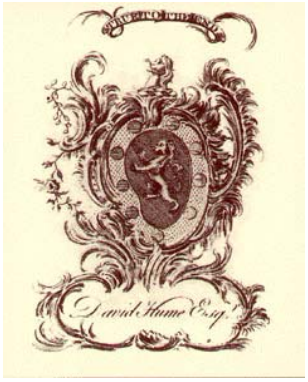

A Refutation of Hume's Theory of Causality

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Hume Studies Volume 2, Number 2 (November, 1976), 76-85.

A REFUTATION OF HUME'S THEORY OF CAUSALITY[1]

Given Hume's conceptions of space and time, which I take to be fundamental to his theory of causality, it is not always possible to meet all of those conditions definitive of the cause-effect relation, i.e., those "general rules, by which we may know when" objects really are "causes or effects to each other" (T.173).[2] To show this, it will be necessary, first, to give a very brief exposition of Hume's conceptions of space and time, with regard chiefly to their implications for the nature of motion. Then, after briefly summarizing his views on the nature of the cause-effect relation, I shall proceed immediately to my objection. It should be noted first, however, that, if one instance of a cause-effect relation can be found to which Hume's analysis will not apply, that, presumably, would be sufficient to refute his theory.

I shall not here repeat all of Hume's arguments for the indivisibility of space and time. Suffice it to say, he takes it to be fairly obvious that each must consist of a finite number of indivisible points or moments, each of which is distinct, and therefore separate, from every other, and, in the case of time, none of which ever "co-exist." Only one of his arguments for the indivisibility of space need concern us here. The argument is brief:

> *The infinite divisibility of space implies that of time, as is evident from the nature of motion. If the latter, therefore, be impossible, the former must be equally so. (T. 31)*

The argument here seems, roughly, to be this: the motion of an object can be described only by giving its positions at various times (the nature of motion). If, therefore, an object, such as a ball moving along a line AB, can be assigned an infinite number of positions taken between A and B (the infinite divisibility of space),

the time taken to traverse AB must also be infinite, i.e., must consist of an infinite number of instants. But the finite time taken to traverse the distance AB is not infinitely divisible; therefore, neither is the line AB. This argument, of course, relies upon the assumption that, in traversing the line AB, the ball will occupy each of the points (whether finite or infinite) of which it consists. The argument can also be turned around so as to derive the finite divisibility of time from that of space. Here, too, it must be assumed that the ball occupies each of those instants which constitute the time taken to traverse the line AB. It thus seems clear that, on Hume's view, the ball's motion can be neither more nor less divisible than the space and time it takes to move. In its motion from A to B, then, the ball will occupy first one, then another of the points lying between A and B until finally it has occupied them all and has moved from A to B. But, in saying that it will occupy first one and then another, we are saying nothing more than that it successively occupies a series of points, and, insofar as its occupation of these different points is successive, it takes time. We are in a position, then, to define motion (at least motion along a straight line) as "the successive occupation of adjacent, linearly ordered points or places."

Now, this is very different from the usual conception of motion. The ball's motion between any two adjacent points is not a moving from one to the other. It is simply its being in the one place at one instant and its being in the other place at the next. It is not a continuous motion, but the occupation of discrete places at different times. It is, as it were, a series of instantaneous leaps.

This interpretation, if it is accurate, may also serve to account for Hume's ill-understood propensity for

referring to cause and effect as objects rather than as events. Events must, on Hume's view of time at least, be essentially static. Unlike those of space, the indivisible parts of time never "co-exist," and there can be no motion or change in a single instant. Hence, given the instants t_1, t_2, and t_3, and an object X, then, if X is changing, we may say that at t_1 it is in a state or condition Xa; at t_2, a state Xb; and at t_3, a state Xc. What we will have, then, is, in effect, three different objects existing at three different times. That this process may give the appearance of continuity is to be explained solely by the fact that the difference in the object from one instant to the next will be, in most cases, almost imperceptibly small.[3]

I have been concerned so far to give only an outline of Hume's views on the nature of time, space, and motion. What I shall attempt to show is that, from what he said about time, space, and, indirectly, motion, it follows that his understanding of the nature of the cause-effect relation cannot be correct.

Let us take the following example: If two billiard balls strike each other in a particular manner, they will both come to a complete stop. The balls' striking we call the cause; their stopping, the effect. In Humean terminology, these events would be conjoined "objects," and, as different objects, they would be discriminable; that is, they would be two separate and distinct things (objects or events) which, when conjoined in a particular manner, constitute this particular cause-effect relation. As Hume would later put this, "Every event is a distinct event from its cause."[4] The difficulty with this view of causation and the relation between cause and effect is that the requisite conjunction cannot be obtained. In order to show this, it will be necessary first to give a brief outline of Hume's remarks on causation.

