CHAPTER - III

THE CONCEPT OF CAUSALITY AND EMPIRICISM

3.1 : The Early Empiricist Approach

I shall be concerned here with the discussion undertaken specially by the British empiricists. The trend which I have called 'Early Empiricist' is associated chiefly with the names of Francis Bacon, John Locke and David Hume. There is also another more important contributor, Mill, who has extended the view of causality very far. In our previous dicussion, we have already noticed that the Rationalist tradition has insisted on the view that causality is positively a logical relation between cause and effect. As diamatrically opposed to the rationalists, the empiricists in general contend that the so-called logical or necessary relation supposed to be implied by the notion of causality appears in the long run to be obviously groundless for the simple reason that it is not available through our sense-experience. What such observation reveals to us is that causality involves a mere constant conjunction in the succession of events. Bacon's *Novum Organum(1620)* throws sufficiently his reflection on the notion of causality. The word "Cause" as Bacon has conceived here receives two sorts of meaning. In the first place, he has identified the word "cause" with the word "form" or "essence" but explained it differently from Plato's interpretation. According to Bacon, the "form" is an aggregate of primary or underived qualities from which other qualities are derived in the way in which effects are deduced from causes. In the second place, he has used the word 'form' to mean the "law" by virtue of which a phenomenon manifests out of its pre-existing, condition. In this sense, this form is the law that governs the process by which a quality on a body comes into existence out of its pre-existing state. This shows that Bacon has used the word "Form" to stand for the word "Law" or "Cause". These two sorts of interpretations which Bacon has provided in connection with the concept of causality

are in fact, not different from each other because both of them carry the same sense that the qualities or bodies as effects arise from the primary or underived qualities as causes, and hence the two senses are not irreconcilable. The attitude adopted by Bacon has an important consequence that goes against Plato's conception of Forms or Ideas as causes. The Platonic Form is purely an ontological entity, while Bacon does not admit the existence of such entities which exist apart from matter. His Forms as causes are always related to the material effects such that they do not have existence apart from the latter. However, Bacon has tried to specify the sense of causality by using the word "Natura Naturans". The word "Natura Naturata" indicates the present condition of a given quality or a body at a given time, while the word "Natura Naturans" stands for the immanent cause of the condition of the quality or the body in question. Thus understood, "Natura Naturans" stands in relation to "Natura Naturata" in the same way in which a cause is related to its effect.

According to Bacon, nature in which we live and have a being is nothing but a composition of individual bodies with the individual manifestations by a causal law. So, to discover Form is to discover the latent causal process in every generation and to discover at the same time the real nature of quiscient bodies. He claims that the causal laws according to which the individual objects manifest themselves is the proper object of our knowledge, and hence the adequacy of knowledge depends on the discovery of causes. So any knowledge is inadequate if it is not the knowledge of causes in the sense mentioned above. According to Bacon, the knowledge of such causes can guide us both in theory and practice, and consequently our theory as well as our practice is correct in so far as it depends on the discovery of Forms. The implication of this position is that the person who apprehends the Forms, law or cause can know the unity of nature in substances. But this does not show that Bacon accepts Aristotle's fourfold causes - the material, the formal, the efficient and the final. In this connection, one important question is how we can discover the causal relation. To this, Bacon has spoken of the method of induction which he calls the method of elimination or the method of exclusion. His basic contention is that it is

not possible to establish the causal connection only by observation of a number of agreeable instances alone because it may be shown to be false by a subsequent single "negative instance". If we proceed directly to establish causal laws, we face a lot of problems in many cases. So Bacon's opinion is that only the negative instances can help us to do so in such cases and that can do so only indirectly. So we are in need of eliminating such negative instances. Since the causal laws are the laws between the generating and generated natures, we have to observe the correlation between them in their various modes of possible occurrences. He insists that on the basis of induction we can establish the causal relation and can claim it as true if the generating nature or cause is co-present, co-absent and co-variant with its corresponding effect. So we have to arrange the evidences which we collect on the basis of observation into the three sets of presence, absence and variance. Though it is claimed that this method can help us to find out the real cause, yet there is a difficulty in so doing because it does not work everywhere. Since Forms are observable, we can specify the cause. But we cannot do this in the case of complicated physical sensation because the physical conditions here are not observable. Therefore, we can unhesitatingly say that Bacon's method of induction cannot help us to single out a real cause in the cases stated above. The suggestion given by Bacon is that we have to take the help of intellect to collect the evidential instances to single out the cause. But Bacon here seems to be going astray from his own empiricistic standpoint and taking the help of rationalism. Kneale points out that this recourse to intellect is nothing but an anticipation of a hypothetical method which cannot help us to go very far. He says, "This doctrine of intellectus permisso is in effect an anticipation of the hypothetical method in natural science and a confession that we cannot go far by the use of his tables."[1] Thus the Baconian position appears to be weavering between empiricism and rationalism. This is so because when the empiricistic tool is found to be incapable of collecting the suitable evidences to discover the real cause, he tries to take the help of intellect. But the

1. Kneale : *Probability and Induction,* p.53.

unwelcome situation is that intellect is not free from its own limitation and therefore the real cause goes beyond our human discovery.

Locke who comes next to Bacon in the British empiricist tradition admits that the idea of cause, which he calls "power", is not obtainable through our experience, for what we get through our experience is only the sensation of it. So, we have two questions in this connexion. First, what this cause is in the sense of power as understood by Locke himself and, second, how far we can know this cause in the sense Locke himself understood. In so far as the first question is concerned, Locke's answer is that the causal relation is the expression of power. He says, "The mind being everyday informed, by the senses, of the alteration of those simple ideas it observes in things without; and taking notice how one comes to an end and ceases to be, and another begins to exist which was not before; reflecting also, on what passes within itself, and observing a constant change of its ideas, sometimes by the impression of outward objects on the senses, and sometimes by the determination of its own choice; and concluding from what it has so constantly observed to have been, that the like changes will for the future be made in the same things by like agents, and by the like ways; considers in one thing the possibilty of having any of its simple ideas changed, and in another the possibility of making that change; and so comes by that idea which we call *power*."[2] For example, fire has the power which can melt gold, and gold has another power to be melted. Now, this power has two aspects, viz, a capacity to make changes and a capacity to receive changes. The former capacity is an active power and the latter one is called a passive power. In the above example, fire has the active power to melt gold, and gold has the passive power to be melted by the fire. Locke ascribes certain features to this powers. First, this active power does possess freedom such that the power acts freely and and acts by virtue of its own capacity. The active power produces motion, for example, our 'will' is a case here. On the other hand, the passive power does not have any

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2. Locke : *An Essay Concerning Human Understanding*, p. 135.

such freedom but possesses two sorts of features, viz, receptive capacity and transmitting or communicating capacity. In the first place, the passive power receives motion only by being directed by some external force. For example, a ball at rest does not have an active power to move. But when it gets the stroke of a billard stick, it is in motion. So this motion in question is not in any way an action of the ball, rather it is in motion by the external force of the stick. In the second place, this passive power of the ball again transmits this motion to any other substance or body. The ball which is thus previously in motion by the force of the stick sets another ball in motion that lays in its way. Here this ball only transfers but not produces motion which it had received earlier from another. Therefore Locke argues that whatever produces something is the cause and that which comes into being or existence by the operation of the cause is the effect. Locke has classified effects into four kinds; viz., "creation" "generation", "making", and "alteration". When the effect is entirely new, it is called "creation". When the effect is made out of something, it is called "generation". When a production is that of artificial things, it is called "making". Lastly, when an effect is produced which did not exist previously, it is called by Locke "alteraction".

