the admission of negative properties follows inability to handle causal relations involving non-negative properties, etc.[15] And unless there exist "negative" events, an event-view will not do any better.

One reason why - exactly when there is no fall of Don - there can be no non-death of Don making "Don does not die" true follows from one of Mellor's Ramsey-inspired arguments. Let us suppose there is: The reason why "Don does not die" is true is that there is a suitably located non-death of Don. Now, it is an obvious and undeniable fact that "Don does not die" entails both "Don does not die painlessly" and "Don does not die painfully." How can those who believe in negative particulars explain this fact? It seems that to explain why the entailment holds, the non-death of Don, postulated to account for the truth of "Don does not die,"has to be both painful and painless. But it cannot be both and so cannot exist in the first place.[16]

But does this really point in favour of the fact-view? Let us imitate the argument, and apply it to the fact-view. "Don does not die, because he does not fall" entails that it is a fact that Don does not die, and that it is a fact that he does not fall, i.e., the existence of two "negative" facts is required. Can there be such facts?

There is an ambiguity of the word 'fact' that may mislead us into thinking so. On the one hand, for every truth there is a paralleling fact. If it is true that it is not sunny, then it is a fact that it is not. To tell the truth is to stick

to the facts. On the other hand, a fact is supposed to *fix* which sentences are true and false. Whether or not 'It is not sunny' is true depends (among many other things) on whether it is cloudy or not. To speak of facts in the first sense is metaphysically harmless but is sufficient for most practical purposes. To speak of facts in the second sense is practically cumbersome but of ontological significance. Let us follow Mellor[17] and reserve 'fact' for the first sense, and 'FACT' for the second.[18]

Let us assume that "Don does not fall" is true. Since this sentence is true, it is a fact that Don does not die. In this sense of 'fact,' negative facts do exist. Whether there is something for causation to relate in this case, is of course not settled thereby; that question demands an answer concerning the FACT, and in some cases there is no such: What fixes that "Don does not die" is true, may simply be that the FACT that Don dies does *not* exist.[19]

Some might nevertheless persist: We have not actually proved that there are no "negative" FACTS, only that we can manage without them. Could there not be a "negative" FACT, existing precisely when the "positive" one does not? Well, let us assume there is, and furthermore that - since Don is alive and well after his first adventure - "Don does not die" is true in the evening of July 6th,1998. Again we mimic the argument against "negative" events: Since the original sentence entails both "Don does not die because he smokes in bed between 16.15 and 16.30 (July 6th, 1998)," and "Don does not die because he drinks whisky in his living-room between 15.00 and 16.10 (July 6th, 1998)," this negative fact would seemingly have the most diverse causes. But it has not, so it does not exist.

There is another ambiguity involved in this argument that might make the parallel to the event-argument less clear. The sentence (S) "Don does not die because he drinks whisky in his living-room between 15.00 and 16.10 (July 6th, 1998)" can be understood in two ways:

1. Don does not die, which is because he drinks whisky [Perhaps the beer is

poisoned]

2. It is not the case that (Don dies because he drinks whisky)

Now, "Don does not die" entails 2 but does not entail 1. And 2 does not assert any causal statement - it denies the truth of one. So it looks as if we cannot establish the multitude of causes-scenario that the rejection of negative facts builds on. To get that we need 1. The reason why we think that 1 is what we actually get depends on the assumption about the negative fact that makes "Don does not die" true in the first place. If there is such a fact, we cannot see that 2 is a consistent interpretation of (S). 2 is entailed by (~P) "Don does not die" only if the negation sign is detachable from P, but how can it be if ~P is a self-standing fact? Still (S) is entailed by "Don does not die," and we now see that if there had been a negative fact making that sentence true, we would have needed to interpret it as 1. This reading, finally, establishes the multitude of causes-scenario which proves the assumption wrong.[20]

HALF-TIME RESULTS: THE CEMENT OF THE UNIVERSE AND ITS DESCRIPTIONS

We are interested in causation because we take it to be 'the cement of the universe.' To illustrate, let us once again take Don's life:

1. *Falling from the cliff* early in the morning caused Don's death.
2. Falling from the cliff *early in the morning* caused Don's death.

