

Causality and Causation: The Inadequacy of the Received View

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The attempt to 'analyze' causation seems to have reached an impasse; the proposals on hand seem so widely divergent that one wonders whether they are all analyses of one and the same concept. (Kim 1995: 112).

The objective of this article is twofold: (1) to point out that the current theories of causation are radically inadequate, (2) to show the historical roots of this inadequacy.

The structure of this article is as follows: first, I will give a general sketch of the most important contemporary approaches to causation. Next, in the second part, I will briefly discuss the historical development of the concept of cause; I will show that the history of the concept of cause reveals a complex evolution marked by two decisive milestones: (I) the *Aristotelian (-scholastic) Conception*, and (II) the *Scientific Conception*, which are two mutually incompatible conceptions. In the third part, I will discuss some fundamental presuppositions of the received view regarding causation. I will show that this view is inadequate in several respects, and that this inadequacy is (partly) due to the failure to recognize the historical roots of concepts related to causation. More particularly, it will be shown that the received view is based upon two incompatible categorical frameworks, which have their origin in, respectively, Aristotle's philosophy and the seventeenth century scientific worldview. Finally, in the fourth part, I will summarize the obtained results.

1. CONTEMPORARY APPROACHES TO CAUSATION¹

The following approaches have been prominent in contemporary discussions of causation: (1) the approach which analyzes causation in terms of necessary and sufficient conditions, (2) the counterfactual approach, (3) the instrumental approach, (4) the probabilistic approach, and (5) the singularist approach, which is a minority view.

1. *Cause as INUS-condition*. The most sophisticated version of the necessary and/or sufficient conditions approach is probably John Mackie's analysis of causes in terms

of so-called *INUS conditions*. Mackie suggested that a cause of some particular event is “an *insufficient* but *non-redundant* part of a condition which is itself *unnecessary* but *sufficient* for the result” (Mackie 1974: 62). Mackie called a condition of this kind an INUS condition, after the initial letters of the main words used in the definition. Thus, when experts declare a short-circuit to be the cause of fire, they “are saying in effect that the short-circuit is a condition of this sort, that it occurred, that the other conditions which, conjoined with it, form a sufficient condition were also present, and that no other sufficient condition of the house's catching fire was present on this occasion” (Mackie [1965] 1993: 34). Thus, Mackie's view may be expressed roughly in the following definition of ‘cause:’ *an event A is the cause of an event B if A is a non-redundant part of a complex condition C, which, though sufficient, is not necessary for the effect (B).*

2. *Causality as counterfactual dependence.* For many other contemporary philosophers, however, causal relations are best defined in terms of counterfactual dependence. To say that ‘*B is causally dependent upon A*’ is to say that ‘if *A* had not occurred, then *B* would not have occurred.’ Moreover, to say that *A* is the *cause* of *B* is to say that there is a chain of causally dependent events linking *A* with *B* (c.f. Lewis [1973] 1993: 200).
3. *The instrumental approach to causality.* The main point of this approach is that there are causes only for persons who are *practically* concerned with certain kinds of events. As R.C. Collingwood, the best-known defender of this approach, put it: “[f]or a mere spectator there are no causes” ([1938] 1991: 151). Or, to put it in a more sophisticated way: “a cause is an event or state of things which it is in our power to produce or prevent, and by producing or preventing which we can produce or prevent that whose cause it is said to be” (Collingwood [1938] 1991: 148). Consequently, what may be the cause of an event in the eyes of one person, need not be the cause from the point of view of another.
4. *Causality as probable occurrence.* The basic idea of the probabilistic approaches to causation is that a cause is an event *A*, the occurrence of which makes the occurrence of another event, *B*, more likely than if *A* had not occurred. Because probability necessarily implies a range of events, this view is usually expressed in terms of *types* of events. Thus, saying that smoking (*A*) causes lung cancer is saying that the probability of getting lung cancer is higher for those who smoke than for those who do not. Accordingly, *an event A may be said to be a cause of an event B, if, given the occur-*

rence of A, the probability of the occurrence of B is higher than the probability of the occurrence of B would have been if A had not occurred.

5. *The singularist approach to causality.* The singularist approach to causality is characterized by the idea that the correct definition of causality must be framed in terms of one single case of causal sequence. According to this view, laws are not relevant to causation, *qua* causation. Thus, for C.J. Ducasse, one of the most prominent defenders of this approach, the word 'cause' signifies that a particular change sufficed to the occurrence of another change. Moreover, the causal relation is directly observable: "we observe [a causal relationship] whenever we perceive that a certain change is the *only* one to have taken place immediately before, in the immediate environment of another" (Ducasse [1926] 1991: 139).