Now the question is : How can we know this causal relation ? According to Locke, we get the idea of cause and effect from the observation of the constant changes in things around us. We see that new things are beings constantly generated out of something else. This idea of change is a concomittent of all our experience, sensory experience as well as introspective experience. Our mind is informed everyday by senses that one thing comes into being and sometimes ceases to be, while another begins to exist which was not before. When we reflect on this matter of change in the phenomena, we desire the idea that like changes will happen in the same thing in future by the operation of the same agent and in the same way. Locke says, "... that the like changes will for the future be made in the same things by like agents, and by the like ways; ... and so comes by that idea which we call power".[3]

3. Locke : An Essay Concerning Human Understanding , p.135.

Thus we only observe that several particulars, both qualities and substances, begin to exist , and that they receive thier existence from the proper operation of some other being. This observation provides our idea of cause and effect. But the troubles arise the moment we are concerned with the second question regarding "power ". Since sensation cannot give us the idea of "power" but only the sensation of the particular state of change, we cannot go very far to find out the "power" which is the real foundation of causality in Locke's philosophy. However Locke's theory of causality has the following consequences. First, causal relation operates between the ideas of substances or their modes. Second, the "power" constitutes the ground of causality. Third, causality is known empirically through our experience or observation of change and succession. But all these interpretations do not have any implication in favour of the positive assertion that the causal relation is a necessary relation between cause and effect. According to Locke, causality is obviously necessary to explain the changes in the phenomena around us. But he never suggests that this causality is a necessary relation. What he suggests is that we desire the idea of causality on the basis of observation of the constant regularities in cause and effect in the succession of events. If so, the implication of this view is that causality is not a necessary connection but only a contingent one. Then the statement "The like changes will happen in the same thing in future by the operation of the same agent and in the same way" is not acceptable because the statement in question is, infact, universal and necessary, and this character of universality and necessity can not be explained from his own empiricistic standpoint. This is so because our observation can not provide us with any logical ground on the basis of which we can prove convincingly that the same effect will be produced always by the same cause. This resuslts in inconsistencies in Locke's interpretation of causal relation, and we find him taking the help of the Divine Will. According to him, the regularities which we find in the external world have been imposed by the Divine Will. So, the Divine Will maintains the universality and necessity of the causal relation among the phenomena , But this contention seems to be entirely whimsical as well as dogmatic because such an assumption is never valid from the empiricistic standpoint in so far as the Divine

Will falls beyond the limit of our observation.

In our foregoing discussion, we have seen that Locke's concept of causality is based on the presupposition of the notion of uniformity in the causal relation, i.e., the notion which is otherwise described as the universality and necessity in the causal relation. This is evident when Locke says by observing the changes in the phenomena that like changes will happen in the same thing in future by the operation of the same agent and in the same way. But two things are to be noticed in this connection. In the first place, Locke's empiricistic commitment does not allow him to accept the validity of the universality and necessity of the causal relation except the "constant regularity". In the second place, he himself has kept silent throughout his discussion on the problem of universal and necessary connection that causality is said to involve. If so, the inevitable outcome of this Lockean position is the following. The so-called sciences claim to provide us with universal and necessary knowledge on the basis of the causality. If causality is a mere relation of regularity, then scientific knowledge would be only probable knowledge; we may think that heat may not expand body in future and it will not involve any contradiction. But Hume does not want to deny the necessary connection in the concept of causality. What is to be noted here is that Hume has tried to put forward the view that this necessary relation is never an objective relation operating independently in the external phenomena but only subjective or psychological one due to the perceiving mind. According to him, we encounter only the changes in the phenomena and not any necessary causal connection which is nothing but an imaginary construction by the human mind. Hume's theory of causality is found mainly in the *Treatise,* and is restated in the first *Enquiry.*

Hume's exposition of the concept of causality as developed in these writings has the following three important factors. They are contiguity, priority and necessitation, First , the idea of causation stands for the relation between two events , viz, cause and effect. This has the implication that the two events called cause and effect are always contignous in this sort of relation. Hume says, "I find in

first place, that whatever objects are cosidered as causes or effects , are contiguous; and that nothing can operate in a time or place, which is ever so little removed from those of its existence. Though distant objects may sometimes seem productive of each other , they are commonly found upon examination to be link'd by a chain of causes, which are contiguous among themselves, to exist...we may therefore consider the relation of contiguity as essential to that of causation".[4] Second, there is another essential factor of causation, viz., priority. This feature exhibits that the cause is always prior to the effect in time. This factor is also called by him "precedence". Hume's reason for giving an importance to this factor is that in experience we always find that cause precedes its effect , and after the operation of a particular cause a particular effect follows. Thus the notion of causation involves the succession of two events in time, and we can not define cause and effect without the succession of the two events in time. "There is a usage of the word 'cause' in English in which we suppose a cause to be an event which produces another event later in time but contiguous with the first. Thus, we may say that the lighting of a match on a certain occasion was the cause of an explosion"[5]. Now Hume's theory of causation in this respect is certainly something new and different from those of Aristotle and Bacon. We do not find any such exposition in Aristotle's theory, while Bacon has interpreted his "Form" in such a way that it is only "contemporaneous" to its effect. But Hume's cause is regarded as the "antecedent cause" in order to differentiate him from both Aristotle and Bacon in this context. Third, the concept of causation involves the idea of necessitation. It is this idea of necessary or universal relation which is the most vital problem raised by Hume about the causal relation.According to Hume, contiguity and priority constitute the essential factors of the concept of causality but cannot exhaust all the aspects of causality. The reason is that an event may be contignous and prior to another event but the former cannot be regarded as the cause of the latter, for example, the relation between day and night. So there must be a necessary connection between the events which are to be regarded as cause and effect.

4. Hume : *A Treatise of Human Nature* , p.75.
5. Kneale : *Probability and Induction,* p.53

According to this concept , the relation of a particular cause to a particular effect is necessary one without exception in the past, present and future. When we say that B follows from A, we accept A as the cause of B, i.e., A as necessary for the existence of B. But Hume argues that this necessary relation is not based on any logical ground, and so it can not be proved by an appeal to logic alone. According to him, the ground of our belief of this necessary connection is the frequent observation of the similar event. He says, "For after a frequent repitition , I find , that upon the appearance of one of the objects , the mind is determin'd by custom to consider its usual attendant, and to consider it in a stronger light upon account of its relation to the first object. It is this impression, then, or deternination, which affords me the idea of necessity."[6] Hence the so called necessary conncetion is not given to the senses. After observing the repeated instances, our mind tends by the habit of custom to expect or think of an inseparable relation between two events. The abstractionists argue that the necessity in causality can be had by abstraction from particular instances. But Hume denies it because we can never encounter any such relation in the events. So we cannot say that the relation of necessity is a general idea which is obtainable through abstraction. Again, Hume tries to refute the rationalist's contention that when we speak of a necessary connection between two events, this connection depends upon an efficacy or power with which any of them is endowed because he claims that this effcicacy or power is not something which is known through observation and is, therefore, unintelligible.

