Chapter 5: Causality

5.1 Introduction

The previous chapter was about substance and how the principle of permanence of substance is a necessary condition for our knowledge of the objects of possible experience, and why it has to be postulated. The substance which exists as the only subject and is without predicate is closely related to causality. 'Cause-effect' is one of the crucial categories among the twelve Kantian categories. In this chapter, I shall discuss mainly the two questions—'How is the principle of causality a necessary condition for having empirical knowledge?' and 'How are substance and causality inter-related?'[78] I discuss the issue of the inapplicability of the law of causality in theories like quantum physics and critically explain the arguments. I begin the chapter with the following discussion.

5.2 The Principle of Causality as a Necessary Condition

Kant has given due importance to both understanding and sensibility. They equally contribute to the production of human knowledge[79]. Kant's principle of causality as one of the principles of physics has epistemological and ontological implications as it is connected to the question of the possibility of knowing the

[78]That is because Kant's philosophy of physics falls between epistemology and ontology.

[79]Kant's theory of knowledge as an epistemological theory is also known as the critical theory of knowledge.

objects of experience. Kant's principle of causality in the CPR (p.218) states that "All alterations take place in conformity with the law of the connection of cause and effect (Principle of succession in time, in accordance with the law of causality)."

The principle of causality is raised from the category 'cause and effect', which establishes a necessary and universal relation between a cause and its effect. The following conclusions can be drawn from the above-given principle of causality:

1. Every appearance follows one another.
2. The objective relation of appearance is determined necessary.
3. The apprehension of the manifold is always in succession.
4. Subjective succession is derived from the objective succession.
5. The connection between cause and effect necessarily follows a rule.

The cause and effect is a pure concept of the understanding which enables us to transform our individual and relative perception into synthetic judgments. The objective relation of appearance is determined necessary, which means that the relationship is not contingent. It is not derived from experience but makes empirical knowledge possible.

We cannot consider things-in-themselves to be appearances. If we consider so, we have to deal solely with our representation, and we could never determine an object from the succession of representations. Further, if the manifold of representations of things-in-themselves is connected themselves, then the

representation through which they affect us is entirely beyond the scope of knowledge.

Kant states that we do not have a determinate order (or rules) in the apprehension of the manifold of the appearance of a house (CPR, A191/B236, p.220), for instance. For an event, which should follow upon an empty time (to be preceded by no state of things), is as little capable of being apprehended as empty time itself. No object is represented, and nothing is distinguished from anything else through a succession, which is common to all. While perceiving something happening, the representation consists of something preceding.

The experience of an event is possible only on the assumption that there is something antecedent to an event on which it follows according to a rule. According to the rule, the event always follows upon certain appearance. We cannot reverse the order of the objective succession of appearances, i.e., proceeding back from the event to determine through the apprehension that which precedes. This order in conformity with a rule is necessary.

Let us construct the concept of cause. We cannot form an empirical concept of cause. The universality and necessity of the rule is derived from its being *a priori*. However, the rule governing the causal relation is only valid when we apply them in experience. A pure understanding is required for all experience and its possibility. This understanding does not only make a representation of objects distinct but also at all possible.

The question "How is causality related to objects of perception?" also implies how the principle of permanence is related to it. It is a rule because without it we cannot have knowledge of the object of experience. The category like cause and effect and the principle of causality is applicable only to the object of perception, and it is synthetic. It cannot be applied to the things which are beyond our perception. Max Planck agrees with Kant's view on causality in the following passage of his *Where is Science Going*? where Planck writes:

> The principle of causality must be held to extend even to the highest achievements of the human soul. We must admit that the mind of each one of our greatest geniuses—Aristotle, Kant or Leonardo, Goethe or Beethoven, Dante or Shakespeare—even at the moment of its highest flights of thought or in the most profound inner workings of the soul, was subject to the causal fiat and was an instrument in the hands of an almighty law which governs the world. (p.156)

Philipp Frank thinks that the law of causality is conventional and incommensurable, on the ground that the law is neither confirmed nor disproved by experience[80]. To Kant and Planck, the principle of causality (cause and effect relation) is necessary to avoid solipsism. The principle of causality cannot be accommodated in quantum physics and sub-atomic physics because they are based on the principle of uncertainty. However, it cannot be avoided at the level of perception and experience of the objects of the world.