According to Ducasse, we are strongly inclined to confuse two questions: (1) "*what did cause, i.e. what did then and there suffice to the occurrence of that concrete individual event?*" and (2) "*which part of what did suffice would be left if we subtracted from what did suffice such portions of it as were unnecessary to such an effect?*" (Ducasse [1926] 1991: 141) Only the first question concerns the cause of an individual event as such; the second question concerns a law-like generalization.

There are numerous variations to the five mentioned approaches. Faced with the abundance of such widely divergent approaches, Jaegwon Kim, one of the most prominent students of causation, conceded some sense of defeat when he wrote "[t]he attempt to 'analyze' causation seems to have reached an impasse; the proposals on hand seem so widely divergent that one wonders whether they are all analyses of one and the same concept" (Kim 1995: 112). Though I tend to agree with Kim's complaint, I think that, nevertheless, most of these widely divergent approaches share some important common characteristics. From now on, I will use the expression 'the received view' to signify all or part of the set of the following approaches: (1) the necessary and/or sufficient conditions approach, (2) the counterfactual approach, (3) the instrumental approach, and (4) the probabilistic approach. Because the singularist view does not entail the idea that causation implies law-like behavior, I will not consider it part of the received view.

According to the *received view*, the two main problems regarding causation concern (1) the *criteria* by virtue of which it can be determined that some item may be called a cause, and (2) the precise nature of the *necessity* that is presumed to be involved in causation.

However, before further examining the received view, I will first briefly discuss the historical roots of a basic ambiguity in our common use of the concept of cause. Possibly, unmasking this ambiguity may prove to be of the utmost importance for clearing the way to a more adequate approach.

2. THE HISTORICAL EVOLUTION OF 'CAUSE'²

The development of the history of the concept of cause reveals a remarkable discrepancy between the constancy in the use of terminology and the gradual shift in the meaning of the terms used. This development - which has largely remained unnoticed - requires analysis, for most contemporary discussions on the subject have been victimized by it. In this section, I will point out how the conceptual tensions that are inherent to the concept of cause have come about. More specifically, it will be shown that two decisive milestones mark the history of causality: the *Aristotelian (-scholastic) Conception* (I), and the *Scientific Conception* (II). Moreover, it will be shown that these two conceptions of cause are mutually incompatible.

(I) Aristotle stated that, in reference to any singular entity, the question 'What is this?' could be answered in four different ways, each of which corresponded to what he called a 'cause' in the sense of 'something without which the thing would not be'. Thus, given a marble statue, the question 'What is this?' could correctly be answered in one of the following ways: 'This is marble', 'This is what was made by Phydias', 'This is something to be put in the temple of Apollo' and 'This is Apollo.' These answers are the answers to four different questions, respectively: 'What is this made of', 'Who is this made by?' 'What is this made for?' and 'What is it that makes this what it is and not something else?' The answers have come to be known as, again respectively, the material cause, the efficient cause, the final cause and the formal cause. Though a complete answer to the original question would encompass those four different answers, and therefore the four different causes, Aristotle argued that the most important and decisive cause was the formal cause (*Physics* II.3, 194b23-195a3).

Only the *efficient aitia* has features we now associate with the idea of causation. Aristotle conceived efficient causes as 'things responsible' in the sense that an efficient cause is a thing that by its activity brings about an effect in another thing. Thus, the efficient cause was defined by reference to some substance performing a change: it is the "primary source of the change." That which is produced is either some new substance, such as

ashes from wood, or simply a change in some property of a given substance. Efficient causation involves a *form* being transmitted from the efficient cause to the effect. Thus, for example, the efficient cause of the statue is the form in the mind of the sculptor. The form of the statue (effect), which is the same *qua* form in his mind, comes about from him by means of the motion he originates. Furthermore, the general context of this meaning of efficient cause is teleological, for each efficient cause acts for the sake of some end. Hard work, for example, is the efficient cause of fitness, which is the end (*Phys.* II.3). Thus, *according to the Aristotelian conception, causes are conceived as the active originators of a change that is brought about for the sake of some end.*