Consequently, Hume goes against the causal inferences or causal reasonings which are based on the uniformity of the causal relations. It is a fact that in our causal inference or reasoning we go beyond the limit of our experience on the ground that the causal relation operates uniformly in the phenomena in nature . But Hume holds that there is no logical certainty in such a causal inference or reasoning for the obvious reason that a causal relation does not involve any necessary connection but gives only a probable reasoning . This is so because the basis of such causal

6. Hume : *A Treatise of Human Nature*, p.156.

inference is our experience or observation of "constant conjunction" of two events. We bear in mind the frequent instances of events and notice that there is a regularity, contiguity and succession in every observed instance. In our previous experience we have noticed this "constant conjunction" that an event 'flame' was followed by the sensation of 'heat', and united these two ideas in imagination by the principle of association of ideas. When one is given, we infer by the habit or custom the existence of the other from the past memory or experience. Thus our causal inferences are union of our ideas, i.e., the inferential process which is determined and guided by the principle of association of ideas rather than by reason itself. In other words, we are guided by the habit or custom and impose the qualities of the past on the future. Thus the possibility of inductive reasoning is only due to the habit or custom that originates in observation. So Hume concludes that it is a habit of mind to anticipate that the same effect will be followed by the same cause; the necessary connection supposed to be in the causation is a feeling which is only psychological and nothing else. But this Humean position which is a logical consequence of his being a strict empiricist is not at all satisfactory . This can be illustrated by the reference to the fact of wave's striking a boat. When we say that a wave striking a boat causes it to move, we imply that there is a positive relation operating between the cause and the effect, i.e., between the wave's striking a boat and the movement of the boat. This relation is not a mere feeling which is derived solely from our observation of these instances. That a thing will get in the same way at different times implies that it follows from the nature of the thing and the situation. To deny this necessary connection in causality is to deny the causality althogether. In this case, it means that any effect can be produced by any cause but this is not true. Only a specific cause can produce a specific effect such that the relation in question is a necessary relation existing objectively in the external phenomena . It can not be denied that one particualr standpoint may fail to help us to grasp the relation adequately but this should not be taken to be the reason for deciding or concluding that there is no such relation at all. Popper says, " At any rate, in the light of a conjecture we can not only explain cause and effect much better than Hume ever did, but we

can even say what the 'necessary causal link' consists of. Given some conjectured regularity and some initial conditions which permit us to deduce predictions from our conjecture, we can call the conditions the (conjectured) cause and the predicated event the (conjectured) effect. And the conjecture which links them by logical necessity is the long-searched - for (conjectural) necessary link between cause and effect."[7]

The concept of causality receives a new shape in the hand of John Stuart Mill because he has dealt with this problem completely differently from his predecessors. In this connection, the credit goes to him particularly due to his discussion of the methods which aim at the discovery of causal relation. Scientific investigation aims primarily at discovering the causal relationships among the natural phenomena. Mill claims that his five methods, viz, the method of agreement, the method of difference, the joint method of agreement and difference, the method of residues and the method of concomitant variation can help the scientists to discover and demonstrate the causal relations. However, Mill means by the causal relation the relation of invariability in which cause and effect are related invariably. On this interpretation, the cause is said to be the invariable antecedant to the effect, while the effect is called the invariable consequent to the cause. Mill defines the antecedent cause thus," The cause, then , philosophically speaking , is the sum total of the conditions positive and negqative taken together; the whole of the contingencies of every description, which being realised, the consequent invariably follows."[8] The antecedent cause is defined as certain combination of some other conditons or facts , viz, positive conditions or facts and negative conditions or facts. The role of these two conditions is to help jointly the cause for its operation to produce the effect. In other words, when these two sorts of conditions are realized or satisfied , then the consequent invariably follows. For example, taking poison causes one's death. Here the cause is composed of such positive conditions as poison, bodily constitution, etc. While the negative conditions are the absence of preventive drugs, etc. The cause is thus the sum total

7. Proper : *Objective Knowledge*, p.91.
8. Mill : *System of Logic*, p. 217.

of positive and negative conditions, which being actualised, the effect invariably follows. Mill says," In other words, every fact or phenomenon which has a begining invariably arises when some certain combination of positive facts exists, provided certain other positive facts do not exist."[9] But the definition of cause as the invariable antecedent to the effect appears to be confusing because there are cases where it becomes very hard on our part to find out the invariable anticedent cause. The obvious case known to us is that of the relation between day and night. If we follow Mill's interpretation, we have to say that day is the cause of night or night is the cause of day. But it is not acceptable because neither of them is the cause of the other. We know that both day and night are the effects of the cause which is the movement of the earth. Here Mill's suggestion is that invariable sequence does not mean what ordinarily passes for causation, unless the invariable sequence is unconditional. Thus unconditionality is equally an important factor besides the condition of invariability. In the words of Mill, "We may define, therefore, the cause of a phenomenon to be the antecedent, or the concurrence of antecedents, on which it is invariably and unconditionally consequent or if we adopt the convenient modification of the meaning of the word cause which confines it to the assemblage of positive conditions without the negative, then instead of "unconditionally", we must say, "subject to no other than negative conditions".[10]

According to Mill, every use of the word "cause" is a universal law; i.e., a doctrine that cause and effect are uniformly connected. We admit that a partucular circumstance causes a particular effect only if we agree that any other circumstance of that type will-- if the attendant circumstances are sufficiently similar--cause another effect of the same kind as the first. In other words, similar causes produce similar effects. The very meaning of the word "cause" as used today is that every occurrence of a cause producing on effect is the example of a general causal law or universal causal law that such circumstances are always accompanied by such

9. Mill : *System of Logic*, p. 216.
10. Ibid. p. 222.

phenomena. Since a general causal law of this sort is implied by every assertion that a particular circumstance is the cause of a particular phenomenon, there is an element of generality in every such assertion. Therefore, a causal law is an assertion that such circumstance is invariably attended by such and such a phenomenon, no matter when or where it occurs. Now the problem is how we come to know such general or universal causal laws. Since the causal relation is not a purely logical or deductive relationship, it can not be discovered by any apriori reasoning. On the other hand, these laws can be discovered only empirically, i.e. only by an appeal to our experience. We observe several instances of certain kind of circumstance (C), and every instance that we observe is accompanied by an instance of certain kind of phenomena (P). On the basis of these observations, we come to the conslusion that "some cases of C are cases of P. But how can we get the general or universal proposition that "all cases of C are cases of P" or that "C causes P"? Mill holds that the method of arriving at this general or universal proposition that "all cases of C are cases of P" or that "C causes P" from the particular facts of experience is called inductive generalization. All these methods work by eliminating rivals candidates for the role of cause. So Mill's Methods of induction are also called the "Eliminative Methods of Induction". Mackie says, "The general nature of these methods may be illustrated by examples of the two simplest methods, those of agreement and of difference ".[11] The method of agreement runs thus: ' If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree is the cause (or effect) of the given phenomenon'. Here we concentrate our attention only on the 'agreeing' point in which the antecedent A exists and B follows. A is the common feature, and we can, therefore, conclude that A is the cause of B. On the other hand, the method of difference is thus stated: ' If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common

