CHAPTER III
DIFFERENT APPROACHES
TO
THE PROBLEM OF CAUSAL ASYMEIRY
It is customary to equate causal asymmetry or priority with temporal priority. This view is ascribed to David Hume. According to him, if c causes e then c is temporally prior to e.\(^1\) In the contemporary times it is advocated mainly by the positivist thinkers. Among them, there are subtle variations. We will take Prof. Berofsky\(^2\) as their representative thinker for an explication of this view.

There is a growing discontent among the philosophers regarding regularity view on causal notions as a whole. Consequently, there is a search for an alternative. Some of the main tendencies which the dissertation intends to discuss in brief are as follows:

REGULARITY THEORY

One very natural approach to the problem of causal priority or asymmetry involves the following two claims: First, that one state of affairs can be causally prior to another only if it is also temporally prior. Second, that the relation of cause and effect is asymmetric because the relation of being earlier than is asymmetric, and the direction of causal processes is nothing more than the direction of time.

This appears to have been clearly articulated by Hume, and it has also been accepted by a number of present day philosophers, such as Suppes. Hume says that of two constantly conjoined events, the earlier is the cause and the latter is the effect.

Following Hume, most of philosophers and the logicians, especially the positivist thinkers, thought that the asymmetry displayed in the causal relations is cue to the asymmetrical nature of time. For example,

J. S. Mill\textsuperscript{4}, a great logician, equated the causal asymmetry in terms of temporal model. That is, the causal relation has a \textit{temporal character}, in the sense, that the cause 'precedes' the effect in point of time and that the former is also 'continuous' with the latter. There is a 'causal chain' connecting the events allegedly separated by temporal intervals. From x to y, the passage is like 'x - u - v - y'. This presupposes continuous time medium. There is, as such, no problem with the continuous time medium. For a description of an event it is lifted out of the continuum. Language forces upon us a discrete time medium. One should be very clear and also cautious of the situation, or else, is likely to land in the whirlpool of zeno's paradox.

according to Mill, the causal relation is an asymmetrical one. Since the 'antecedent' event in time is the cause, there is no possibility of interchanging causes and effects. Mill is very clear in his analysis of causation. But unfortunately, there has been a tendency in modern physics, possible under the influence of the

Uncertainty principle of Heisenberg, to repudiate the conception of causality. The present day physicists want to replace 'causal determinism' by 'statistical probabilities'. Thus causation ceases to be a case of only 'regular precedence'. In this way, it is thought that the reference to 'time factor' way be, and actually has been, cropped from the concept of cause. With it, also goes away the character of asymmetrical relation in causation.

Similarly, positivist thinkers, following Hume, claim that if two events are found to be "constantly conjoined" and "contiguous" in our experience, then the earlier item causes the later one. It appears that there is an oncological category mistake. Because, "constant conjunction" demands generic events, while "continuity" demands particular events. Thus, positivist thinkers hold that causes are always operative along with the direction or time. Some are of the opinion that temporal order is determined through causal order.

So, positivistic and empiricistic view is that there is no separate category called "causal priority". It is only a subset of temporal priority. They rule out every possibility of simultaneous as well as backward causation. This creates a problem at the oncological level. Let us assume that c cause e. In that case c is temporally prior to e. To apply the notion of temporal priority within a small time interval, time has to be viewed as a discrete medium, which it is not. To avoid this difficulty the positivists grant that e should not occur temporally prior to c, thereby granting the possibility of simultaneous causation.

Bernard Berofsky, in his book. Determinism, proposes an analysis of causal priority which remains within the framework of "regularity" theory, claims that, where c causes e, there be some set of laws, L, meaning postulates, and factual assumptions such that a statement asserting the occurrence of c taken together with these laws, etc., entails a statement assorting the
occurrence of e. Difficulties of causal direction arise because in many such deductions when 'c' and 'e' are interchanged the deduction remains sound. Berofsky suggests a condition that would rule out of law L₁, from being applied to c in terms of e; if there is another law L₂ that can account for c and also account for facts other than the occurrence of c for which L₁, cannot account, then L₁ cannot be legitimately applied in an account of c. His major difficulty, as pointed cut by Douglas Ehring, is that "if we allow for the possibility of causes that are not subject to any legitimate lawful account, this approach cannot be the whole story" 6.

The Humean thesis, is however, exposed to at least three objections. The first is that this approach cannot provide a satisfactory account of temporal priority. Because if the direction of causation is to be analysed in terms of the direction of time, and asymmetry of causation explained in terms of the asymmetry

of temporal model, then a causal theory of the direction of time is exposed to circular fallacy. So an advocate of the present approach must hold that either the concept of temporal priority is analytically basic, or that it can be analysed in non-causal terms, however, it can be argued that neither of these is ultimately plausible. This thesis does not argue these points in details.

The second objection is directed against the claim, that one state of affairs can be causally prior to another, only if it is also temporally prior. The thrust of the second objection is that it is logically possible for a cause to be simultaneous with its effect. That is to say, there seem to be cases of simultaneous cause-effect pairs. The causal asymmetry in such cases obviously can't be accounted for in terms of temporal asymmetry alone.
There are two main ways of attempting to support the claim that it is possible for cause and effect to be simultaneous. One is to describe cases, either actual or possible, in which it seems plausible to say that a cause is simultaneous with its effect. The other involves supporting the claim that causes can be simultaneous with their effects by arguing for the stronger thesis that they must be. Can the former claim that it is at least possible for cause and effect to be simultaneous be supported by actual cases? This question may be answered in the following way. Let us consider a pencil that begins to move when a force is applied to one end of it. It is natural to suppose that the force that is applied to one end of the pencil causes the simultaneous motion of the other end. This supposition cannot be correct, since it's incompatible with the theory of relativity. But what exactly is wrong with the case? The answer is that, since our world does not contain any perfectly rigid bodies, it is not true that at the precise instant when
the force is applied to one end, the other end will immediately begin to move. The fact is that the end of the pencil to which force is applied is accelerated, and undergoes compression, with the result that the other end of the pencil does not begin to move until compression has occurred throughout the length of the pencil. So it is not the case that the force exerted at a given instant causally brings about, at the very same instant, the movement of the other end of the pencil.

The problem here is, of course, a very general one; it is not tied to the particular example just considered. For if relativity theory is correct, there is a finite limit to the speed with which causal processes can be transmitted. So actual examples of simultaneous causally related events can never involve events that are spatially separated.

Let us search for other actual examples of simultaneous causally related states of affairs.
Consider the cases of physical objects that are in contact, will it not be true that, if one of the object is moved, it is the movement of the surface of that object which is the cause of the movement of the part of the surface of the other object that is in contact with it? If so, the claim that this is a case where cause and effect are simultaneous will not conflict with the relativity theory. Because there is no distance between the two surfaces.