[80]Philipp Frank., *Einstein: the Life and Times*, New York, Avon Books, 1999, p.148.

5.3 Substance and Causality

Empirical knowledge as something objective is not possible from perception alone. It is required that the knower (person) organize the data of the perceptions. Perceptions are received in consciousness as they are, and this means that data are contingent. But knowledge is something true for everybody, not for one particular individual only. When we apply categories of substance, causality and community, the relations become necessary and consequently objective. The analogies of experience explain when we have intuition and sensation, how subjective (private and relative) sense-data transform into judgments about the objects by applying the categories of substance, causality and community. The principle of analogies of experience tells us that it is concerned with our thought of relations of the existence of objects and is regulative only.

We have three analogies of experience which make our experience of objects possible. These analogies are interrelated to each other. The latter two principles are dependent on the principle of permanence of substance. Nevertheless, they together make experience possible.

When we talk about causality, we are also talking about substance. The permanency of substance and time mentioned in the first analogy makes the relation of cause and effect possible. The time determination and possibility of knowledge of objects of experience are made possible by the analogies of experience. The relation between cause and effect cannot be established without

a presupposition of something permanent (already discussed in the previous chapter).

Regarding the relation between substance and time, Eric Watkins is of the opinion that we should begin by describing the distinctive context of the Analogies of Experience within the CPR and the argumentative framework of the analogies in general (2005, pp.185-6). However, Watkins suggests that it is more specifically important to understand: (1) how the analogies relate to Transcendental Deduction. (2) Substance and causality are concerned with addressing what can be called the problem of time-determination. (3) Substance and causality are concerned with the possibility of experience in the form of unity of time. (4) They should be understood as making neither purely metaphysical nor exclusively epistemological claims, but rather claims that combine metaphysical and epistemological elements.

5.4 Causality and Community

Causality, as treated in the second analogy, is a relation of one-sided dependence. The effect is regarded as dependent on the cause, but the cause does not depend on its effect. For example, Malaria depends on Anopheles bite, but the latter does not depend on the former. Community, as contrasted with causality, is possible only if all substances co-exist. Kant explains the situation in the CPR (p.234): “the principle of co-existence in accordance with the law of community (reciprocity) emphasizes that the substance must not be regarded as isolated from one another.Without substance, we cannot have the perception of substance and

the knowledge of co-existence. Co-existence is of substances, and these substances must be regarded as 'influencing' each other. Substances can be known as co-existing only if they are regarded as bringing about changes reciprocally, that is, A causing a change in B and B causing a change in A. From this dependency on each other, the totality of substance can be known. Substance as 'isolated' cannot give us knowledge of co-existence because principles of isolated substance cannot be connected (they are not perceived)."

The three analogies enable us to anticipate the experience. The knowledge of objects is possible only after satisfying the condition imposed by the three analogies. Even a concept like 'gravitation'[81]makes no sense in the absence of coexistence and interdependence. We have accepted that gravitation is a concept that depends on the interaction of substance. However, the details of what influence among substances depends on actual empirical conditions require to be discovered only through experience[82].

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[81]Gravitation' and 'Gravitational waves' are well-accepted scientific ideas. The so-called 'Gravitational Wave' has not been detected till now. But if the scientists, with the development of more sophisticated technology, are able to do that, then they would know about the formation of the black hole, the very moment of expansion of the universe, and the rate of its expansion and about many other mysteries. That will consequently bring about a reorientation in many theories in physics. That will bring about some changes in our understanding of the world and universe and our place in them, but not as much as has been thought at the cognitive level.

[82]Newton's theory of gravitation is a particular version of the categories of community in which Newton is concerned mainly with the motion of celestial bodies. Einstein, on the other hand, has approached it differently by geometrizing gravitation.

According to Kant, the causal principle is constitutive of knowledge (of objects). Empirical knowledge involves the relation of cause and effect (sensation and their cause). We think of an object when we see, hear, touch, smell, and feel. Without cause-effect relation, therefore, we remain ignorant of the existence of other human beings and material objects. Human beings use this relation spontaneously, and it is *a priori*. We do not learn to use this relation. It is a naturally inbuilt *a priori* in the Kantian sense. *A priori* is nothing but a logical priority. (I have discussed this in the second chapter). Empirical knowledge consists of *a priori* and empirical elements: *a priori* element is an ordering element, and the empirical element is that which is ordered (content, matter, and determinable). On the occasion of sensations received in consciousness, our mind orders these sensations as the effects of objects.