(II) *Probably the most radical change in the meaning of cause happened during the seventeenth century, in which there emerged a strong tendency to understand causal relations as instances of deterministic laws. Causes were no longer seen as the active initiators of a change, but as inactive nodes in a law-like implication chain.*

This change of perspective had its antecedents in Stoicism and medieval philosophy. The Stoics were the first to associate causation with exceptionless regularity and necessity. But, contrary to the scientific conception of cause, the necessity involved in the causal relation pertained to *particular* events; it was thought to be necessary that the same *particular* effect would recur in the same *particular* circumstances, and that it was not possible that it would be otherwise (Sorabji 1980). Aquinas went further than the Stoics by relating efficient causality to natural necessity and to law-like behavior; things belonging to the same *type* act similarly in similar causal circumstances (Aquinas SCG II). The dismissal of explanations by final and formal causation by Descartes, Francis Bacon and Galilei brought about the rejection of the Aristotelian-scholastic doctrine of active qualities and substantial forms as causal factors in natural processes. The Aristotelian idea that a substantial form be transmitted from a cause to its effect had no basis whatever in our experience of things.

However, paradoxical as it may seem, it was precisely this concept of formal cause that came to play an important role in the development of the new conception of efficient cause, according to which efficient causes were simply instances of general laws, which in turn were general, mathematical principles. But, to a large extent, the concept of law of nature was the inheritor of the concept of formal cause: both concepts were meant to explain the stability of the world. The main difference is that, whereas the formal cause was thought to explain the stability of the world by explaining the structure of things, the laws

of nature were thought to explain the stability of the world by explaining the *relations* between things.

An important characteristic of the modern conception of cause was that causation and determinism became virtually equivalent. The crux of the debate between the rationalists and the empiricists pertained to the nature of this determination.

(IIa) In the rationalist conception of cause, the relationship between cause and effect is a *logical* relation. Necessitation involves implication. Thus, a complete knowledge of the causes is tantamount to knowing the premises from which by reasoning alone the effects can be deduced. Though Descartes, Hobbes, Spinoza, and Leibniz roughly shared this view, they could not avoid some basic ambiguities. Thus, Descartes, while regarding the laws of nature themselves (instead of their instances) as efficient causes, also held the view that the relation of a cause to its effect is the relation of ground to consequent: a logical relation. On the other hand, he regarded minds as free and as particular causes, in the sense of active initiators of a change (Descartes 1644 II: 36-37). Hobbes's position was equally ambiguous. For, while he defended IIa (given the cause, "it cannot be *conceived* but that the effect will follow"), he regarded the concepts of cause and *power* as complementary notions (Hobbes 1655, 9.3), an idea that is characteristic of the Aristotelian conception of cause (I). Similarly, Spinoza, perhaps the most straightforward defender of the view that necessitation means implication, held that God is a free cause in the sense of being a real initiator of change, but that the necessary causes are necessitated by other causes and are therefore just inactive nodes in a chain, each of them logically necessitating its effects and logically necessitated by its effects (Spinoza 1677).

Even Leibniz, who held the most original view of causation by rejecting the idea that the ultimate constituents of reality (the monads) have a causal relation to each other, and thus limiting causation to the links of the historical-logical chain constituting each individual substance, could not avoid one major ambiguity. For, whereas, in his view, the necessity involved in the causal relation is as strong as logical necessity (IIa), the innermost significance of causality is that of the *active initiation of change* (I). For, every monad is "spontaneous," that is to say, its substantial form is the only source of its modifications. Monads are real "centers of activity." Remarkably, Leibniz' originality resulted partly from his 'reactionary' defense of both formal and final causation. Each monad behaves in accordance with its nature or substantial form, which is its original purpose, given by God (Leibniz 1712). Efficient causes are therefore means to ends (I). Thus, it may be argued that the rationalist philosophers all held some hybrid conception of cause,

involving a combination of cause IIa (the identification of causes with grounds) and cause I (the originators of a change).

(IIb) To David Hume, commonly held to be the main representative of the empiricist approach to causation, our idea of causal necessity is due partly to our observation of the *constant conjunction* of certain objects, and partly to the *feeling of their necessary connection* in the mind. The habitual impression of conjunction *feels* like a necessitation, as if the mind were compelled to go from one to the other. The necessary connection is not discovered in the world but is projected onto the world by our minds.