But this sort of example is not satisfactory either. The basic problem is this: on the one hand, if the relevant part of the surface of either object has only thickness, then the same sort of difficulty will arise as in the above case of the pencil. And if neither surface has any thickness, they can't be in contact. because, if the surfaces have no thickness, they can be represented by closed sets of points, and two such sets cannot stand in the relation that is required if the corresponding objects are to be in contact. From the actual cases discussed above, it may be concluded
with a fair degree of certainty that our world does not, in fact, contain any esses in which a cause and its effect are simultaneous. It seems, therefore, that one must instead consider whether one can describe logically possible cases in which a cause and its effect would be simultaneous. Some philosophers are of the opinion that the possibility (logical or perhaps physical) of simultaneous causation must be considered.

Let us now turn to the second part of the objection which is more dramatic. In this part, we intend to establish the claim that causes can be simultaneous with their effects by arguing that they must be. On the fact of it, this line of thought seems rather unpromising. For, as Richard Taylor has argued, if all causes were contemporaneous with their effects, temporally separated states of affairs could never be causally related.\(^7\) We know that temporally separated events are sometimes causally related. But Prof. Myles Brand\(^8\) has

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argued for the view that it is a mistake to think that temporally separated states of affairs are even causally related. The argument that brand offers rests upon what he refers to as Hume's maxim:  

"For any event e and f and time interval t if e occurs during t and e does not change during t and e is the cause of f, then f occurs during t".

But we may ask: what reason is there for accepting this claim? Brand's answer to this question is as follows:-

"Hume's maxims says that if an event e occurs during t and does not genuinely change during t, then f also occurs during t if e is the cause of f. Suppose that, contrary to the maxim, e occurred during t, e remained the same during t, e was the cause of f, but f began after e began. However, if f began after e began, then something happened after e began to have made f began. There was nothing, however, that happened after e began that could have made f began. No other

9. Ibid, p.147
event could have made $f$ began after $e$ began, since $e$, was the cause of $f$; and no change in $\xi$ during $t$ could have made $f$ began offer $e$ started, since $\xi$ did not change during $t$. Thus $f$. did not begin after $e$ began, and the denial of the maxim does not specify a situation that canoccur".¹⁰

One may think that Brand's argument seems weak for the following two reasons(i) What is logically untoward about there being a causal law expressed by a statement of the form 'If $x$ has property $p$ at time $t_1$ that state of affairs will directly give rise to the existence of some ether entity, $y$, that will have property $q$ at time $t_1$, where there is a non-infinitesimal time interval, $d$, between $t$ and $t_1$? How does Brand, in the above argument show that there can not be such gap in causal connections? The answer is that Brand has not really offere any argument. He has simply asserted that '... if $f$ began after $e$ began, then something happened after $e$ began to have made $f$ began', (ii) the situation is

¹⁰. Ibid, p.148
the same it one sets aside the possibility of gappy causal laws, and considers the less esoteric case of laws according to which the value of some quantity at some point in time is causally dependent upon the value of certain quantities during a preceding interval. Thus consider a law which says that the velocity of a particle at some time $t_1$, is causally determined by its velocity at some earlier time $t_0$ together with all of the forces that acted upon the particle during the interval from $t_0$ up to, but not including, time $t_1$. Now, if there were no force acting upon the particle during that time interval, one would have a case that falls under Hume's maxim, since the velocity of the particle does not change during that time interval preceding time $t_1$. But it would be a case that falsifies the maxim, since the effect does not occur at the same time as the cause. Brand tries to show that this sort of case is logically impossible. But here, too, the only thing in his argument that is relevant to this case is the unsupported assertion that if $f$ began after $e$ began, then something happened after $e$ began to have made $f$ began.
These cases show, moreover, that the problem is not merely with Brand's argument. Since both sorts of cases are logically incompatible with Hume's maxim, these possibilities show that the maxim cannot express a logically necessary truth.

The final question that needs to be considered is whether it would follow that if Hume's maxim were a necessary truth, that a cause must not be simultaneous with its effect. Brand does not develop his argument very carefully. But his basic line of thought appears to be this. Causes must be either events that involve change or events that do not. If the cause is an unchanging event, then Hume's maxim leads immediately to the conclusion that the event must be simultaneous with the cause. Suppose, then that the event involves change. It can then be resolved into a sequence of unchanging events, the final member of which will be the cause of the original effect. Hume's maxim can then be seen to hold.\textsuperscript{11} The main problem with this argument

\textsuperscript{11} Ibid., p.148
lies in the assumption that if one can cite some changing event as a cause of some other event, the former event can be resolved into a sequence of unchanging events having a final member which is the cause of the original effect. That this is false can be seen from the following sort of case. For example, a particle has velocity $V_0$ at time $t_0$, and during the interval from time $t_0$ upto, but not including, time $t_1$, is acted upon by a force that varies continuously. The particle having velocity $v_0$ at time $t_0$, together with the forces acting upon the particle during the interval, are causally sufficient to ensure that the particle has velocity $v_1$ at time $t_1$. Now, we may ask, can this cause be resolved into a sequence of unchanging events, the final member of which can be cited as the cause of the particle's having velocity $v_1$ at time $t_1$? The answer, obviously, is negative. For, no matter how small an interval, $At$, prior to time, $t_1$, is selected, the velocity of the particle, and the forces acting upon it, vary throughout that interval. There
does not exist, therefore, may unchanging event which is the cause of the particle's having velocity $v_1$ at time $t_1$. So Hume's maxim cannot be applied.

Thus, we may say, Brand's overall argument is, in short, rather unsatisfactory. His defence of Hume's maxim, upon which the argument turns, is unsuccessful. Moreover, the maxim itself does not appear to express a logically necessary truth. Finally, even if it did, it would not follow that causes must be simultaneous with their effects.

The third objection is that it is logically possible for an effect to precede its cause. Given the difficulty of establishing even the more moderate claim that it is possible for an effect to be simultaneous with its cause, this third line of attack may seem very unpromising.
The question of whether it is possible for an effect to precede its cause has been discussed very extensively, and most philosophers seem to feel that a negative answer is called for. A variety of arguments have been offered in support of this view. Some have argued that allowing both forward and backward causation gives rise to contradiction. Although philosophers are generally agreed that a cause must either precede the effect or at least be simultaneous with the latter, some of them, at least, are inclined to think that the impossibility of cause's succeeding the effect has not been demonstratively proved. Dummett, for example, is of the opinion that the question 'can a cause succeed its effects'? - is, after all, a sensible question. The question whether a cause can succeed its effect could, Dummett explains, arise in our mind from such considerations as the following.