The first step in Hume's argument is to determine the relations between objects that give rise to the idea of causation. The first of these is contiguity. Every cause is contiguous with its effect. Such contiguity must be both spatial and temporal (T. 173, rules 1 and 2). As Hume puts it, "nothing can operate in a time or place, which is ever so little remov'd from those of its existence" (T. 75). Where such contiguity appears to be lacking, we find upon closer examination that they are connected by a chain of causes such that the effect is finally caused by an event which is contiguous with it (T. 75). In other words, making a distinction between remote and proximate causes, we may say that the remote cause is connected with the effect through a chain of causes, the last one of which is the proximate cause, and that the proximate cause is that event which is contiguous with and which produces or causes the effect.

Immediately subsequent to this argument, Hume argues for the further relation that the cause must be prior to its effect. To do away with the relation of priority of cause to effect, he argues, would entail "the utter annihilation of time," since, if every cause were "co-temporary" with its effect, there would be no succession, "and all objects must be co-existent" (T. 76). The argument here relies heavily upon the view that time is a succession of indivisible instants, and I believe Hume's view of causation will stand or fall with his conception of time.[5]

I must pause here to answer a possible objection. It might be noted that, after giving this argument to show the necessary priority of cause to effect, Hume allows that "the affair is of no great importance" (T. 76). I believe this is so, on his view, because he is not here concerned so much to elucidate the nature of causality as the idea of necessary connection. When, however, he

comes later to state the "rules by which to judge of causes and effects," those rules which I take to be definitive of the cause-effect relation, that "the cause must be prior to its effect" is among them (T. 173).

Having made these two points, that cause and effect must be contiguous in both space and time and that the cause must precede the effect, there is only one point which remains to complete the definition. That, of course, is the idea of constant conjunction. From Hume's first definition of "cause," however, "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" (T. 170), it is clear that the notion of constant conjunction is reducible to that of contiguity, in the sense that an object A can be said to be the cause of an object B only if the two are always contiguous in both space and time (and, of course, if it always precedes its effect). This would seem to be the point of Hume's remark in the Treatise, p. 87. Rules four through eight (T. 173-174) would seem to constitute just an elaboration of the implications of this requirement.

This, of course, is only the briefest possible outline of Hume's analysis of the cause-effect relation. I have intended to make only the three points that, on Hume's view, cause and effect are separate and distinct events; they are always contiguous; and the cause must precede the effect. This, I think, is just sufficient to provide an adequate basis for my argument.

Consider, for a moment, the motion of a billiard ball along a straight line extending from the initial position A to the final position J during the time period extending from t_1 to t_{10}. The ball's motion will consist in its being in position A at t_1, B at t_2... J at t_{10}. If we wish to account for the ball's moving

from A to J, we may say that the cause was the ball's being struck by the cue stick. The effect will be, presumably, its moving from A to J. When the ball is struck, however, at t_1, it is in position A. It is not until t_{10} that it is in position J. Now, the only object or event which is spatially and temporally contiguous with and prior to the ball's being at J at t_{10} is the ball's being at I at t_9. It is clear, then, that if anything is the cause of its being at J at t_{10}, it is its being at I at t_9 and not its being struck by the cue stick at A at t_1. Furthermore, if we describe the object or event which is the cause of its motion, rather than its being at J at t_{10}, we find that this is not its being struck, but its being in contact with the cue stick at A at t_1. The effect, then, will be, not its motion from A to J, but its being at B at t_2. However, if we consider the effect to be the ball's moving or going from A at t_1 to B at t_2, then the cause would not be what happens at t_1, since that is a part of the effect, but at t_0. But at t_0 the cue stick had not yet contacted the ball![6]

The foregoing argument is not conclusive; however, it can be strengthened. To repeat some important points: time is composed of indivisible instants, and a cause occupies the instant immediately preceding the instant occupied by the effect. We may return now to my earlier billiard ball example: two billiard balls strike each other in such a way that they both come to a complete stop. We may suppose that the positions of these balls, when they strike, will be A and B, and we may refer to their positions prior to their striking by number subscripts. Now, let us say that at t_1 the balls will be in positions A_2 and B_2; at t_2, in position A_1 and B_1; and, at t_3, in positions A and B. At t_4 they will, again, be in positions A and B.