However, Hume's view was far from being shared by all empiricist philosophers. Indeed, he misrepresented the view of his fellow empiricists by criticizing them for their belief that necessity was synonymous with power, a belief which in fact they did not hold. For, both Locke (1690, II, xxii and xxvi) and Newton (1687 I:14) explicitly denied that the ideas of causation or power involved the idea of necessary connection according to law. According to Newton, these two notions are even mutually exclusive because complete uniformity or necessary connection would entail a denial of causal efficacy. For Locke, as for Newton, causality is related to the Aristotelian belief that causes are substantial powers that are put to work. Therefore, Hume's famous criticism only concerns the rationalist scientific conception of cause (IIa), which, from an historical perspective, is merely a derivative sense of 'cause.'

Kant's concept of cause, by which he tried reconcile the rationalist and empiricist views, is a hybrid of IIa and IIb. Because causal relations involve laws (II), Kant in effect says that an event A is the cause of an event B if, and only if, there is a universal law of the form: events of type A are necessarily followed by events of type B. But, while defending the rationalist idea that causality is an *a priori* conception, which involves strict universality and necessity (IIa), he also holds the empiricist view that causes precede their effects, which from the perspective of IIa (according to which, causes are contemporaneous with their effects) is utterly impossible.

Mill too conceived causal relations in terms of law-like generalizations (II). His analysis is about *kinds* of causes and *kinds* of effects. The "real cause" of an event is that set of conditions which, when they are all met, is invariably and unconditionally followed by the *type* described as the effect (Mill 1874, 234-66).

All in all, the complex evolution of the concept of cause from the seventeenth century on is marked by the interplay between, at least, two radically different conceptions of

cause: the Aristotelian-scholastic conception, according to which causes are the *active initiators of a change*, and the scientific conception, according to which causes are the *inactive nodes in a law-like implication chain*. Our common use of causal terms is entirely oblivious of this ambiguity. But, more deplorably, most discussions by modern philosophers have failed to see this basic duality, because the premises of those discussions are usually infected by it. For instance, the common assumption that causation is inherently linked to law-like behavior is far from obvious.

In short, my analysis of the historical development of the concept of cause shows that each analysis of causation must start from the recognition that causal propositions are ambiguous, and that (at least) two mutually exclusive meanings are to be distinguished. According to I, 'A is the cause of B' means 'A is the initiator of a change in B'; according to II, 'A is the cause of B' means 'Given the occurrence of B, A must necessarily have occurred.'

3. THE INADEQUACY OF THE RECEIVED VIEW

In this section, I will show that the received view of causation as it presents itself now is caught between two incompatible categorical frameworks. First (3.1), I will discuss some disputable presuppositions of the received view. Next (3.2), I will show that (the ambiguity of) the modern concept of cause is the result of the interplay between the Aristotelian-scholastic Conception and the Scientific Conception, which are mutually incompatible.

3.1. SOME PRESUPPOSITIONS OF THE RECEIVED VIEW

Some basic *presuppositions* of the received view are: (1) causation consists in some sort of *relationship*; (2) this relationship is *external* to its relata; (3) the *relata* of the causal relation are *discrete entities*; (4) causation is basically a *timeless* relationship. I will discuss these successively, and my discussion will be inspired partially by the process approach to reality, as put forward by C.S. Peirce, A.N. Whitehead, and Ch. Hartshorne.

3.1.1. CAUSATION IS A RELATION

Though the Aristotelian Conception has remained an unmistakable aspect of our common sense idea of 'cause,' the received view unashamedly subscribes to the Scientific Conception of cause, and implicitly rejects the Aristotelian conception. According to the scientific view, causation means some sort of law-like *relation* between cause and effect,

rather than the *production* of an effect by its cause. For reasons of economy and clarity, I will henceforth strictly distinguish *causation* from *causality*. I will use the term 'causation' exclusively for the *production* of an effect by a cause, and I will restrict my use of the term 'causality' to the *relation* between cause and effect. If correct, the distinction has far reaching consequences. For, since each of the modern theories concerns causality rather than causation (even the singularist Ducasse regards causes as sufficient *conditions*),³ the contemporary discussions of the concept of 'cause' pertain to causality rather than to causation. By asking, "What are the necessary and sufficient *conditions* for something to be a cause?" they fail to address the more basic issue of causation.