A given change that is caused could be said to occur under a set of numerous conditions. Among these conditions are included both necessary and sufficient conditions. Now, from this it follows that if a particular event is necessary as well as a sufficient condition of another event, then the other event is also a necessary as well as a sufficient condition of that event. If, in certain circumstances, a projectile's striking the wall from a particular angle and with a particular velocity is both a necessary and sufficient condition of the rebounding at a given angle and with a given velocity, then its rebounding in the way that it did is also both a necessary and sufficient condition of its striking the wall with the particular velocity and from that particular angle. From this it follows that if an earlier event is a necessary as well as sufficient condition of a latter event, then the latter event is also in its turn a necessary and sufficient condition of the earlier one.\(^\text{13}\) There is nothing in the concepts of 'necessary' and 'sufficient' conditions

as such which necessitates their application to the latter event.

Take the example of the 'quasi-cause' which Dummett cites. A 'quasi-cause' resembles a 'cause' in every respect except that it is stipulated to succeed its effect. Such a 'quasi-cause' must, according to Dummett, satisfy certain conditions in order to establish its undisputable claim to be counted as a cause of its preceding phenomenon. Having these conditions in mind, Dummett constructs the following example of a 'Quasi-cause'. Let us suppose a certain man regularly wakes up three minutes before his alarm-clock goes off. This regularity is maintained even when he does not know that, and for what time, it has been set. He sleeps very late on those occasions when the clock fails to ring. Suppose also that one day the man forgot to wind the clock and the following morning he woke up very early and a friend of his, who knew nothing about this strange phenomenon, happened
Just to walk into his room and inadvertently set off the alarm clock just three minutes after the man wakes up. Could it not be reasonable to think in such cases that 'the man wakes up because the alarm-clock is going to go off'?  

Now although there is contradiction involved in the thought of an effect preceding its Cause, it seems almost impossible to show the reason why it must be contradictory. In our opinion, the only way to prove the contradiction involved in speaking of a cause succeeding its effect is by insisting on the point that a cause is essentially a producer. In order that a later event might cause an earlier event, the later event must be able to bring about an event in the past. But the only way to bring about an event in the past is to alter what has already happened. Yet everybody will object to such an absurd suggestion. The past is unchangeable, closed. But the question could still be asked. What

makes it impossible to speak of bringing about an event that has already happened? Does it reflect some arbitrary choice on our part to restrict the use on the expression "bring about" to events that have not yet happened? or is there some genuine difference between the past and the future which induces us to speak of 'bringing about' only future event?

Prof. Ayer suggests that the reason why we do not allow ourselves to conceive of our actions as affecting past events, is, not merely that the earlier events exists, but that they are, for the most part, already known to exist. Since the same does not apply to the future, we come to think of human action as essentially forward-moving. Normally, when one tries to bring something about, one is not certain of its happening. Because the future seems to us uncertain, we think that we must strive to bring things about. The past, on the other hand, is not unknown to the same degree, especially not the immediate past.\(^{15}\)

15. Ayer, A.J. The problem of knowledge, p. 175
The above suggestion, to us, does not appear to be the whole story. Our knowledge of any state of affairs does not make us mere spectators or the drama of existence. Even if we known that we are going to see satyajit Roy's movie at the cinema tomorrow, that does not make our going there redundant or fruitless. And if we sit down idly in our rooms doing nothing, we cannot be said to have known it already.

Moreover, our knowledge of the past is really not so certain as Prof. Ayer suggests. Even with regard to the immediate past, we can make mistakes about what we claim to know. So it cannot be true that we not try to produce something in the past because we are absolutely sure of what happened in the past. There are many instances where we are not sure whether something has happened in the past. Someone may ask, however, why do we not make any effort in those cases to find out whether the event has taken place by trying to wring it about?
Our suggestion would be that efforts cannot be ascribed to an agent to bring about something after the potentiality of a thing is actualized. Before some state of affairs comes into being, it could be said to be potential. Potentiality or possibility makes sense only in the case of the existence of alternatives (of existence and non-existence). When a potential becomes actualized, the alternatives of its existence are closed. We then make no efforts to bring it about, we do not perform any action intended to produce it because efforts make sense only in the presence of alternatives. Thus we make no effort to bring about a past event as the alternatives of its being and non-being are closed. But in the case of a future event we make efforts to bring it about, because there are alternatives to the existence of the event. Unless we make efforts to bring it about, unless we perform those actions that were intended to bring it about, it may not come into existence at all.
The concept of production is an integral part of the concept of causation. And the concept of production rules out the possibility that a past event may be brought about. We get instances of production primarily in the realm of human activities. Here, all the instances are cases of agents producing something in the future. There is no instance of an agent producing something in the past. But Humean concept of causation is not connected with production. Thus temporal asymmetry implies that backwards causation is an immediately obvious contradiction. Tut surely this is wrong. Even if there are, in the end, deep conceptual reasons (which we have already discussed critically) why effects can't precede their causes, they are not immediately obvious. We can certainly make some initial sense of precondition (where present mental states are affected by future events) and of travelling back in time (where the traveller's past behaviour is affected by his or her present day experience). Thus we ought to allow that backward causation is at least conceivable.
For example, one kills himself today (the cause) to bring about the last birthday of his life (the effect) that he actually celebrated ten days back.

The upshot is that it seems to support the conclusion that it is logically possible for an effect to precede its cause. We would seem to be Justified in concluding, then, that the asymmetry of causal processes, ana the direction of then, can not be explained in terms of temporal priority. So it cannot properly account for the causal asymmetry. In place of the temporal priority view a number of possible alternatives have been offered in the last two decades. Let us try for another approach.
Prof. J. L. Mackie clearly shows in his article "The direction of Causation" that causal asymmetry need not merely be temporal. He argues that causal asymmetry or priority may be accounted for in terms of fixity. Though uncertain that there are genuine cases of backward causation, he thinks that an account of causation should not rule out the possibility that some effects precede their causes. Mackie puts it:

"...it seems, conceivable that there should be evidence for cases of recognition, and if precognition were anything like ordinary perception it would involve backward causation: the details of the precognized object would be causally responsible for the content of the precognizer's belief and of the description he offers. It seems, then, that we recognize a relation which we may call causal priority, which holds in one direction only between a cause and its effects, and that this relation is not identical with and probably does not entail, temporal priority?"

Mackie tries to establish causal priority or asymmetry in two ways. The former one is as follows:

2. Ibid, pp.441-442
"If A and B are causally connected in a direct-line, then B is causally prior to A, if there is a time at which B is fixed, while A is not fixed otherwise than by its causal connection with B."

It may be remarked here that though, taken literally, the lints quoted above purpose only a sufficient condition for causal priority, Mackie fact takes it in the main body of the paper as both necessary and sufficients that A and B stand in such a relation is constitutive of B's being the cause, specifically, of A.