Now, if their striking is the cause of their

stopping and if their striking is defined as their being in contact, that is, as their occupying positions such that parts of each ball are spatially contiguous, then their striking occurs at t_3. But their stopping also occurs at t_3. It is at this point that their respective motions, that is, their successive occupation of different, linearly ordered points or places ends. And, if the cause in this case is their striking and the effect their stopping, the two "events" are one and the same event occupying one and the same time. Note that we could not describe the cause as their moving and the effect as their being at rest. If the cause is their moving, the cause is not, then, contiguous with its effect, since their motion consists at least of their occupation of different places at successive instants prior to their stopping. In other words, their moving will consist of their occupying A_1 and B_1 at t_2, followed by their occupying A and B at t_3, and their being at rest will consist of their occupying A and B at t_3, followed by their occupying A and B at t_4. Since, in this case, a part of the cause is what happens at A_1 and B_1 at t_2 and a part of the effect, what happens at A and B at t_4, the two events are not contiguous (here it must be remembered that we are speaking of these events as events rather than as objects, a move which is not really permissible in the context of Hume's theory), but a further and more important problem here is that their occupying positions A and B at t_4 is a separate and distinct event or object from their occupying A and B at t_3, which is, in its turn, a separate and distinct event from their occupying A_1 and B_1 at t_2. There is, then, an intervening event between the events of t_2 and t_4 which constitutes part of the cause and part of the effect. In other words, the cause and effect are as follows: t_2t_3 (or A_1B_1 AB) and t_3t_4 (or AB AB). There is an event which is shared between them (their being at A and B at t_3) as an

integral part of each, and the cause and effect are not, therefore, separate and distinct, contiguous, or successive.

It might, of course, be objected that their stopping does not occur until t_4 or, in other words, that their stopping does not occur until an instant after their striking. This is, I think, an obviously ad hoc objection, for we do ordinarily think that the balls stop when they strike and not an instant later. However, the objection can be easily met. If we assume that the effect is their stopping or their being in contact at t_4, it is clear that there is no difference whatever between the cause and the effect except that some time has elapsed. The two objects (at t_3 and t_4) are identical; they are one and the same. But if this is denied, the objection may be met in this way: their being in contact at t_3 is the cause of their being in contact (or, at least, of their not moving farther) at t_4, and the cause of their being in contact at t_5, and so on. Now, if we trace this chain of causes backwards, we find that every effect (as should be the case by rules three and four) has the same cause and every cause the same effect -- except their being in contact at t_3, which is the effect of their being in positions A_1 and B_1 at t_2, and two very different causes will have precisely the same effect.

The only way to avoid the conclusion that cause and effect are, at least in this case, one and the same event, is to say that the cause of their stopping is not their being in positions A and B at t_3, but their being in positions A_1 and B_1 at t_2. In other words, it could be argued that the cause is not their striking at all but their moving toward one another (their being at A_1 and B_1 at t_2). On this view, it could be allowed that their striking and their stopping are one and the same event or two different ways of describing the event, and it would still be the case that their cause occurred at the

immediately preceding instant. Now, this objection appears to be compelling and in order to show that it is not, it will be necessary to view the events in question in a somewhat different light. Let us say that, rather than the balls' striking being the cause of their stopping, ball A's striking ball B is the cause of B's stopping and B's striking A is the cause of A's stopping. I believe it will be admitted that this is no more than just a different way of describing the event without changing it. Now, if the objection were accepted, it would follow that the cause of ball A's stopping at t_3 is ball B's being in position B_1 at t_2. In this case, the cause is clearly antecedent to and temporally contiguous with its effect. It is not, however, spatially contiguous with it, since the position B lies between the positions A and B_1.

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1. I wish to thank my colleague and former teacher, Professor James Noxon, for his comments on an earlier version of this paper.

2. All references to the Treatise of Human Nature (abbreviated T) are to the Selby-Bigge edition (Oxford, 1888).

3. That Hume himself understood this consequence is fairly clear. Note his own example, T. 35.

4. An Inquiry Concerning Human Understanding, ed. Charles W. Hendel (Indianapolis: Bobbs-Merrill, 1953) p. 44.

5. For instance, if the fact that A causes B entails that (1) A is prior to B in a linearly ordered series, (2) that A is separate and distinct from B, so that there can be no common or overlapping elements within the series, and (3) that A is contiguous with B so that there can be no third instant C which is within the series and between A and B, then it would seem clear that the fact that A causes B entails also that time cannot be infinitely divisible.

6. This argument is very similar to one proposed by Justus Hartnack ("Some Remarks on Causality", Journal of Philosophy 50 (1953), 466-71). Hartnack's argument fails to take account of Hume's theory of space and time, however, and, with that taken into account, I take it to be obvious that Hume's theory has not yet been refuted (he need only reply that it is not necessary that the cue contact the ball. The cause is what happens the instant before, i.e., its approaching the ball), although it has been made to appear very odd.