Of course, 1) may be true while 2) is false (and *vice versa*). For example, Don died because falling from the cliff he broke his neck hitting a stone - making 1) true and 2) false; and Don died because falling early in the morning, at ebb, he broke his neck hitting the bottom of the sea - making 2) true and 1) false.[21]

The question is whether 1) and 2) tell us anything of interest concerning the nature of causation. Decades of philosophy of language have turned more than one philosopher's head. But frequently, what is mirrored in language is

little more than the characteristics of our descriptive capacities. What, for example, are the ontological correlates of "contrastive relations" or "a shift in emphasis?" The language of "negative" and "positive" is similar. The two words function as markers in descriptions. The world, however, cannot be anything but blind to the positive/negative distinction.

As the previous section showed, that "Don does not die because he does not fall" is a causal report cannot be used as basis for an argument in favour of the view that causation is a relation between facts. If "negative" facts are but conceptual tools, they cannot function as reinforcing bars in the world. In this respect facts are as bad a choice as events as the fundamental relata of a causal relation.

This concludes the first part of this essay. We began by asking: Of what type are the entities that causation relates? Then we examined the obvious candidates: objects (things), events, properties, and facts. But objects did not work, there are too few of them.[22] And events give us problems with non-existing negative events; properties face the same difficulty. Finally, the obstacle to facts is similar. Thus, none of the obvious alternatives seems to work. This looks like a problem.

But, first, arguments by elimination are problematic. Their force are curtailed, e.g. by lack of imagination and creativity. We have eliminated the possible candidates one by one, but there might be alternatives we have not thought of. Second, we have not presented an example where none of the alternatives work. A possibility is therefore that causation does not relate one type of entity, but rather a mixed and complex set of stuff. Third, causation might not be a relation at all. The idea that causation is a (binary) relation is probably best described as folk-philosophy, it is the billiard-ball-view of the world - there are hardly any arguments supporting it, still the idea has strongly flushed the philosophical literature.

There are several alternative conceptions to consider. Causation may be thought of as a structure or a mechanism. Or there may be some other "truth maker" behind causal reports - such as *nomic* FACTS or *laws embodied in*

spacetime.[23] In this paper, however, we make no attempts to develop such an idea, and whether or not the already available alternatives conflict is something we have to leave unsettled. In any case, their common properties are what make these approaches succeed where the cause/effect view does not: They add something to the causal situation which is still there when there is no causal relation. And they focus on this, which causation is mediated through, rather than on that which is produced. This is necessary to bypass the difficulties that negative causal reports give rise to. The theories operate, so to speak, on different levels.

There is nothing epistemically suspect about this. Hume's billiard-balls stimulate thoughts in terms only of causes and effects, but reflections over a coffee-machine leads us in the other direction. Sometimes causes are hidden, sometimes other aspects of the causal situation are. (And sometimes they do not exist, even though we are convinced they do). It is important to note that even though causation sometimes links moving balls on a billiard table, this way of approaching causation has led to many misconceptions; one is that it made philosophers understand causes and effects as concrete and evident, while the "causal tie" appeared as abstract and questionable.

The concluding section of this paper is devoted to some other persistent problems of causation - and to their dissolution.

THE DISSOLUTION OF THREE PERSISTENT PROBLEMS

The problems of causation have traditionally been problems concerning its causes and effects. The following three are interesting in, that although not solved they tend to be forgotten in recent discussion:

1. The chronological problem

Sometimes causes appear to be simultaneous with their effects. Recall Kant's leaden ball which makes a hollow in the cushion. "The greater part of operating causes in nature are simultaneous with their effects,"[24] he claims. In spite of

this 'the temporal priority of the cause' is an explicit condition in several theories of causation.[25]

Why? To be able to understand the chronological assumption we have to recognise the need for a *local* link between cause and effect securing that, rather than its qualitatively similar cousin, this specific object was singled out.[26] So the clash with our intuitive grasp of causation occurs because of the tinkering with another problem with the cause-effect relation. This, however, does not prove that our intuitions were misguided. It might instead indicate a flaw in the theoretical framework.