In a latter account Mackie Says:

"Suppose that X and Y are individual events, and x is seen as necessary (and sufficient) in the circumstances for y, so that the basic requirement for the judgement that x caused y is met, then, despite this, x was not causally prior to y if there was a time at which y was fixed while x was unfixed. If, on the other hand, x was fixed at a time when y was unfixed, then x was causally prior to y. Again, if x was not fixed until it occurred, then even if y also was fixed as soon as x occurred (given, of course, that x was necessary in the circumstances for y), x was causality prior to y. And further, if there is some line or chain of causation, some continuous

3. Ibid., p. 457
causal process, linking x and y and some other event z so that x was between y and z, and if a was not fixed until it occurred, then x was causally prior to y".4

Both these accounts explain causal asymmetry in terms of fixity. It is quite fundamental in Mackie's analysis. According to him, two individual events A and B are such that the basic requirements for the judgement 'a caused b' is fulfilled. Under the circumstances, Mackie says that a would be causally prior to b, if and only if, there is no such time, t, when b is fixed and a. is not fixed. This notion of fixity explains that causal relations are asymmetrical, without any explicit reference to time. In other words, he fixes it instead by appeal to the concept of events being 'fixed'. That is causes 'fix' their effects but not vice-versa. For example, 'if a and b are causally connected... , then if b is fixed at time when a is not fixed, it must be a which is the effect and b the cause'.

Hackle explain causal priority in terms of a distinction between fixed and unfixed events. The outcome of his analysis seems to be this: If an event $A$ is epistemologically fixed before another event $B$, this precludes $B$ being the cause of $A$. Mackie sums up his reasons for accepting this principle in the following passages:

"Although we may be able to infer a cause from a previously known effect this would only show that the cause occurred; it would smooth the way to our knowledge of the cause, but not to its existence, whereas if we explain the effect by reference to the cause we show how the way was smoothed to the existence of the effect. And above all, if the effect was unfixed when the cause was fixed, we cannot explain the cause's actually being there by reference to something which still might not have happened: what is explained must depend upon what explains it, so the latter cannot have been less ontologically solid than the former?"

This leads us to ask: what does it mean to say that an event is fixed at a given time? Mackie, construes that an event $e$ occurring at time $t$ is fixed at $t_1$ if and only if either $t_1$ is not earlier than $t$, or there

5. Ibid., p. 185
is some event d which is nomologically sufficient for e, and which occurs at or before time \( t_1 \). There are a number of objections against Mackie's analysis of causal priority.

Firstly, as Mackie himself points out, his account implies that the world is totally deterministic. That means, it is to be understood as a world in which, for every contingent state of affairs involving particulars, there is a temporally prior, nomologically sufficient condition that no states of affairs would stand in the relation of causal priority. "...if total determinism holds, and there was not even a first creative event, our present concept of causal priority will not be true of the real world."\(^6\)

Thus, it seems that Mackie's account of causal priority can obtain between events only if there is some time at which the events are not fixed, and in a totally deterministic universe this will not be so. He is not especially troubled by this consequence.

\(^6\) Ibid, pp.191-92
Yet surely it is rather surprising that our ordinary concepts of causation has the consequence that it is logically necessary that some events be causally undermined.

Secondly, an analysis of causality need not beg the question against determinism. It is not relieved by the likelihood that indeterminism holds at the microlevel. The vast majority of causal connections with which we are acquainted occur on, the macroscopic level and have a direct dependency on microscopic indeterminism. Thus, the vast majority or causal connections do not satisfy Mackie's requirement that the effect be unfixed prior to the cause's occurring.

Thirdly, in analysing causal priority in terms of fixity, which in turn involves the notion of temporal priority, Mackie faces the problem that confronts any attempt to relate causal priority to temporal priority. namely, what account can be given of ten oral priority?

Can it plausibly be treated as primitive, or is some analysis called for? And if the concept of temporal priority stands in need of analysis, is there any satisfactory alternative that does not involve causal notions? If not, then Mackie's account of causal priority is implicitly circular.

Fourthly, Brown's challenge against Mackie's analysis of causal priority is that there seems to be an ontological difference between cause and effect in the sense that causes smooth the way to the existence of their effects, while effects do not relate in the same manner to their causes. This ontological primacy of cause has to be taken account of, even if it is not possible to match it by an epistemic analysis.\(^8\)

Another objection arises from a possibility mentioned by Douglas Gasking.\(^9\) Let us suppose that iron glows in a certain way only when its temperature is at least 1000°C. It seems possible that the state

of affairs, which is iron's being at that temperature, might have precisely the same spatio-temporal location as the state of affairs, which is the iron's glowing. But even if that were so, one could. Gashing argues, know that the former was causally prior to the latter, in view of the fact that the heating of substances always makes them hotter; but does not in general make them glows that iron glows at 1000°C.

Someone may ask: why does this sort of case constitute a problem for Mackie's analysis? The reasons are (i) given that the events occur at the same time, and that each is nomologically sufficient for the other, there cannot be any time at which one is fixed, and the other not. And (ii) given that they also occur at the same place, there can be no intervening causal process by virtue of which one is causally prior to the other. So if such cases do occur, or if, at least, they are logically possible then Mackie's analysis must be unsound.10 we may, therefore, very well conclude that the notion of fixity fails to capture, the notion of causal asymmetry. Let us now pass to another alternative.

David Hume implicitly attempts a counterfactual analysis of causation. He says in his *Inquiry*:

"... if the first object had not been, the second (would) never (have) existed". (See, *An Enquiry concerning Human Understanding*, p. 76)

Although he himself never took the connection between counterfactual and causation seriously, some other philosophers certainly have. Only in the recent past, counterfactuality entered into the discussion as a basis for distinguishing laws from accidental generalizations.¹ The main distinction between them is that laws support counterfactuals, but accidental generalizations do not. This line of argument was often used by those advocating an entomological approach.

The counterfactual approach, however, has recently taken a new direction. Encouraged by the success in possible-world semantics for counterfactuals,² attempts are now in progress to explicated 'cause' in terms of

counterfactuals and to bypass the detour into nomologicals. Let us consider Lewis account of counterfactual dependency briefly.

David. Lewis has argued in his article "causation"\(^3\) that \(c\) cause \(e\) just in case \(e\) counterfactually depends on \(c\). For him, in the counterfactual dependence of \(e\) on \(c\) is absent, \(e\) is absent too. We can summarize Lewis's account in the following two statements:

a) An event \(e\) causally depends on an event \(c\) just in case if \(c\) had not occurred \(e\) would not have occurred.

b) An event \(c\) is a cause of an event \(e\) just in case there is a chain of events from \(c\) to \(e\), each event in this chain being causally dependent on its predecessor.