3.1.2. THE CAUSAL RELATION IS EXTERNAL TO ITS RELATA

Contemporary discussions of causation are inherently infected by Hume's views on the subject. One symptom of this 'infection' is the idea that the relationship between causes and effects is a purely *external* affair. Thus, to say that smoking causes cancer is to say that, although smoking and cancer are completely different sorts of 'things' (which, as such, are not internally related), there is yet a relation such that the occurrence of the one (smoking) increases the probability of the occurrence of the other (cancer). On this account, Hume is right when he writes, "all events seem entirely loose and separate." There certainly is no *logical* connection between events. To say that causality is not a logically necessary relation is to say that even if A is the cause of B, it is *logically* possible to suppose that, given A, B might not have occurred. According to Hume, this is precisely the reason why causal relations cannot be known a priori; in order to determine whether or not a causal relation holds between A and B, we must rely on our experience of similar relations. But Hume also insists that we cannot observe "ties" or "connections" between events:

... there appears not, throughout all nature, any one instance of connection which is conceivable by us. All events seem entirely loose and separate. One event follows from another, but we never can observe any tie between them. They seem *conjoined*, but never *connected*. (Hume [1748] 1975: 74)

The question is, however, whether Hume's contention is warranted. In order to answer this question, we must first inquire what evidence Hume provides.

Certainly, the evidence is not based upon an analysis of the structure of events, for he never provided such analysis. Moreover, though Hume often spoke of the causal relata as if they were *events*, and though he sometimes gave examples in which the causal relata

were events, his entire discussion is based on the idea that both causes and effects are 'objects,' conceived as *substances* having certain qualities. Consider, for example, the following passage at the beginning of his discussion of causation:

We must consider the idea of *causation*, and see from what origin it is deriv'd. [...] Let us therefore cast our eye on any two objects, which we call cause and effect, and turn them on all sides, in order to find that impression, which produces an idea of such prodigious consequence. At first sight I perceive, that I must not search for it in any of the particular *qualities* of the objects; since, which-ever of these qualities I pitch on, I find some object, that is not possest of it, and yet falls under the denomination of cause and effect. And indeed there is nothing existent, either externally or internally, which is not to be consider'd either as a cause or an effect; tho' 'tis plain there is no one universal quality, which universally belongs to all beings, and gives them a title to that denomination. The idea, then, of causation must be deriv'd from some *relation* among objects. (Hume [1739] 1978: 74-75)

Hume apparently supposed the causal relata to be *substances*, and observed that the idea of causation cannot be derived from some particular qualities of the cause-substance, but, instead, must be derived from some *relation* between substances. Similarly, he observed that the idea of necessary connection could not be derived from certain qualities of an object ([1739] 1978, 86-87); for instance, we cannot by a careful consideration of the qualities of a knife derive all the qualities of a wound inflicted by that knife.

Thus, remarkably, Hume's entire discussion takes place within an Aristotelian-scholastic framework, according to which the world consists of the set of substances (*ousiai*) and their properties. By thus implicitly putting the question of causation in terms of an Aristotelian-scholastic conception of the world, he was forced to conceive the relationship between causes and effects as an *external* affair, which was moreover seen as a matter of the imagination.

There is something tragic about Hume's perception of causality. For, though he evidently had seen that causation can be properly discussed only in the context of events, he was the victim of his own Aristotelian heritage when he argued for the causal intransitivity of events on the basis of premises that were correct only within the context of the Aristotelian view of substantial entities. To put it in terms of a very actual discussion, from the fact that a cigarette does not in any way reveal the symptoms of cancer, he concluded that smoking a cigarette cannot be inherently related to the onset of cancer.

The Humean idea that causation is a purely external relation was severely criticized by A.N. Whitehead (1859-1947). Though Whitehead agreed with Hume that the idea of the transference of a quality from cause to effect is unintelligible, he thought that the cause is in some sense *immanent* to its effect:

The mere notion of transferring a quality is unintelligible. Suppose two occurrences may in fact be detached so that one of them is comprehensible without reference to the other. Then all notions of causation between them, or of conditioning, become unintelligible. There is [...] no reason why the possession of any quality by one of them should in any way influence the possession of that quality, or any other quality, by the other. [...] The only intelligible doctrine of causation is founded on the doctrine of immanence. Each occasion presupposes the antecedent world as active in its own nature. (Whitehead [1938] 1968: 164-65)

Causes are not merely external conditions of an effect; there is an 'active immanence' of the causes in the effects.⁴ According to Whitehead, we do have concrete experiences of the interconnectedness of events in perception and memory. Thus, the *perception* of an electric light suddenly switched on makes us blink our eyes. We have the concrete experience of a "compulsion to blink." The flash, though in the immediate past of the blink, is still present ("objectively immortal") in the compulsion to blink (Whitehead [1929] 1978: 175). Similarly, whenever we *remember* something, the past event is, somehow, actively involved in the present event of our remembering it; there is an "immanence of the past energizing in the present" (Whitehead [1933] 1967: 188).