11. Mackie : *The Cement of the Universe,* p.297.

save one, that one occuring in the former; the circumstance in which alone the two instances differ, is the effect or the cause, or an indespensible part of the cause of the phenomenon'. The method of difference picks out as the cause the one respect in which a case where the effect occurs differs from an otherwise exactly similar case where the effect does not occur. Here we observe that A is absent and B does not follow though all other conditions remain the same in both the cases. In this way we depend on the inductive generalization to find out the causal law. We first become familiar with many partial uniformities of sequence or many cases of causation. These are causal laws of inferior generality. From these several particular facts of experience that a certain kind of circumstance A is accompanied by a certain kind of phenomenon B, we get the universal proposition "all cases of A are cases of B". So Mill holds that the belief in the universality in the causal relation is not instinctive but an example of inductive generalisation.

Mill argues that the doctrine of universal causation is grounded in the principle of the uniformity of nature. This assumption is warranted if we look at the actual course of nature . We observe that there is an order and unity in nature, and proceed to construct on its basis that whatever is true in any case is true in all cases of the same nature. Thus the belief in the uniformity of nature is based on our experience. And this is the principle which is responsible for the uniformity or universality in the causal law. This universal causal law is our warranty for all our inductive inferences from the known to the unknown. So the uniformity in nature is the ultimate major premise which makes our induction possible. Now, the old problem arises here as to how Mill explains the concept of necessary connection in the causalilty. Certainly, he has no other alternative than to opt for the Humean tradition. Mill argues that the necessary relation in causality is supported by the uniformity in nature. The question is : What is the guarantee that nature behaves uniformly so that we can assert the universal causal law that such and such circumstance is invariably attended by such and such a 'phenomenon' ? To this, Mill's answer is that the guarantee is rooted in our observation. If so, observation or experiance, as we have noted earlier, cannot

give us any necessary connection either in the course of behaviour in nature or in the case of causal relation. In this sense, we are , then, cutting out the idea of necessary connection and trying to content ourselves with mere uniform succession, that is, we are attaching ourselves to an empiricism like that of Hume. Ducasse says, "It succeeds only in obscuring the issues, without solving any of the difficulties".[12] Being an empiricist, he is not interested in the search of necessary relation in the causality. To him, the causal principle is an empirical generalisation from experience and, therefore, it is a synthetic a posteriori truth. In so far as the experimental methods are concerned, Mill is interested only in discovering this causality in the realm of human experience. But we see here that his methods have not always been able to discover the real cause. It is an undeniable fact that competent scientists have been working for decades to discover the cause of cancer but the methods used by Bacon and Mill are not at all able to find out the cause so far.

3.2. The Later Empiricist Approach

In so far as the concept of causality is concerned, we find that the Humean tradition has more or less been carried on by the latter empiricists like Bertrand Russell, Samuel Alexander, Arthur Pap and Alfred Julius Ayer. However, their modes of treatment of the problem of causality are, no doubt, different. This is because all of them have looked at the problem from their respective originalities. But what is worthnoticing amidst these differences is that they have the common consent to the central thesis of empiricism that the concept of causality is a de facto regularity. Consequently, their attitude always goes towards the denial of the concept of causality in the ontological sense. They have abandoned it because observation reveals only the uniformity of sequence and nothing else. Secondly, it is equally an undeniable fact that the writings of these philosophers have been influenced all along by some modern sciences specially by physics and mathematics. Obviously, their solution

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12. Ducasse : *Causation and the Types of Necessity*, p.26.

to the causal problem has a bearing upon sciences as well. Russell is of the opinion that the concept of causality which is commonly held by philosophers is false. This concept does not have any application in science. In this connection, Russell has clearly favoured the commonsense view of causality. The common people believe that causality means a general proposition which helps to infer the unseen from the seen or known. The general proposition "All thunder is preceded by lightning " is a causal law. It is because of this causal law that one who hears the sound of thunder but did not see lightning can infer that there was a flash. Russell says, "By "a causal law" I mean any general proposition in virtue of which it is possible to infer the existence of one thing or event from the existence of another or of a number of others. If you hear thunder without having seen lightning, you infer that there nevertheless was a flash, because of the general proposition, " All thunder is preceded by lightning."[1] This general or universal proposition, i.e., causal law is composed of two parts, viz, antecedent and consequent. The antecedent and consequent themselves are particular events like "this thunder", "that lightning", and so on. In the causal concept, these two particular events have the relation of accompaniment. Russell has interpreted it in terms of the relation of constancy. So, when we say that thunder always accompanies lightning, we mean to say that these particular events themselves are not constant but the relation between them is. Again this relation is temporal, i.e., in the form of succession between the antecedent and the consequent. In this relation the antecedent is given first or earlier while the consequent is inferred later on the basis of the antecedent. But it does not mean that Russell accepts the so-called necessary connection in the causality. Though the causal law is general or universal, yet it is not so in the strict sense of the term "universal". According to him, the strict universal causal law is an ideal; it may be true but there is no available evidence by means of which we may be sure of it. But we accept the causal law because we believe it, and our belief in such causation is "The animal belief ". The lower animals like dogs, horses, etc

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1. Russell : *Our Knowledge of the External World,* p.164

have this belief. These animals experience the uniformity of sequence, and some sort of expectation grows in them. Later on, when the animal observes one event of the sequence, it expects the other. This is a mere psychological expectation in the Humean sense. Similarly, Russell holds that we have the animal belief in the causation. We repeatedly observe the uniformities of sequence, for example, we experience that after lightning thunder comes, and the experience of this uniformity of cause and effect leads us to expect that this will follow on future occasions, too. Thus causation is not a connection between events; it is only the uniformity of sequence which is observed in many cases. Since this relation is available only through the observational evidences, there seems to be no exhaustive evidences by virtue of which the relation can be proved to be certain. Hence, this relation can fail to hold in future under the newly acquired set of evidences. But Russell here argues that in such a case we will try to find out the more constant relation under which the events fall. But this assumption, according to him, is probable and yet it is sufficient for our rational expectation and practical guidance. So causality is a working hypothesis which may be ruled out by subsequent observation and experiences.