It follows that the counterfactual conditional "if \(c\) had not occurred, \(e\) would not have occurred," entails, under Lewis's analysis, the causal statement "\(c\) caused \(e\)."

In another article, Lewis further addresses the question whether this kind of analysis can account for the asymmetry of causation.\textsuperscript{4} The difficulty is this: given that in general the nearest world in which a cause is absent will be one where the effect is absent, what stops us from symmetrically taking it that the nearest world in which an effect is absent will be one where the cause is absent, thus ending up with effects causing their causes as much as vice-versa.

Lewis' answer is roughly along these lines. A given particular cause will characteristically produce a range of independent chains of particular effects (consider the way in which an explosion, say will leave traces all over the place.) But a given particular effect will very rarely be produced by more than one chain of particular causes (only one lighted match, or bolt of lightning, or finger on the button, or whatever, will normally be responsible). As Lewis put it, effects

are rarely overdetermined by their causes; but the overdetermination of causes by effects is absolutely normal. And then he argues that the nearest possible world without a given effect will still contain the cause, because there will be lots of other effects left to fix the cause, but take away the cause and there will be no alternatives left to fix the effect.

We may say that the key counterfactual 'if c had not occurred, e would not have occurred' - is true (in the actual world) just in case some possible world in which neither c nor e occurs is closer to the actual world than any possible world in which e but not c occurs. Closeness of possible worlds to the actual world is to be understood in terms of one world resembling the actual world in respect to overall comparative similarities more than another world resembling the actual world (However, the notion of 'actual world' need not be metaphysical, it is only indexical).

There are two major charges against Lewis' account of causation. J.Kim objects to Lewis' classification of certain kinds of cases as one of causal dependence. Among these some, Kim observes, exemplify an 'analytical' or 'logical' relation, and other in which one event is a part of another. Bernard Berofsky objects to Lewis' contention that the vagueness of counterfactuals infects causation we shall try to look more closely into the above objections.

First, Lewis defines counterfactuals as 'if c had not occurred e would not have occurred' entails 'c caused e'. We obtain a counterexample to this definition by letting c be 'jadu's getting married' and e be 'Jadu's not remaining a bechelor'. There is some sort of analytical tie between 'getting married' and not 'remaining a bachelor', not a causal connection or using kim's well known example, let c be 'socrates drinking the hemlock' and e be 'Xanthippe becoming a

window'. There is some kind of dependency between 'socrates drinking the hemlock' and 'Xanthippe becoming a window', but it is a non-causal connection.\(^7\)

Second, Lewis analysis of counterfactuals cannot deal with cases of overdeterminism. There are two main types of overdeterminism, namely; (a) preemptive overdeterminism (in short 'POD') and (b) simultaneous overdeterminism (in short 'SOD'). In the POD, one event causes a second, but the second event would have been caused by a third event if that event was not prevented from occurring by the first one. And in the SOD, two events in fact occur such that each is causally sufficient for a third. For example, suppose that \(S_1\) and \(S_2\) are switches, equidistant from a bulb \(B\). Suppose also that \(S_1\) and \(S_2\) are flipped at precisely the same time. The following diagrams, Fig.1 representing SOD and the fig. 2 POD (where \(S_1\), \(S\) being flipped breaks the connection between \(S_2\) and \(B\) ) make the example illustrative.

Lewis' position can deal with POD. The counterfactual if $S_1$, had not been flipped, B would not have lighted' is false, since the flipping of $S_2$ would have lighted B. But from this it does not follow that $S_1$'s being flipped did not cause B's being lighted. For there is a causal chain, consisting of the events of the current's flowing through the wire from $S_1$ to B, the filament in B becoming heated, and so on, such that each is causally dependent on its predecessor.

It is more difficult for Lewis to account for SOD. His definition of counterfactuals yield the result that B's lighting is caused by neither the flipping of $S_1$ nor the flipping of $S_2$. There is no counterfactual dependency between B's lighting and the predecessor-event in the $S_1$-chain, and similarly in the $S_2$-chain; if $S_1$'s flipping had not occurred, B would have nevertheless lighted because $S_2$ was flipped, and similarly for $S_1$'s flipping. Moreover, given that there are no other plausible candidates for the cause of B's lighting, its lighting is an uncaused event.
Lewis dismisses SOD as "test cases" because he lacks "firm naive opinions about them". But whatever naive opinions one has about these cases, surely the result that B's lighting is uncaused cannot be accepted.

Third, Prof. Bereofsky raises minor and major objections against counterfactual analysis of causation. According to him, Lewis' analysis is in certain respects too weak and in other respects too strong. Bereofsky argues that cases of genuine overdeterminism in a deterministic context provide examples of causes that turn out not to be causes on Lewis analysis, for they are not necessary conditions. Bereofsky also argues that the respect in which the counterfactual analysis is too strong is in making every necessary condition a cause. Since the counterfactual analysis of causation ultimately makes use of the concept of comparative similarity of worlds, a concept conceded to be vague by its creator, Bereofsky poses a question as to the legitimacy of allowing this vagueness in the analysis of causation.
In spite of the above criticisms, this line of approach is further developed by J. L. Mackie.\(^8\) He formulates an account of causal priority in counterfactual terms. In accordance with this terms; \(c\) is causally prior to \(e\) if and only if \(c\) and \(e\) are causally connected on a particular occasion and, if a small change were made such that \(c\) and \(e\) had not been so connected on that occasion but things had been as far as possible as they were, \(c\) would have occurred but \(e\) would have failed to occur.

Mackie illustrates this view with an example of two causally related items, e.g. the rotation of a drive shaft and the rotation of the rear wheels of a car. When the engine is moving, the car along the road, the rotation of the wheels is causally dependent on that of the drive shaft. What does this mean? The answer is: '... this means that if the connection between the two rotations had not been there—say, if the differential had

failed or had been missing - but things had otherwise
been as far as possible the same, the drive shaft would
have been rotating but not the wheels" As Mackie put
it, the directed conditionally is formulated in terms
of a counterfactual conditioned of which the contrary-
to-fact antecedent is that the causal relation between
the relevant items is absent. The antecedent also
includes the condition that the failure of the causal
relation is the result of a 'small change in the
circumstances'- so that the circumstances are as far
as possible the same. The consequent of the conditional
states that the cause-event occurs but the effect-event
fails (or might fail) to occur.

This analysis of causal priority, in general,
is vulnerable to counterexamples involving preemption.
Suppose, for example, the "small change" required to
eliminate the causal connection between £ and e brought
into play in some otherwise preempted cause d, which
in the absence of this connection, causes e.

