

CAUSATION

Chapter 7

7. Conserved Quantities and Continuous Processes

The three Humean approaches considered so far all offer a reductionist *analysis* of causation. Analytical reductionism is not, however, the only form that reductionism with respect to causation can take. Thus, even if it does turn out to be the case that causal facts are not logically supervenient upon noncausal ones, there is still the possibility of an *a posteriori* identification of causal and non-causal facts.

The idea of a non-analytic reduction of causation has been advanced over the past few years by a number of philosophers. Thus David Fair (1979), for example, proposed that basic causal relations can, as a consequence of our scientific knowledge, be identified with certain physicalistic relations between objects -- relations that can be characterized in terms of the transference of either energy or momentum between the objects involved, while, more recently, Wesley Salmon (1997) and Phil Dowe (2000a and 2000b), have proposed that causal processes are to be identified with continuous processes in which quantities are conserved. Thus Dowe (2000b, p. 173), for example, suggests the following account:

Causal Connection: Interactions I_1, I_2 are linked by a causal connection in virtue of causal process p only if some conserved quantity is exchanged in I_1 , and transmitted by p .

What are the general prospects for a contingent identification of causation with such physicalistic relations? Perhaps the first point that needs to be made is that once one abandons the view that causal relations are logically supervenient upon noncausal states of affairs, and embraces an *a posteriori* reduction, one is left with the question of how the concept of causation is to be analyzed.

But does someone who advances a contingent identity thesis really need to grapple with this issue? Can it not be left simply as an open question? Perhaps, but the situation in the case of contingent identity theses concerning the mind suggests that this may very well not be so. For until a satisfactory analysis has been offered, there is the possibility of an argument to the effect that it is *logically impossible* for causal relations to be identical with any physicalistic relations. In particular, might it not plausibly be argued that the concept of causation is the concept of a relation that possesses a certain *intrinsic* nature, so that causation must be one and the same relation in all possible worlds, just as what it is for something to be a law of nature does not vary from one world to another? But if this is right, then one can appeal to the possibility of worlds that

involve causation, but that do not contain the physicalistic relations in question, or that involve non-continuous causal connections between events, in order to draw the conclusion that causation cannot, even in this world, be *identical* with the relevant physicalistic relation.

What is needed, in short, if an *a posteriori* reduction is to be sustainable, is a satisfactory analysis of the concept of causation according to which causation, rather than having an intrinsic nature, is simply whatever relation happens to play a certain role in a given possible world. But at present, no such analysis seems to be at hand.

A second problem for any contingent identification of causation with a physicalistic relation arises from the fact that one needs to find a physicalistic relation that, like causation, has a direction, but where the direction of the physicalistic relation does not itself need to be cashed out in terms of causation. In Fair's account, for example, the appeal is to the direction of the *transference* of energy and/or momentum, and this is exposed to the immediate objection that the concept of transference itself involves the idea of causation.

Fair's response to this problem is that the direction of transference can be explained in temporal terms, rather than causal ones (1979, 240-1). But this response involves substantial assumptions concerning the relation between the direction of time and the direction of causation. In particular, many philosophers think that the direction of time is itself to be explained in terms of the direction of causation -- a view that is immediately precluded by Fair's account.

If, on the other hand, one appeals to features such as the direction of the increase in entropy, or of open forks, etc., to supply the direction for causal processes, one encounters the problem that there are simple worlds, and temporally 'inverted' worlds, that have the same laws, and the same fundamental particles, as our world, but where the contingent identification being proposed either generates the wrong direction for causal processes, or none at all.

A third difficulty concerns the relation between brain states and the properties of experiences, or between thoughts and decisions and subsequent action. Thus, many philosophers hold that the phenomenal, qualitative properties of experiences cannot be reduced to non-emergent physicalistic properties. But if this is right, is it plausible that some quantity is conserved when a brain event gives rise to an experience, or that there is a transference of energy and/or momentum from the fundamental particles of physics to states of affairs involving qualia? Or is it plausible that when a thought results in behavior, some conserved quantity was transmitted from the thought to the brain? If these suppositions are not plausible, then any identification of causation with physicalistic relations presupposes the highly controversial claim

that the mind involves no properties other than those that are reducible to the properties and relations that enter into theories in physics.

In view of the above points, the prospects for a physicalistic reduction of causation do not appear bright.