The scientists, Russell holds, use such hypothesis which are based on observation, A scientific method tries to establish hypothesis by collecting relevant data related to the case concerned, and it is confirmed or disconfirmed by subsequent observation. In this sense, a hypothesis is a tentative truth which has the possibility to be overthrown in future. If so, the scientific laws are causal laws that are merely hypothesis. This is very obvious in the case of atom. The scientists have claimed that they have been able to provide the explanation of the behaviour of atom in accordance with the principle of causality but they are in a fix the moment they try to penetrate into the problem more deeply. In these cases, the scientists have tried at their best level to find out the causal relation but in vain. None of them is sure of the relation so far discovered. They remain satisfied with merely stating what is going on there. This provides no reasonable ground for our belief that whatever happens in nature happens according to the law of causality. So the simple scientific law which

we hold as causal law is not necessarily based on solid foundation, and probably the true cause is yet to be discovered. But science accepts it so far as it is only a working hypothesis. When a scientist only observes uniformities of sequence in particular cases and concludes that all As. are Bs; he assumes that the next case of A will be the case of B. But this assumption is only probable as already shown above. Yet it can not be denied here that a scientist is able to proceed few steps ahead in his search on the basis of this assumption. But he should remember that the causal law which he has so far discovered is only approximate and not absolute. Russell's observation appears to be improper in this context because the scientists are not thinking along this Russellian track. They point out that this sort of uncertainty is, no doubt, faced in quantum physics, but we face that problem upto a certain stage. After a certain stage the atomic jump is not determinable because it is then uncertain. In this connection , Planck and Einstein hold that if we broaden our experimental range, we would be able to find out the operation of causal laws there. Planck says, "...the non-fulfillment of the satistical rule in particular cases is not therefore due to the fact that the law of causality is not fulfilled, but rather to the fact that our observations are not sufficiently delicate and accurate to put the law of causality to a direct test in each case. If it were possible for us to follow the movement of each individual molecule in this very intricate labyrinth of processes, then we should find in each case an exact fulfillment of dynamical laws."[2] Thus Russell has not been able to evaluate properly the causal activities in sciences. Harris argues that the relation between cause and effect is not equivalent with the mere succession of sequence in time. We should not forget that the temporal succession is serial order where the order of change is determined by one another. According to Harris, "What constitutes temporal succession is a serial order, and while the changes themselves are constituted by the qualitative develpment of the material in which they occur, their temporal order is determined by the application of a metric to the process so as to relate events to one another as a continuous order. Such correlation of changes with

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2. Planck : *Where is Science Going* ?, p.145.

a metrical scale is possible only if there is a rule of succession linking the phase of the process and determining their order. This is just another aspect of the heterogeneity of the continuum and is the source of the cause-effect relationship."[3] Thus Harris supports the determinacy in the concept of causality. He says, "In the course of the process of change these relations do not change and are, in fact, irreversible, not because the temporal reality is static—quite the reverse, because the metric is a fixed scale, within which the divisions and demarcations stand in mutual relations that are of necessity unalterable."[4] So it is obvious that Russell's view of mere succession of event is not satisfactory in so far as the modern science is concerned. If we accept this view, then all the events become isolated from one another. But science attempts at providing a comprehensive and systematic knowledge of the universe and tries to establish the causal laws from this standpiont, while the observation of atomic events in mere succession can not help us to discover the laws here. Boodin does not accept Russell's position. According to him, it is no doubt that there are complicated facts in nature and it is a problem which prevents us from discovering the continuous process in the natural environment. Yet he admits that the natural environment is not composed of isolated facts. In nature there is a determinate factor which determines the course of nature. Both animate and inanimate objects act and react in a definite manner according to their nature and properties and as such there is no randomness of events. They act and react in precise way to the properites and to the temporal and spatial relations within specific contexts. Therefore, the Russellian approach towards the problem of the concept of causality fails to overcome the gap between the epistemic aspect and the logical aspect of the relation. In so far as our perceiving capacity is concerned, we, as Russell seems to contend, only encounter the uniformities of sequence and nothing else. So the necessary connection involved in the causation goes outside the scope of observation and, consequently, remains unexplained. On Russell's interpretation, we do not have affirmative attitude in this regard. Alexander belongs to the tradition of

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3. Harris : *Foundations of Metaphysics in Science*, p p.472-473.
4. Ibid. p. 476.

English philosophers and undertakes the attempt to overcome the gap between the epistemic aspect and the logical aspect of the concept of causality, According to him, the concept of causation as analysed by the common people, the scientists and the philosophers as well fails to exhibit the true nature of the concept in question. The common sense view is in favour of regarding the cause as a distinct substance which possesses in it the 'energy' or 'power' to produce an effect. The empiricist philosophers in general hold that what we perceive in our experience is only the succession of events in time and nothing else. It is because of this epistemic standpoint that these philosophers have been unable to find out the logical or necessary relation supposed to be contained in the causation. The logical Idealists have identified the causal relation with the logical implication that holds between the logical ground (premise) and its consequent (conclusion). Consequently, these pholosophers have usually built a system of ground and consequent like the process of geometry where the real causal ground and the effect together with their actual relation fall outside this system itself. Science regards both the cause and the effect as existent events; it tries to find out in so many existing events a precise causal factor for its effect, e.g., 'the event B follows after the event A', and claims its universal applicability to future case also. But Alexander in his treatment of the concept of causation goes against the so-called views of it. According to Alexander, the common-sense view that a thing or a substance is the cause in so far as it has the 'power' to produce an effect is not satisfactory. The reason is that a thing by itself alone is a static concept and cannot be the cause untill and unless it comes to be related to other events in the relevant contexts. This static concept of causality in some other form reappears in the empiricist philosopher's treatment of the notion as a mere succession of events in time. Alexander argues that this view fails to be adequate because the events are regarded here as mere isolated occurrences and not as a continuous process. If so, the cause in this discontinuous sense can have no reference from present to future, and, hence, there seems to be no real sense in asserting that the future is thereby determined. The logical consequence of this position is that it destroys the important mark of causality that the cause is essentially prior to the

effect. This is applicable equally to the case of science where the causal relation is limited only to the actual correlations of isolated existents.

Alexander holds that the so-called views of causality have rendered it static concept and not dynamic, while he says that this dynamic aspect constitutes the very heart of causality. According to him, cause and effect are two different motions in a state of continuity ; the cause on this view is the motion which is continued into the motion of effect. The concept of motion in Alexender's treatment of causality is extremely and basically vital. The ultimate reality or cause from which all things are engendered is Pure Motion or space-time. This is the ultimate cosmic reality which is otherwise called the fundamental dynamic principle. According to him, we should not speak of space and time as two distinct and separate realities as Newton thought. If by space we mean co-existence of several points, the points then must be arranged in successive order, i.e., one after another. It is, therefore, evident that the idea of space includes that of succession or time, that is, the idea which means successsion among events . If one event succeeds another event, then both of them must be existent in space, and the idea of time, therefore, includes the idea of space. All events are space-events, and all space-points are even-points. Therefore, Alexander holds that we should speak of 'space-time', without speaking of space and time as separate realities. Now, the motion of space is, therefore, made up of points successively occupied by instants of time. These point-instants are called events of which motions are made up. This motion is something which is continuous from past to future, and, hence, the events which are the ultimate constituents of the world have their location not only in space but also in past and future. Alexander says that what we call a substance or matter is composed of motion. Therefore, when it is said that causality is a relation between substances, we mean to say thereby that both the cause and the effect are motions, the former motion as the cause is continued into the latter motion which is the effect. Alexander says, "But a substance is a system of motions and whether the cause is a substance or a motion is all one. A cause is the motion of a substance, or a substance in respect of its motion. Thus the cause of the

breaking of the window-pane is the motion of the stone or the stone in motion".[5] He argues that the succession of events is not an essential feature of causation because it does not involve the change or motion in the causation. So the cause and the effect both are motions in the system of continuous motion of space-time. He says, "Causality is thus the spatio-temporal continuity of one substance with another; and the cause is the motion which preceeds that into which, let us say, it passes or is transformed".[6] This conception of causality as thus propounded by Alexander has the implications of his fundamental hypothesis that space-time is a continuous system in which every event is related to one which preceeds it and to one which follows.