Secondly, Doughlas Ehring\textsuperscript{10} points out that suppose f is a necessary condition of the causal relation between \( c \) and \( e \), where \( c \) causes \( e \) elimination of \( f \) will eliminate the causal relation between \( c \) and \( e \). However, we can suppose that \( f \) is also a necessary condition for both \( c \) and \( e \). For example, \( f \) may be the presence of oxygen and \( c \) and \( e \) two fires. Thus, if \( f \) fails to occur so will \( c \) and \( e \), and Mackie's analysis will not provide a verdict on which is the cause relative to the other. That means, Ehring suggests a concrete instance, where \( c \) and \( e \) are two fires and the \( f \) which is necessary both for the causal relation and for \( c \) and \( e \) separately is the presence of oxygen.

Thirdly, Mackie claims that his analysis is true where '\( A \)'s doing \( X \) is necessary, sufficient, or both' for B's doing \( Y \). Suppose that \( c \) is a sufficient but not a necessary cause of \( e \) such that \( e \) is causally overdetermined by \( c \) and \( d \), we then introduce a small change in the circumstances which eliminates any causal relation between \( c \) and \( e \). Since \( c \) is Causally overdetermined, \( e \)

occure in the absence of this causal link to $c$. If we further suppose that the small change made also eliminates a necessary condition of $c$, then we are required to conclude that $e$ cause $c$ contrary to our assumption.

The above counterexamples, therefore, show that Mackie's analysis does not provide an adequate reconstruction of our concept of causal priority, thereby initiating the search for an alternative approach.
TRANSFERENCE THEORY

An alternative approach which has gained recent adherents is perhaps best referred to as "transference theory" - Jerrold Aronson and David Fair provide the most detailed analysis of this view. Fair's account gives a revised version of Aronson's analysis of transference theory. Let us discuss them critically.

The main theme of Aronson's account of causation is the notion of "transference of same quantity (energy, etc.) from cause-object to effect-object". The following three necessary conditions (jointly sufficient) for the truth of "A cause B" are:

a) In "A causes B", "B" designates a change which is an unnatural one (i.e., change which cannot be accounted for without reference to the behaviour of other bodies).

b) In "A causes B", at the time B occurs, the object that causes B is in contact with the object that undergoes the change.


c) If "A causes B", prior to the time of the occurrence of B, the body that makes contact with the effect object possesses a quantity (e.g. velocity, momentum, kinetic energy, heat, etc.) which is transferred to the effect object (when contact is made) and manifested as B.

Now we try to illustrate the above mentioned conditions, as given by Aronson. He states that the theory of transference is meant to be applied to "mechanical" cases of causation. Condition (a) incorporates a distinction between two kinds of change, i.e., "natural" and "unnatural" - which in turn is presupposed by condition (c) A natural change is characterized as a change in an object that takes place independently of other objects, i.e., a change in an object that can be accounted for without reference to the behaviour of other individual objects. An example of a natural change would be a body in motion in a straight line with a constant velocity. In this example, we do not ask for a causal explanation of constant unilinear velocity. Aronson asserts that all natural changes are uncaused.

Unnatural changes are changes which result from the interaction of an object with other objects. According to Aronson, unnatural changer, unlike natural changes, are causal.4

This distinction between natural and unnatural changes, with the corresponding claims about their causal relations/ plays a crucial role in Aronson's account of causation. If some natural changes have causes, Aronson would be hard pressed to interpret those causal sequences in terms of the transference of same quantity.

Aronson clearly requires that "transference" involves at least two objects, one of which initially possesses the quantity and another to which the quantity is transferred. Since caused natural changes would involve only single object, no such transference could occur.

The transference theory suffers from at least three difficulties.(a) Aronson's assertion that there are no such caused natural changes is unwarranted. That is to say, not all causal sequences involves transference of a quantity from one object to another. Consider, for example, a chemical substance undergoing internal processes or an atom transmitting radiation. Although such processes in no way require explanation by reference to the interaction with other bodies, we still allow that these are causal processes. The fact that the changes in question are the result of internal processes does not by itself, either on conceptual or empirical ground, rule out that such changes are caused.\(^5\)

b) Second line of objection to this version of transference theory is directed against the claim that all causal processes involve the transference of some quantity. In other words, even in cases involving two objects, the causal sequence is not always accompanied

5. One might weaken this condition to require only transference between subparts of an object or objects, However, we must still deal with cases in which the quantity is released but not transferred to any subpart of any object.
by such a transference. Counterexamples of this claim may be generated along the following lines. Suppose that a light $L$ is on at time $t_1$, and at time $t_2$ a switch is turned off causing the light to go out. Clearly, there is no transference of a quantity from the switch to the light. Indeed, the causal efficacy of flipping the switch depends upon the elimination of any such transfer of electrical energy from the switch to the light. Other similar counterexamples may be constructed. In general we may suppose that A is a necessary condition for the occurrence of B in the circumstances and that there is some transference of a quantity from A to B. In order to cause the elimination of B, we eliminate the transference from A to B.

c) Aronson, in the course of his discussion, considers an objection to this theory. For instance, a catch is released "causing" a spring to pull a weight over some distance. The release of the catch certainly did not transfer any quantity to the spring. Aronsons
strategy, in this case, which be counts as an instance of a "triggering phenomena" - is to deny that the release of the catch causes the weight to move. He bases his denial of this causal Judgment on a distinction between what he calls, "causes" ana their "occasions" - the latter being "a condition for making possible", i.e., a condition that allows the cause to act. This distinction between "causes" and "occasions" cannot be sustained. Where more than one causal factor contributes to the effect, often each factor is necessary to the causal efficacy of the remaining factors. Thus the match may only be effective in starting a fire given the presence of oxygen, etc. The presence of the oxygen can legitimately be picked out as a cause. Aronson is not drawing a distinction between the cause and other causal conditions, rather, he is distinguishing between those factors which can be counted as causes and those which cannot.

Let us discuss Fair's notion of transference theory critically. He develops a version of transference theory which is not subject to many of the counterexamples
which are considered against Aronson's theory. Fair's revised formulation might be represented as follows:-

A causes B if and only if either A is a p-cause of B or A is an O-cause of B.

"p-cause" is an expression used by Fair to designate the crucial notion of cause and "O-cause" is introduced here to cover cases in which omissions play some causal role.

"P-causation, according to Fair, is the core notion of causation, whereas "O-causation" is a systematic extension of this core notion.