Note that the shift in perspective that we suggest dissolves the dilemma. One may reject the idea that cause-effect relations exhaust the nature of causation. Kant's case is obviously causal, but does it report causes and effects? The traditional approach has to assume that it does (what else could it present), and this causes trouble. It is interesting to recollect Russell's discussion in 'The notion of cause'[27]: Sometimes if one knows the configuration of the system, later (or earlier) configurations are calculable. But to do that no causes nor effects have to be involved. This has been interpreted as a reason for dropping the idea of causation in the sciences, but we can now see that like Kant's observation, Russell's objection only operates on the cause-effect level. Another kind of argument would be needed to throw out causal mechanisms or structures.

2. The branching problem

When the barometer goes down, bad weather usually follows. Perhaps, when swallows soar, barometers tend to rise. There are plenty of regularities in the world, and in one form or other the idea of regularity is utilised in reductive accounts of the cause-effect relation. But not every regularity is a sign of a relation between cause and effect. Even a lawlike correlation at best betrays the existence of two causal *relatives*. These may be closely related (as cause and effect), or they may be more distant relatives (as, for instance, two effects of a common cause). This is the well-known side of the problem, and Gärdenfors

discusses how his analysis handle some of these problems in Gärdenfors (1988), 9.4.

There is a less recognised side as well. We are not helped by a too pronounced distinction between cause/effect and other causal relatives. In many cases, also for matters of intervention, knowledge of causal relatives other than the cause are valuable to us.[28] For all we know, every piece of our present causal knowledge may be of this kind.

Many reductive theories of causation have immense problems in sorting out causes and effects from every other causal relative, and even if they are successful in this task problems of reintegration arise. The only connective tool is the cause-effect relation; so every structure has to build on branching causal chains. Either two causal relatives belong to the same causal chain, or they belong to causal chains originating from a common cause. But it is far from clear that this is a satisfactory way of understanding complex systems. For one thing, negative causal reports, *ceteris paribus* connections, and the no-cause/no-effect situations that Russell describes, abound in these contexts. These are problems that cannot even be handled in the single case. Now we have to assume that there are sufficiently many concrete entities for reconstructing the whole causal situation.

Again, we do not think there is a simple solution to these problems. Instead we should suspend them by not committing ourselves to the idea that we have to understand causation in terms of their causes and effects.

3. The selection problem

Whether causation links facts, properties, events, or objects, each effect often has endlessly many causes. As Germund Hesslow has observed, there are at least three reasons for this: (a) the phenomenon occurs because of the (immediately) preceding occurrence of many different phenomena; (b) the causal chain can be traced backwards in time; and (c) it is often possible to conceptualise the causes in infinitely many ways.[29] The selection problem is sometimes understood as epistemic or pragmatic. Metaphysicians often deny

the need to differentiate between a multitude of causes. The problem is seen as the problem of identifying *the* cause. This is not surprising: According to traditional views it has to be so understood. There are no proper tools to tamper with it.

But the burden of proof might perhaps be shifted. If we cannot differentiate between the causes there is in fact no nice list from which the cause (the explanatory, legally or morally relevant, interesting, or whatever) is to be chosen. The multiplication of causes gives us no relief. It is difficult to see how we can be so good at handling causal information unless there is an alternative, more fundamental, way of conceiving of causation. On a cause-effect view, the recognition of negative causal reports obviously threaten to multiply the number of causes in a similar way. We should admit them both as problems of metaphysical significance.

SUMMARY

In his book, Gärdenfors complains that some of his solutions to classical counter-examples may be thought of as invoking "artificial events"[30]. He is right in being worried. The problems we have collected in this paper are intriguing and may hardly be handled without the admission of *ad hoc*-hypotheses. Together these difficulties lead us to the conclusion that the fundamental problem of causation (understood as identifying the relata of causation) probably has no solution. This is a metaphysical conclusion about the inadequacy of the cause/effect view, but it should be equally important for theories of causal beliefs. To see clearly what causation is not is partly to understand what causal beliefs we have.

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NOTES

[1]Thanks are expressed to Alexander Bird, Bengt Hansson, Wlodek Rabinowicz, the *'small seminar'* in Lund, and – especially – to D. H. Mellor.

[2]Gärdenfors (1988), p.192.

[3]The sections where these arguments appear are based on a forthcoming paper, *The relata of causation: A note*.

[4]Hume (1739-40), Abstract, p. 649.

[5]It seems that Hume thought so: "We may define a CAUSE to be 'An object precedent and contiguous to another, and where all the objects resembling the former are plac'd in like relations of precedency and contiguity to those objects, that resemble the

latter.'" Hume (1739-40), 1.III.xiv, p. 170.