While explaining the notion of causality, Alexander has classified it into two kinds, Viz, transeunt causality and immanent causality. In the case of transeunt causality, one motion or a set of motions turns into a different motion, for example, 'fire burns the wax'. Here the 'fire' and the 'melting of the wax' are two different motions. This shows that when the cause and the effect are two completely differenrt substances, the causal relation is called transeunt. On the other hand, when either the effect is produced from the same substance or the relation of cause holds between the parts of an organic system, it is called immanent causality, for example, curd is produced from milk. Thus in the case of an immanent causality, both the cause and the effect are on the same direction of continuity, while in the case of transeunt causality the cause and the effect are in different directions of continuity. Johnson says, "Here then the cause occurrence and effect occurrence are refferred to different continuants, whereas in immanent causality cause occurrence and effect occurance are attributed to the same continuant. This illustration serves further to indicate what may be assumed to be universally applicable, that any concretely described causal process must be analysed into a conjuncdtion of transeunt and immanent causality; and neither types of causality are to be found actually separate".[7] Alexander thinks that there is no self-contained substance in the universe; each and every substance is related to some

5. Alexander : *Space, Time, and Deity,* p.280.
6. Ibid. p. 281.
7. Johnson : *Logic,* pp. 128-129.

other substance. If so, the distinction which is drawn between the two sorts of causality is only relative; the universe ifself is the only immanent cause. This concept of causality as the spatio-temporal continuity of one substance with another makes itself a dynamic concept, the one that has a reference from present to future, and hence, involves the reason that the future is thereby determined. According to Alexander, everything in this world-process has emerged from the space-time matrix. He posits space-time as the base of the pyramid of emergent evolution from which higher and higher levels, matter, life, mind and deity emerge (but Alexander thinks that deity will emerge as the highest category out of the mind). In other words, nature forms a pyramid where in each case the higher presupposes the lower, and those which occur at higher levels are characterised by the general features at the base of the pyramid. "Two main features have been noted so far. The first is that every thing in the world is made up of motions, more or less complex; the second is that a particular combination of motions has qualities which are inseparable from it. The former was worked out by Alexander in terms of point-instants and the categories which make up the space-time continuum; the latter, in terms of the theory of emergent characters".[8]

The consequence of Alexander's notion of causality is that it leads to the view of emergent evolution, for the qualities when they are produced by the cause are only emergent qualities. The mechanists take evolution as a continuous and unbroken process of change in which nothing completely new appears, but every level is a bare repetition of the preceding level in a more complex form. In the evolution of life from matter, life is only a complex form of matter and as such it is not a new creation. But Alexander holds that life is a new phenomenon that did not pre-exist in the material cause. We should be careful here about the distinction between 'resultant quality' and ' emergent quality'. The resultant quality is only the repetation of their antecedents and as such are deducible from their causes. For example, in the case "Oxygen and hydrogen produce water", the weight of water is equivalent

8. Magill : *Masterpieces of World Philosophy*, p. 828.

to and is a repetition of the weight of the elements combined. On the other hand, the emergent quality is a novel one which is not deducible from their causes. Thus, life which comes from the non-living matter is material, but it is a matter with new quality of 'vitality'. So when a cause produces an effect, something 'new' is being continuously evolved or emerged in this causal process. This sort of interpretation of the causal relation leads Alexander to the doctrine of teleological evolution. He admits that 'Nisus' is the power or agency that directs or pushes the evolution towards the deity, and though deity does not now exist, yet as the next order to evolution it is experienced as future. Thus in Alexander's system, past and future are just as real as the present. The reason, as we already mentioned, is that cause and effect are two different moments in the continuous system of space-time. This shows that causality is not the result of our psychological expectation as Hume and his followers asserted. But Alexander's standpoint does not seem to be satisfactory in so far as his conception of deity is concerned. He has said that deity will emerge as the highest category out of mind and there is a nisus or impulse towards this. But if space-time matrix, according to Alexander, is the cause of everything, then it does not justify the presence of the nisus. Besides, the concept of deity is claimed here to play almost all the same role as Aristotle's idea of God in the sense of the 'teleos' of this dynamic world. Consequently, everything that happens in nature is completely disposed so as to reach the goal of deity but that is not so settled by the metaphysical necessity. The causal process is certainly determined by this sort of goal because evolution, according to this standpoint, is regarded as a process of achieving new values whose nature is unpredictable by us and hence it is a matter of possibility. Again, it is objected that mere spatio-tamporal continuity does not amount to causation, for this conception only expresses a half-truth of it. In making a comment on Alexander's view of causality, B.K. Bhattacharya says, "For both temporal and spatial continuity can be determined only through the help of regular sequence and this regularity need not be spaced out in time but may be observed by different persons in different places at the same time. Hence regularity of sequence is a test for causation not with reference to its necessilty or invariability but with reference to its character of

causation as distinct from a mere sequence that is not continuous and a mere co-existence that is not continuous. Contiguity, both spatial and temporal, can be ascertained from a single observation, but not so continuity which is, strictly speaking, beyond the scope of observation and even of experiment. We can determine it only with more or less probability and this is the real reason why even regular sequence cannot establish causal connection with absolute certainty. It may be objected that under the circumstances we should not speak of continuity, but in that case we should not speak of causality either".[9] Pap has implicitty tried to provide an affirmative answer to the aspect of the necessary connection in the concept of causality. In the foregoing discussion, we have seen that Hume, Mill and Russell have arrived at the conclusion that causation is nothing but a regular sequence of events. So it leads to the probabilistic view of causality, that is, the view that the relation between cause and effect is merely a probabilistic correlation. Pap accepts this regularity theory of causation not in the sense of probabilistic correlation between cause and effect but in some other stronger sense.