A is e P-cause of B if and only if there are physical descriptions of A and B as manifestations of energy or momentum such that either :-

i) this energy/momentum, at least in part, is transferred from A-objects to B-objects.

ii) this energy/momentum is transferred between A-objects and B-objects, and the physical re-description of A is a discription of an energy gain and B, an energy loss.

iii) the energy/momentum re-description of A is of a lowering of a barrier to the release of potential energy, and the physical re-description of B is of a manifestation, at least in part, of that released potential energy.

or
iv) A's physical re-description is of the raising of a barrier to the flow of energy or momentum, and B has a physical re-description as the interruption of the flow of energy or momentum.\(^6\)

Now we shall try to explain the above four clauses one by one. Clause (i) of the definition corresponds to Aronson's transference requirement. Fair does not require, as does Aronson, that on every occasion effects energy/momentum is transferred from the cause, A. Fair further specifies that the quantities transferred must be energy or momentum. Clause (ii) takes account of a certain class of cases which fail to satisfy the transference requirement of clause (i), specifically those in which transference runs from effect—objects to cause—objects. For example, it is correct to say, according to common sense, that placing ice in water causes the water to become cold, even though the energy flows from water to ice. Fair contends, however, that in all such cases the physical re-description of the cause will be an energy gain and of the effect an energy loss. Clause (iii

is addressed to another class of cases which do not meet the transference condition, those in which no energy/momentum may be transferred from cause—objects to effect-objects, but in which the cause consists of releasing stored energy. These causal sequences are the "triggering phenomena" which Aronson attempts to treat as non-causal. Clause(iv) picks out cases in which the cause consists of stopping the flow of energy/momentum.

It is important to note that 'O—cassation' involves cases in which either the cause or effect or both are omissions. In order to illustrate Fair's approach, the truth-conditions for one such case will be stated. The con-occurrence of $x$ causes the non-occurrence of $y$ if and only if in some plausible world $x$ p-causes $y$. 
The notion of "plausible world" is relative to persona and context, and is left purposely vague. Fair lists two additional clauses for causal relation in which one or the other but not both, cause and effect, are omissions.7

The first objection is, unlike Aronson, Pair does not distinguish between "natural" and "unnatural" changes. Fair does, however, seem to assume that causation must always involve 'objects' and that the "causal-objects" must be distinct from the "effect-objects". This assumption is inconsistent with cases of the following sort: two electromagnetic waves interacting in a closed system. In such cases, the causal interaction is independent of any objects. We might even imagine that the "objects", which are the source of these waves, have prior to their interaction, been converted to energy. At the same time, this assumption does not seem to be easily replaceable. One possibility is to define "transference more generally as a change in position, of quantity.

of energy/momentum, however, this modification generates its own difficulties. As Aronson makes clear in attempting to distinguish "unnatural" from "natural" changes, certain "transferences" of energy in this new sense do not involve causation. In the case of initial motion, for example no causal explanation is required although a quantity of Kinetic energy is transported from one point in space to another.

Another problem which has been raised against the traditional Humean account of causation is that of backward causation. Neither Aronson's nor Fair's version of transference theory is able to deal with such cases. Aronson does not even consider the issue, but Fair explicitly states that his account "does not rule out backward causation - as a conceptual possibility." However, it is far from obvious how a transference theorist could distinguish between cases of forward and backward causation. In the case of forward causation, "transference" consists of the possession of a quantity

8. Ibid., p. 241
of energy/momentum by an object at a time \( t_1 \) and the possession of that same energy/momentum (or a part thereof) by another object, at a later time \( t_2 \). The same would be true in case of backward causation. If a later event causes an earlier event, the corresponding "transfer" would be indistinguishable from a case in which earlier event caused the later, that is, the energy/momentum is possessed by one object at \( t_1 \) and by another object at \( t_2 \). Fair and Aronson must either reject the possibility of backward causation or provide us with some way of distinguishing forward from backward causation. The latter possibility would seem to require going beyond an account of causation simply in terms of "transference" alone. Thus we shall try to look at another alternative approach to tackle the problem of causal asymmetry.
In his recent paper "causal asymmetry", Douglas Ehring has proposed an account of causal priority or asymmetry based on the 'circumstantial' character of causal relations. The purpose of his paper, is to provide an "adequate reconstruction" of causal priority which will "apply to all empirically possible worlds".*

Ehring's account may be summed up simply as: on a particular occasion a given event c causes another event e just in case there are certain additional conditions or events, at least some of which are causally connected to £ but not to £. In order to develop a precise statement of this approach to causal priority, two key notion require clarification. One is that of "causal connection" and other is that of "condition of a causal connection". The first, that of a causal connection, is relatively unproblematic. That is to say

some event \( c \) is causally connected to another event \( e \) just in case \( c \) causes \( e \) or \( e \) causes \( c \). On the other hand, the second notion, that of a condition of a causal connection, is unfortunately less tractable. He claims that an event \( f \) is a condition of causal connection (CCC for short) of events \( c \) and \( e \) if the causal connection of \( c \) and \( e \) is counterfactually dependent upon \( f \). That means, it is a CCC if \( f \) had not occurred, \( c \) and \( e \) would not have been causally connected. Ehring excludes, as possible CCC's, preempting and overdetermining causes on the one hand, and joint effects of a cause on the other hand.

A direct condition is characterized in the following way:

\( f \) is a direct condition of the causal connection between \( c \) and \( e \), where \( e \) and \( c \) are particular events, if and only if

1) a) \( c, e, \) and \( f \) occur, and \( c \) and \( e \) are causally connected,

b) \( f \) is a member of a set of events \( (f,d_1...d_n) \) each of which occurred, such that the causal connection
between c and e is counterfactually dependent upon each member of the set in the absence of the other members, where this set includes all and only nonredundant\(^1\) member, and

2) there is no event c upon which f counterfactually depends which is not a member(either redundant or net redundant) to the set \((f, d_1... d_n)\)\(^2\).

It is important to note another condition that is an indirect condition of the causal connection between c and e. An indirect condition is illustrated by the following schematic examples suppose that c causes f and f causes g, so that f, is a direct condition of causal e, so that f is a direct condition or the causal connection between c and e. In the case of 'c causes f' suppose that the condition of this causal connection c, where c is not identical with e, c then will qualify as an indirect

1. According to Ehring, the definition of a condition of a causal connection is meant to emphasize that without the condition(or any occurrent "substitutes"), the particular causal connection between c and e which is at issue would fail to be realised. He also says that the relevant causal connection between c and e might fail to be realized because either c or e or both fail to occur.

condition of the causal connection between \( c \) and \( e \), via its direct conditioning relation to \( c \)'s causal connection to \( f \); and \( f \)'s direct conditioning relation to \( c \)'s causal connection to \( e \). Thus we have the following definition of an indirect condition:

"\( c \) is an indirect condition of a causal connection between \( c \) and \( e \), if and only if, \( c \) is a direct condition of a causal connection between some direct condition \( f \) of a causal connection between \( c \) and \( e \), and either \( c \) or \( e \)."\(^3\)

After discussing the above conditions, Ehring says,

We are now in a position to offer a definition of "causal priority" as follows:\(^4\)

\( c \) is causally prior to \( e \) iff either

a) 1) \( c \) and \( e \) are causally connected, and

2) there is some condition of the causal connection between \( c \) and \( e \) with is not connected causally to \( c \) and is causally connected to \( e \), and there is no condition causally connected to \( c \) but not to \( e \).