[6]Compare Mellor (1995), Ch. 10.1, p. 122. Some would say that we need something still more fine-grained than events. Following Dretske (1977), it has been argued that causation links "event allomorphs" rather than events; see Hitchcock (1996) for a recent illustration. For reasons to be discussed later on, we think that this line of thought has little merit.

[7]Hume (1739-40), 1.I.iv, p. 12.

[8]Compare Hume (1739-40), 1.I.iv, p. 12.

[9]Mellor (1987) and Mellor (1995).

[10]This seems to be the position advocated in for instance Armstrong (1978), Vol. 2, Ch. 16, p. 44. It is also suggested in Noordhof (1998), pp. 857-858.

[11]Davidson's view is expressed in his *Essays on Actions and Events*. See for instance Davidson (1967). The term "event" has been used in many ways and the truth of the assertion depends on the interpretation. Following Kim (1969), for example, it is not true. However, it has been widely acknowledged that Kim's events resemble states of affairs or facts more than objects.

[12]Of course, there are other cross-cutting difficulties for causes and effects. A well-known problem with the event-view is that it is difficult to see which of many possible events it is that enter the causal relation. Is it Don's fall or his fast fall onto rocks that is the cause, and is his death or his instant death the proper effect? There are arguments for defining events widely (to secure the possibility of recurrence), and there are reasons for defining them narrowly (to secure regularities without exceptions). See, for instance, Russell (1912), p. 187. However, these need not detain us. It is enough to focus on the possibility that an event can be conceived in many ways, from being extremely "thin" to being extraordinarily "thick." Few independent ways of determining the issue seem to exist. And both an object-view and a fact-view also face this problem.

[13]Ramsey (1925), p. 14.

[14]There is indeed a tradition which identifies causes and effects with properties. For instance, there are those who think that the relevant properties are once-for-all occurrent, i.e., tropes. Campbell (1990) and Bacon (1995) advocate such a view. And properties understood as universals are important in the accounts of causation in

Armstrong (1978) and Tooley (1987).

[15]An e-mail discussion with D. H. Mellor has helped us see the structure of the argument more clearly.

[16]Mellor (1987), p. 208.

[17]Mellor uses the fact/factum distinction to make the point. Mellor (1995), p. 162.

[18]Note that a similar trick might be employed with other entities, such as events and EVENTS, for instance; and such a distinction could be used to resolve some problematic cases. For instance, it might be argued that while the events in "Don does not die because he does not fall" are negative, the EVENTS are not. Compare Nordhoof (1998), p. 859. However, this is *not* the way to solve the problem we are pointing at. On the contrary, Mellor's example is presented as a possible situation where we need to rely on negative EVENTS.

[19]Compare Mellor (1995), p. 162, and Persson (1997), p. 91.

[20]A discussion with Alexander Bird has helped our understanding of the implications of this argument.

[21]Note: This may be constructed as an argument for a property-view of causation. But, as we have indicated above, there are other strong arguments against such a view.

[22]According to the difficulties presented by Russell (see footnote 9) there is an independent reason for this claim which also gives the result that there are too many objects. But this is, as we remarked, a cross-cutting difficulty.

[23]Mellor (1995), p. 216.

[24]Kant (1781), Transcendental Analytic, Bk II.2.iii.3b, pp. 134-135

[25]This is not surprising since its appearance in two of the more influential accounts, namely Hume (1739-40) and Suppes (1970). Note, however, that neither Kant nor Hume was interested in theories of causation.

[26]Compare Persson (1997), pp. 20-21. See also Noordhof (1998), p. 866.

[27]Russell (1912), p. 194

[28]Let us elaborate on one of Stuart Glennan's examples in Glennan (1996): A combustion engine is designed to move the drive shaft. As a side-effect, heat is produced. The motion of the drive shaft terminates in the motion of the car. Now, let us suppose that you are about to change your engine oil. The first thing you do is to drive the car a couple of kilometres, making sure that the used oil will run out easily.

In interacting with the world, you manipulate things almost as frequently by their causal relatives as by their causes. Once again, the problem only occurs because of our way of conceptualising causation.

[29]Hesslow (1988), p. 11

[30] Gärdenfors (1988), p. 202.