What is the regularity of the theory of causation in this stronger sense? The reply is that this stronger sense does not imply that the relation in causality is a logically necessary relation. The causal relation is established on the basis of evidences which are empirical in nature. Whatever may be the range of such empirical evidences, it can not help us to establish the so-called necessary relation between cause and effect. Again, the relation in causation which we thus establish is also refutable on the basis of subsequent perceptual evidences because the future is unseen and unpredictable. Hence the negaion is possible, and this negation in respect of any causal judgement is conceivable without any contradiction. Besides, one may argue that if by the word "cause" we mean "power", then this power is such that it necessarily produces its effect. But the ascription of the power to the concept of cause does not help us to be certain of the necessary relation in

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9. Bhattacharyya : *Causality in Science and Philosophy*. pp.170-171

causation. This is because the very problem of unpredictability regarding the future also arises here. We do not know future and there the so-called power may lose its capability. It may be said that arsenic may lose its power of poisoning in future. This shows that we have no way in favour of demonstrating positively the necessary connection in the causality. Rather the only alternative before us is to describe the causality as the regular succession of two events, i.e., the former event is followed regularly by the latter one in such a relation. And here in lies the important diffference between Pap and his predecessors. Pap has tried to interpret this regular succession theory differently from that of the previous philosophers. What is lacking in the previous account of the regularity theory ? To interpret this, Pap has introduced a distinction between two sorts of propositions: (1) 'A caused B' and (2) 'A preceded B'. Pap argues that the relation in the proposition 'A caused B' is implicitly compulsory. We can discover with our rudimentary knowledge of causation that the antecedent 'A' has some sort of 'power' which makes B happen as its consequent, while in the second case of 'A preceded B', the relation is not compulsory but one of succession. 'A' is here only the temporal antecedent but not a causal one of the event 'B'. In this case, 'A' does not have any power to make 'B' happen. It is only for this reason that any temporal antecedent to the effect can not be regarded as the cause. If we do so, then there would be a fallacy called "Post hoc ergo propter hoc". The two events 'A' and 'B' in the proproposition 'A prededed B' are related only in terms of temporal relation of succession, while the two events 'A' and 'B' in the proposition 'A caused B' are not only related in respect of temporal succession but also in respect of causal connection. So the proposition 'A caused B' is never entailed by the proposition 'A preceded B', but the latter is always entailed by the former. So Pap concludes that if the regular succession theory of causation means 'A preceded B', then it fails to capture the real character of the causality. He holds that we should be always very cautious about the selection of antecedent cause. The fallacy "post hoc ergo propter hoc" warns us for this purpose; we should, therefore, not forget that any temporal antecedent can not be considered as the cause of the effect concerned. Now, Pap thinks that the proposition 'A caused B' holds the relation stronger than

that which the proposition 'A preceded B' holds. According to him, it is entirely due to the antecedent cause 'A' which occurred in the first case. The cause 'A' by itself is not able to function its role properly in the causal relation. It can do this if it is in conjunction with some other condition 'C'. The addition of the condition 'C' to the cause 'A' makes 'A' a necessary condition for the event 'B'. Pap calls such a condition 'A' 'conditionally necessary condition'. This sort of condition called 'C' is obviously the fact when we analyse a particular causal statement like "The striking of a match causes a flame". The striking of a match by itself can not cause a flame but it can do so only by its dependence on or conjunction with some other conditions like 'the presence of enough oxygen", "the dryness of the match", etc. These conditions jointly constitute the condition 'C'. According to Pap, it is conclusive that 'A causes B' or 'the same cause produces the same effect' when the other condition 'C' is fulfilled. Ordinarily we do not engage ourselves into the analysis of such conditions; we simply say that the same kind of effect can be produced by the striking of a match knowing implicitly that the other condition 'C' is already fulfilled in this context. So the causal relation between "A' and 'B' in the proposition 'A caused B' is not logically necessary, but only compulsory due to some efficiency in the antecedent cause 'A'. Since the antecedent cause 'A' depends on the fulfilment of certain other condition 'C', 'A' as the 'cause' of a particular event is necessary but not sufficient condition for the effect. Thus the causal relation is not like the material implication of symbolic logic ; it is rather a weaker connection than analytic connection. Hence the fact is that 'that similar cause produces the similar effect' may be justified but does not follow analytically. Because we can not find out the logical certainty of the causal relation on reflection upon the words used in the causal relation. Pap holds that the previous regularity heory of causation has failed to take into consideration this account of the causal antecedent:

Now, Pap argues for the dispositional factor in causal statement in order to prove that the same cause would produce the same effect in future, too. The modem scientists and positivistically inclined thinkers such as Mach and Hertz have

supported this view. Instead of using the "occult power" or 'force' in the notion of cause; they have used the word 'disposition'. The disposition, according to them, is a quality which causes certain type of effect not only at present but also in future as well under the same circumstances. In other words, "disposition' is the inherent capacity by which a substance acts in the same manner under the same circumstances. 'Sugar is soluable in water' means that sugar in contact with water has this power or capacity to behave in a particular manner. This sugar is soluble in future also if it is in contact with water. But if at the time variable the circumstances do not remain unchanged, then a given thing may have a certain disposition at one time but not at another. This shows that we are justified in believing the dispositional interpretation of the causal propostion. Again, in subsuming an observed regularrity under a dispositional concept, one anticipates an explanation in terms of the intrinsic, structural microproperties of things involved. When we say that 'fire burns', we anticipate that 'fire' is characterised by some microstructural property by which it produces its effect. On the basis of such dispositional statement, we can have a transition from the empirical science to the unifying theoretical science; it is possible for us to predict at least theoretically about the states and processes of the physical objects. This prediction leads to a causal determinism. He says, "The assumption of permanent objects and unobserved physical processes is forced upon us by the principle of causality, by the desire to account for our sense-impressions in terms of fairly simple laws".[10] The causal determinism does not require us to have the sense-impression of the entire process at work. Pap admits the close logical connection between physical realism and causal determinism. The principle of causality is working not only in the physical sciences but also in the social sciences. Social sciences can not venture to predict any law which is as certain as the laws in physical sciences. The reason is that the subject matter is here human behaviour and 'free will', and all these are the results of our conscious behaviour. But Pap does not allow any imcompatibility between 'free will' and 'determinism'. The alleged incompatibility arises from our superficial sense of the

10. Pap : *An Introduction to the Philosophy of Science*, p. 325.

word 'free will' or 'free action'. It is said that a free action is one which the agent desires and prefers to do. But desiring is distinguished from deciding. Deciding does not mean just the desire to do, for looking at the consequences of a certain desire we decide not to do. Thus, a free action is defined as an action which the agent decides to perform. Pap argues that 'determination' and 'free will' fall within this same boundary. Now physicist would allow that , given all the physical forces determining a particle's motion and given the particle's initial state, it sould have moved diffierently from the way it moved. Similarly, given all the causal antecedents, no body could have desired or decided differently. Pap says, " Even if quantum jumps occur in the brain when a human being consciously reacts to the environment in a certain way, his reaction might still fall under a "deterministic molar law" of the form. "Whenever a human with (acquired or inherited) disposition $D_1, D_2, \ldots$, is exposed to an environment of kind E, then he reacts by doing A".[11] So the human behaviour is guided by the principle of causality.