3. An indirect condition may fail to be a direct condition of that which it indirectly conditions. If \( c \), the indirect condition, had not occurred, \( f \) may still have occurred, and thus \( c \) and \( e \) would have been causally connected.

Or

b) \( \mathbf{c} \) is causally connected to some event \( \mathbf{f} \) and
\( \mathbf{c} \) is a direct condition of a causal connection
between \( \mathbf{f} \) and \( \mathbf{e} \), and \( \mathbf{f} \) is causally prior to \( \mathbf{e} \).

In order to elucidate the above definition, Ehring himself beings with two illustrations. The first is diagrammed as follows:

In this diagrams, there is a causal connection between \( \mathbf{c} \) and \( \mathbf{e} \), where \( \mathbf{f} \) is a direct condition of that causal connection. Ehring further supposes that there is a causal connection between \( \mathbf{f} \) and \( \mathbf{e} \), but no causal connection between \( \mathbf{f} \) and \( \mathbf{c} \). From these suppositions, we may conclude that \( \mathbf{c} \) causes \( \mathbf{e} \) rather than that \( \mathbf{e} \) causes \( \mathbf{c} \), given clause (A), of the definition of "causal priority".
Ehring offers a concrete example: the scratching of the match = c, the match’s ignition = e, and the presence of oxygen = f. There exists a causal connection between the scratching of the match and the lighting of the match. The presence of oxygen is a condition of the causal connection between the scratching and the lighting, and the presence of oxygen and the scratching are not causally connected. From these facts, it is clear that the cause in the pair is the scratching and the effect is the fire.

The second illustration, according to Ehring’s presentation, involves an indirect condition. It can be diagrammed as follows:
In this case c and e are causally connected, and f is a direct condition of the causal connection between c and e. f in turn is causally connected to c, and g is a direct condition of this connection. g, however, is not causally connected to c, but g is causally connected to e. Thus we can conclude that c causes e rather than e causes c.

Shring also claims that clause (B) comes into play in those cases in which clause (A) fails to apply. He offers the following example: suppose that c causes e and that there is only one causal connection, f. f in turn is a cause of c (and thus of e). A rough example of this night consist of c = the burning of a match; e = the burning of a building; and f = the presence of oxygen. A diagram may help to clarify:
If \( f \) is the only condition of \( c \)'s causal connection to \( e \), then there would exist no condition of \( c \)'s causal connection \( e \) which was causally independent of \( c \). According to Ehring's definition of causal priority, clause \( (B) \) resolves this difficulty. First: of all, he says, we must assume that, since \( f \) causes \( c \), there exists a condition of that causal connection (call that \( h \)). \( h \) is causally independent of \( f \), and thus there is a condition of \( f \)'s causal connection to \( e \) which is causally independent of \( f \). Thus, \( f \) is causally prior to \( e \). If \( h \) were to fail to meet cause \( (A) \) with respect to \( f \) and \( e \), the problem would be moved back one stage. Thus \( f \) is causally prior to \( e \). \( c \), in turn, is a direct condition of the causal connection between \( f \) and \( e \), since \( c \) is causally between \( f \) and \( e \). Thus, by cause \( (B) \), Ehring concludes that '\( c \) is causally prior to \( e \)'.

Jig-chuen Lee\(^5\) offers a counterexample against Ehring's account of causal asymmetry. He presents the

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following example. John puts a pile of poisonous mushrooms of kind X in the Soup. Fred then injects a chemical into the mushroom which changes their colour, size, etc., but not the nature of their poisonous character. Although now of kind Y, the mushrooms kill people in the same way. In turn, Don would have injected the same chemical (call this event d') if Fred had failed to do so. Harriet drinks the soup and dies. Fred's injecting the chemical(f) would seem to be condition of the causal connection between Harriet's drinking the poisonous soup of kind Y(e) and her death(e).

It seems that since f, is a condition of the causal connection between c and e, Fred's action should be a cause or Harriet's death, given the assumption that a condition of a causal connection is a cause of the effect of the causal pair. However, it is counterintuitive to say that Fred's action is a cause of Harriet's death. "For the chemical does not affect the way the mushrooms kill people. with or without Fred's action, Harriet would have died anyway".

6. Ibid., p.216
Gregory Bassham\textsuperscript{7} has also doubted against Ehring's claim that "causal priority will apply to all empirically possible worlds".

Ehring's account presupposes that causal relations must be asymmetrical at least in the following respect: that if an event $c$ causes $e$, then $e$ does not cause $c$. But Bassham argues, 'once the possibility (logical and perhaps physical) of backward causation is admitted, should this presumption be retained?' The following picture, in which an event $c$ (in part) causes an event $e$, and $e$ in turn (partially) backward cause $c$, seems at least to be a conceptual possibility:

\begin{center}
\includegraphics[width=0.2\textwidth]{diagram}
\end{center}

The above picture shows that asymmetry is not a necessary feature of causal relation, as Ehring assumes.

\textsuperscript{7} Basshgm,G."Ehrinc's theory of causal Asymmetry", \textit{Analysis} Vol. 46, (1986), pp.29-32
Thus, 'causal priority' and 'causal asymmetry' - are not, as Ehring treats them, interchangeable terms, according to Bassham.

Ehring's account of causal priority involves a further assumption that no account of causal priority, as such should involve that every event in the universe is not causally connected to, and counterfactually dependent upon, a first cause. But Bassham asks: How does Ehring's account presuppose this? Suppose, that there is a first cause $c$, upon which every event in the universe is counterfactually dependent. Suppose further, that we want to establish the causal priority or $c$ to some event $e$. It is evident that clause (A) of Ehring's definition is not applicable, since in the present example there is no $ccc$ of $c$ and $e$ which is neither connected causally to $c$ nor to $e$. Even clause (B) does not apply, since Ehring excludes joint effects of a cause $c$ from counting as a condition of the causal
connection between c and some other effect e. But every event, ex-hypothesi, is causally connected to, and counterfactually dependent upon, c. Thus, every event is a Joint effect of c, and there is no event which can count, as clause (B) requires, as a ccc of c and e. Thus, on Ehring's analysis, we would have to conclude, contrary to Bassham hypothesis, that c is not causally prior to e or to any other event. Therefore, it seems that Ehring's notion of causal priority, in terms of circumstantial character of causal relation, fails to capture the notion of causal asymmetry. We find that during the recent years, there has been an attempt to explain the problem of Causal asymmetry in terms of manipulability.

We pass on to the next chapter.