3.1.3. THE CAUSAL RELATA ARE DISCRETE ENTITIES

If Whitehead is right, cause and effect must somehow be *continuous*. Consider his example of some event arousing some man's anger. How can we explain the fact that the man knows that a quarter of a second ago he was angry? Obviously, the mere reference to 'memory' is putting the cart before the horse. According to Whitehead,

[t]he feeling as enjoyed by the past occasion is present in the new occasion as datum felt, with a subjective form conformal to that of the datum. Thus if A be the past occasion, D the datum felt by A with subjective form describable as A angry, then this feeling - namely A feeling D with subjective form of anger - is initially felt by the new occasion B with the same subjective form of anger. The anger is continuous throughout the successive occasions of experience. [...] His anger is the subjective form of his feeling some datum D. A quarter of a second later he is [...] embodying his past as a datum in the present,

and maintaining in the present the anger which is a datum from the past. (Whitehead [1933] 1967: 183-184).

Thus, Whitehead makes clear that, without some continuity between a past event as a cause and a present event as its effect, we simply cannot have any recollection of something happening a quarter of a second ago. Though our experiences are in some sense definite, individual events, they are continuous in respect of their subjective forms; there is, in Whitehead's words, an "identity of subjective form inherited conformally from one occasion to the other" (Whitehead [1933] 1967, 186).

Similarly, C.S. Peirce (1839-1914) concluded on the basis of a detailed analysis of the question, "How can a past idea be present?" that events are not discrete because they do not have a definite beginning and a definite end. According to Peirce, saying that a past idea can be vicariously present explains nothing because it raises once more the question how this vicarious representation is related to the past idea. After thus having rejected the idea of vicarious representation, Peirce presented the only possible alternative:

How can a past idea be present? Not vicariously. Then, only by direct perception. In other words, to be present, it must be *ipso facto* present. That is, it cannot be wholly past; it can only be going, infinitesimally past, less past than any assignable past date. We are thus brought to the conclusion that the present is connected with the past by a series of real infinitesimal steps. (EP I: 314; 1892)

Similarly, Peirce emphasized that a moment must necessarily cover an infinitesimal interval of time. In this infinitesimally spread-out consciousness "we directly perceive the temporal sequence of its beginning, middle, and end" (EP I: 315; 1892). Thus, the present moment involves an infinitesimal duration; as such it is "half past and half to come" (EP I: 323; 1892).

Thus, it would appear that if causes are *internally* related to their effects, and both cause and effect are two aspects of one *continuous* process, the distinction between cause and effect is to some extent arbitrary. For, between any event A, designated as the cause of another event B, there is an innumerable series of events affecting B, which might just as well be called the cause of B. There are strong indications that this view was indeed defended by Peirce (see EP I: 323; 1892).⁵ Whatever is designated as *the* cause of an event, will then necessarily depend on some sort of practical considerations such as those suggested by Collingwood (section I). Paraphrasing Collingwood, one might say that,

though "for a mere spectator there are no causes" (and therefore no causality either), causation nevertheless is very much there.

In conclusion: the idea that causation consists in an *external relationship* between *discrete* events is based upon a mistaken presupposition regarding the nature of the causal relata. Here Hume's implicitly putting the question of causation in terms of an Aristotelian-scholastic framework, together with his failure to make a thorough analysis of the nature of events, proves to be fatal not only to his own conclusions, but to the received view, which uncritically inherited his blind spots. The analyses by both Peirce and Whitehead of the nature of events provide strong evidence in favor of the view that causation involves the *production* of an event, and that the cause is in some sense *immanent* to its effect. It is only from the standpoint of the effect that the causal relation may be defined in terms of antecedent entities, which are abstractly separated from the concrete continuous process. Mistaking the nature of the relationship between these abstracted aspects for the core of causation, is committing what Whitehead has called the "fallacy of misplaced concreteness," which consists in confusing conceptual abstractions with the concrete reality from which they are derived (Whitehead [1925] 1967, 50-51).