Pap has mentioned that the modern scientific attitude goes sometimes in favour of the theory of relativity. This theory is a challenge against the validity of the causal determinism. The contention is that it is not possible either practically or theoretically to predict about the nature and activity of the individual electrons. So, the principle 'Every event has a cause' is not working here. Pap holds that this objection is not insurmountable, for we have to find out the sufficient condidtions for the effect. In this connection, his suggestion is that when we establish a causal generalization, this should be qualified by this escape clause 'provided the same relevevant circumstances are present'. It is certainly the fact that a cause produces its effect if the relevant situation remains unchanged. It is not logically possible to avoid the notion that every event has a cause. The scientists take the help of the causal principle in order to find out the cause of a particular effect. Pap says, "The principle of causality, therefore, is not analytic, nor is it an inductive generalization that could be refuted by contrary instances. It is best described as a guiding principle of

11. Pap : *An Introduction to the Philosophy of Science,* p.333.

causal inquiry that owes its success to a contingent feature of the universe. It "guides" the scientist in his search for a difference in antecedent conditions to account for the fact that apparently similar antecedents were followed by dissimilar effects, whether in this conception it can be claimed to be a true, or at least a well-confirmed proposition, or should be accorded the status of a "rule of procedure" that cannot properly be called true or probably true, is really a matter of taste since the distinction between a proposition and a rule of procedure becomes some what fuzzy as we ascend on the ladder of inductive generalization".[12] We may say that the causal law is a hypothesis but it differs from the hypothesis in the ordinary sense. Planck holds "But it is a fundamental hypothesis because it is the postulate which is necessary to give sense and meaning to the application of all hypotheses in scientific research. This is because any hypothesis which indicates a definite rule presupposes the validity of the principle of causation".[13]

Thus is evidently clear from the above discussion that Pap has tried his best to provide the certainty to the causal relation, and this attempt has been made from the scientific standpoint. But he fails to lead the position very far because of the limit of the standpoint which is empirical. The certainty for which he has pleaded is not a logical certainty between cause and effect; it is not demonstrable apriori or analytically. Ayer is in agreement with Hume and Russell in so far as the causal law is concerned. He holds that the place or the source of the so-called necessity is in our mental habilt of association and equates causality with the regular sequence. This is very much evident when Ayer defines the term 'cause'. According to him, a cause always preceds its effect; it never succeeds its effect. It shows that Ayer has particularly pointed out the causal directions in clarifying the meaning of the word 'cause'. The reason for holding the above definition of cause is that the course of events takes place earlier and later; it is that where we can make more precise inferences from earlier event to later event but not conversely. Secondly, the causative verb always

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12. Pap : *An Introduction to the Philosophy of Science.* p.311.
13. Planck : *Where is Science Going* ? p.153.

shows this sort of direction; it is always 'forward-looking'. In so far as the meaning of the causative verb is cencerned, it has a reference to the future. Thirdly, the human activities also involve this sort of direction; these are equally 'forward moving'. Consequently, Ayer defines the concept of causality in terms of the direction of events. The direction of events is such that a cause always preceds its effect and the effect succeeds its cause. In defining causality, Ayer has been influenced by Hume. His interpretation of the antecedent cause makes us remind Mill's influence. Ayer like Mill has defined cause in terms of positive and negative conditions, and both of these conditions, according to him, are essential for the production of the effect. But the question is how these conditions can be defined. There is some method for this, "For example, it is usually possible to distinguish between what Prof. Price has called standing and differential conditions - that is to say, conditions which are relatively stable and conditions which come in changes and it is then the differential conditions that are singled out as causes. Thus, in the case of a forest fire, it is the spark that ignites the fire, and the wind that fans it, that are said to be the cause of conflagration, rather than the state of the climate or the composition of the world."[14] Now, Ayer holds that the relation between a cause and its effect is invariable in the sense that when the cause is present the effect will follow. When we say that 'A causes B', we mean thereby that either A is the sufficient condition for the happening of B or A is the necessary condition for this occurrence or A is both the necessary and the sufficientcondition for B's happening. Ayer holds that the relation between cause and effect is not necessary and universal but only contingent. This is so because any one can deny the causal relation without self-contradiction. So the relation is not logical in character. Ayer speaks of the workability in practice in order to provide the justification for the causal law. If the causal law works successfully in practice, then we are justified in accepting such a law.

Ayer argues that we desire the idea of cause from experience as we have already mentioned above, and the repeated experience of it helps us to construct

14. Ayer : *Probability and Evidence*, p.134

generalized causal proposition. What we call the generalized causal statement is nothing but a generalization from the singular causal statement. A singular causal statement is about a particular causal relation that operates between the events at observable level. This causal statement is partly factual because the relation between the events is a fact. The factual content of the singular causal statement consists in an assertion of the existence in such and such spatio-temporal relation of the states of affairs which it conjoins. Now, we establish universal causal statement by the arrangements of particular facts which we have already experienced by assuming that in future they will occur under similar circumstances. Ayer calls that this process of establishing universal causal proposition is imaginary and regards it as statement of tendency. On this version, such statements have no unrestricted truth-value, for causal statements are only partly factual. At the observable level, the factual content of a universal causal statement is that of the corresponding factual generalization, According to Ayer, all generalizations (or universal propositions) are not causal generalizations. He speaks of four types of cases of generalizations which are called causal. First, there is a generalization which falls under a well-established wider theory, for example, the statement regarding the gravitation. Second, there is a universal generalization consisting of 'because' clause, i.e., the clause that speaks of the effect which emerges from the composition or structure of an object. Third, there is some general proposition about the state of disposition or mind which causes some effect invariably. Fourth, we have some generalization about causally linked state of affairs, i.e., the relation between events.

One important problem arises here regarding the causal relation. Ayer holds that we can not perceive the causal relation like other observable facts. It is not a distinct event like cause and effect. But some philosophers like Ducasse hold that the causal relation is a concrete event. Consequently, it is an observable fact. When we perceive the change in our every day experience, we equally observe the causal relation. Ducasse says, "we observe it whenever we perceive that a certain change is the *only* one to have taken place immediately before, in the immediate

environment of another".[15] But it is argued that the causal connection does not have the same status as that of colour, smell, sound, etc. Again, we do not have the way to know it to be true. Yet we do hope that this causal relation is true and it is true for our practical purposes. Here we suppose this to be true, and as such it is a postulate. This status of the causal law can be made explicit by reference to Popper's interpretation. According to Popper, every organism possesses the capacity to make responses to impending events. He says, "Thus we are born with expectations; with 'Knowledge' which, although not valid apriori, is psychologically, or genetically apriori, i.e., prior to all observational experience. One of the most important of the expectations is the expectation of finding a regularity".[16] But Ayer also unambigously states like Hume and Russell that causality is a regular sequence. He may have some differences in opinion on some aspects of causality, but he has no objection to accept the Humean tradition of the concept of causality. Ayer says, "Accordingly, he placed the source of the supposed necessity in our mental habits of association, and for all practical purposes equated causality with regular sequence. Though his theory is open to objection on some points of detail, I have no doubt that on central issues it is entirely right".[17] It is equally obvious to us also that the central theme of the empiricist account of the causality is the same that causality is a de facto regularity. All the empiricists argue along the line of Hume that there are neither nor have to be any truly physical necessities. The idea, or the pseaudo idea, of causal necessity is just an empty shadow of our own mind's throwing, and hence all are really nothing but only regularities of non-necessary constant conjunction.

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15. Ducasse : *Truth, Knowledge and Causation,* p.9.
16. Popper : *Conjectures and Refutations,* p.47.
17. Ayer : *Metaphysics and Commonsense,* p.76.