3.1.4. THE RELATION BETWEEN CAUSATION AND TIME

The most favored contemporary approach to causation defines causes in terms of necessary and sufficient conditions. One of the main problems with this approach - first raised by Scriven (1966) - is that it fails to logically distinguish causes from their effects. For, if A and B are events and A is necessary and sufficient for B and therefore the cause of B, then it logically follows that B is necessary and sufficient for A and therefore must be the cause of A. But clearly, the ignition of a match is not the cause of its being rubbed. Thus, the problem of *symmetry* is a major problem of the 'necessary and sufficient condition approach'; the distinction between causes and effects obviously requires some temporal constraints.

Though this problem of symmetry does not hold for the counterfactual approach, the instrumental approach, and the probabilistic approach, the tendency common to all of these to consider causation as a *relation* rather than as a process, betrays an ambivalent attitude toward the relationship between causation and time. Though it is said that causes precede their effects in time, it is not stipulated how this precedence affects the relationship. If there is indeed a temporal priority of causes to their effects, then causation must somehow involve the *production* of the effect by its cause such that the cause precedes its

effect. And "if [causation] does involve 'production', then it is a process rather than a relation" (Bennet 1974, 12).

3.2. TWO MUTUALLY INCOMPATIBLE CATEGOREAL FRAMEWORKS

If our analysis so far makes any sense, the received view is inadequate both because it conceives causation as a *relation* instead of a process, and because it falsely assumes the causal relata to be *discrete* entities between which there is not even a hint of transitivity. The most troublesome aspect of the received view, however, is its basic ambiguity regarding the causal relata. Thus, though most contemporary philosophers hold that the causal relata are *events*, there are also some philosophers who hold that they are *facts*, and again some who hold that, next to event causality or fact causality, there is also agent causality in which the agents are conceived as *substances*. This observation requires closer scrutiny.

In ordinary language, we rarely identify causes as events. Indeed, the grammatical subject-predicate structure of our sentences lures us into thinking causes in terms of things or substances. It was probably that seductive power of language that was the basis of the Aristotelian doctrine that causes are substances. We still do not think there is anything wrong in saying that 'John broke the glass', or that 'mosquitoes are the cause of malaria'. Only when we are asked to clarify those statements, do we correct ourselves by saying that some action performed by John caused some process occurring within the glass. In other words, we tend to clarify ourselves by interpreting causes in terms of events. I have already pointed out that the continual shift between referring to causes as things and then again to causes as events had characterized Hume's seminal text.

But the confusion grows as soon as philosophers try to clarify what they mean by events. For instance, though the concept of *event* is rightfully associated to the concept of *change*, for instance the acquisition or loss of a property in a particular object, it has also been linked to *states* (Kim 1973; Lewis 1986). Thus, it is said that the persistent state of an object - say the insistence of malaria - may be causally explained by another persisting state - say the continuing presence of certain organisms in the blood. There may be some disagreement regarding the question whether or not events involve persisting states, but there is almost universal agreement about events being somehow related to *substances*: they are said to be either changes or 'unchanges' in an object. This clearly shows that in many cases, the defenders of event causality who explicitly endorse an ontology of events, are in fact closet defenders of a substance ontology by assuming that relations

between events are rooted in a relation between substances. The same holds for those who have insisted that there is a special class of causation called *agent causation*, which refers to the act of a person in bringing about a change. There is a controversy whether agent causation is reducible to event causation. For instance, 'someone washing the dishes' would be an example of agent causation. This may be described in terms of event causation, for it may be said that the decision to wash is an event, which is the cause of the dishes being washed. Yet, most philosophers maintain that decisions necessarily require agents who decide. And these agents are again perceived to be *substances*. In the end, therefore, it would appear that the defenders of event ontology, in spite of frequent explicit rejections of the Aristotelian *substance*, cannot really extricate themselves from an *Aristotelian categoreal framework*. According to this framework, 'the basic furniture of the world' consists of substances and their qualities, and every sound explanation of events must therefore be given in terms of substances (or basic entities) and their properties.

An exception should be made for those philosophers who maintain that the relata of causation are *facts*. And indeed, this view too is supported by ordinary language, as when, for instance it is said that gravity is the cause of the fall of an apple. Gravity is neither a substance nor an event. It simply is the fact that, given two masses and a certain distance between them, a certain mathematical relation obtains, which allows us to describe the behavior of the apple. A fact is the truth-maker of a true proposition. Thus, the fact that John shot Peter, which contains the objects John and Peter standing in the relation of shooting and being shot, makes it true that John shot Peter. Where event theories favor statements of the form '*C caused E*,' fact theories favor expressions of the form '*E because C*' (Mellor 1995, 11). For instance, event theories favor statements like "The temperature's dropping severely caused the freezing of the pipes" (events), while fact theories prefer statements like "The pipes froze because the temperature dropped severely" (facts). The example points out another important difference: facts do not exist; only the particulars involved in the fact do.

Clearly, the ambivalence regarding the status of causal relata is a symptom of the circumstance that our modern worldview is strangely caught between Aristotle's *substance ontology* and the modern scientific *fact ontology*. The latter view, which became the predominant view during the seventeenth century, was most clearly expressed by Wittgenstein in his *Tractatus*: "Die Welt ist die Gesamtheit der Tatsachen, nicht der Dinge."⁶ This general ambivalence is particularly relevant to our discussion, for the tension be-

tween the two views, neither of which really allows for an event ontology, is reflected in our conception of causality. Consider the following example: our belief in the nutritional value of bread is usually not seen as the belief that my eating of this bread is the cause of my being fed, but as the belief that the *nature* of bread, being what it is, necessarily involves nutrition in certain organisms. Indeed, Hume's rejection of a rational justification of causal relations assumed that the latter formulation was the expression of our ordinary belief. Accordingly, he assumed that causation was best described as a relationship between general *types*, rather than as a relation between concrete individual events, and that therefore the causal relata are *facts* rather than events. And this view is clearly reflected in our received view.

Thus, it would appear that the received view's apparent insistence on events is trapped between Aristotle's substance ontology and the modern scientific fact ontology. This tension may be a heritage of Hume's ambivalence when he described causation as a relation between types of events, thereby implicitly endorsing a fact ontology, while his examples were expressed in the terminology of a substance ontology. The confusion seems hopeless.

4. CONCLUSION

The objectives of this article were (1) to point out that the current theories of causation are radically inadequate, and (2) to show the historical roots of this inadequacy.

One of the main reasons of the inadequacy of the received view of causation is the interpretation of events as changes in a substance. This view is inconsistent because it is based upon two incompatible categorial frameworks: a substance ontology and a fact ontology. The tendency to implicitly conceive the causal relata as substance-like entities is rooted in Aristotle's substance ontology, and contradicts the standard view that causation is some sort of relation. The latter view goes back to the fact approach to reality, which became predominant in the seventeenth century. Thus, the history of the concept of cause was seen to be intimately related to the historical evolution from the substance ontology to the fact ontology. This evolution was marked by two decisive milestones: (I) the Aristotelian-scholastic Conception, according to which causes are the active initiators of a change (substances), and (II) the (seventeenth century) Scientific Conception, according to which causes are inactive nodes in a law-like implication chain (facts). The inadequacy of the received view is (partly) due to the fact that it has failed to recognize

this basic ambiguity, and that it has taken the Scientific Conception (II) as point of departure, which, from both an historical and an ontological point of view, is a derivative conception of cause.

I made a distinction between *causation*, or the *production* of an effect by a cause, and *causality*, or the *relation* between cause and effect, and I concluded that the received view concerns only causality. I argued that causation is more fundamental than causality, because causes and effects are abstractly separated aspects from a continuous process of causation. Mistaking the nature of the relationship between these abstracted elements for the core of causation is due to a confusion between conceptual abstractions and the concrete reality from which they are derived (Whitehead's 'fallacy of misplaced concreteness').

The apparent impasse that characterizes the contemporary attempts at analyzing causation may partly be due to an insufficient appreciation of the lack of a consistent categorial framework. In another, recent publication (Hulswit 2001), I have suggested that Charles S. Peirce's *Categorial System*, which provides such consistent categorial framework, offers better opportunities for an adequate analysis of the concept of causation.

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NOTES

1. For an extensive discussion of contemporary approaches to causation, see Hulswit 2002.
2. This section is based on an extensive discussion of the historical development of the concept of cause. For this discussion and for further references, see Hulswit 2002.
3. This does not hold for the singularist Anscombe (1971). She holds that causation means the *production* of an effect by a cause, rather than some sort of law-like *relation* between a cause and its effect.
4. See also Whitehead (1929) 1978: 237.
5. For an extensive discussion of Peirce's concept of causation, see Hulswit 2000, 2001, 2002.
6. I have borrowed this insight from Debrock (1988).

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