5.5 The Principle of Anticipation

Perception has been treated by Kant in terms of causality. Causality is a relational concept that enables us to transcend ourselves mentally. When we are affected by objects, we have a sensation. This sensation is an effect on our sensibility by which we become conscious of something in addition to ourselves (conscious of something which is outside of us). It should be noted that by 'sensation' Kant understands it to be 'instantaneous'. This sensation is treated as a 'unit'. It is a common experience that sensation has intensity. For example, the radiation of the midday sun is so intense that we cannot look at it for long. Thus, in all appearances, sensation corresponds to the object and this sensation has intensive magnitude.

‘Anticipation’, as a principle, anticipates experience and informs us of the necessary characteristics of the object of perception before any particular experience. To have the necessary characteristics of a particular object of perception or to have *a priori* knowledge of its matter, that is, a matter which must be given through empirical sensation, we should be able to anticipate experience in its empirical elements

All appearances of the real object having extensive magnitudes are impossible without space and time. Appearance as an object of perception has a sensation, and this sensation as mere subjective representation gives us sense-impressions or spatio-temporal manifold to which we relate an object in general. Here, we have a graduated transition from empirical consciousness to pure consciousness where the former, which is real, vanishes and the latter a mere formal *a priori* consciousness (not exactly formal like a schema) of the manifold in space and time remains.

Intensive magnitude as the degree of intensity is not in space and time but is the product of sensibility. Between less intensity and high intensity, there is a continuum which means intensive magnitude diminishes and increases, but quanta continue[83]. The sensation is not in space and time because what are given to our sensibility are only qualities (of objects or things). Intensive magnitude

[83]In physics, a quantum is the smallest possible unit of something (energy, light, etc.). There is no 'in-between' for nothing and the smallest possible unit of something. No matter how much of 1 quantum of something is taken away, it will always be a whole-number multiple of 1 quantum.

has to be thought like quanta. It is not certain; they have dual characteristics; they come in quanta and have been thought to be continuous and jumpy.

To Kant, nature is full of lawfulness and to know the phenomena of the world we have to put ourselves into it. We can agree with Philip Ball[84] when he says that 'Reality' is not the reality of the outside world but the reality that we make. This is because though the objects and events of the world are outside and independent of us, we apply categories, principles, laws, and space and time to know the objects and events[85] (phenomena) of the world. Hence, describing and explaining the phenomena of the world by a theory like quantum theory is only one of the ways of knowing the reality of the world.

Philip Ball in his article 'Reality? It's What You Make' enquires into the quantum theory that attempts to interpret reality. The quantum theory describes nature and reality in a quite different way than other preceding theories like the theory of mechanics and the theory of relativity. It tries to answer questions concerning every subject-matter of the human-world.

We have been told that reality is different from what we know by our common-sense knowledge. We plunge deeper into the nature of reality. We walk from human consciousness to sub-particle level (i.e., in quantum physics), from concepts to a theory at large. However, some problems crop up in between many

[84]Ball, P., 'Reality? It's What You Make', *New Scientist*, Vol.236, No.3151, 2017, pp.29-32.

[85]Our experience reveals events but we correlate them as cause and effect. The application of 'cause-effect' is our way of arranging materials of knowledge, as with other categories.

explanations due to the subjective nature of the human mind and independency of the objects of the world. According to Ball, scientists and philosophers are trying to find out some reasonable answers to these problems. An event perceived by two persons at different locations describes an event in a quite different manner. Even if we connect and co-operate the two persons (observers), there lies a gap between them. We cannot say that we either know reality or fall in solipsism. We know objects and events and other phenomena of nature and all of them collectively make our reality.

The knowledge of nature is the factual knowledge of our nature, and there is a relation between observers and the objects of nature. Reality is not the reality of the objects and events of nature because they are independent of us. We interpret, describe and explain them as per our capacities. The reality we talk about is our reality, not the reality of the objects of the world. As conscious human beings having intelligence, we talk about reality and that is why reality denotes reality for us, not a reality for the objects that are independent of us. This also means that we know reality or nature only by putting ourselves into it. In other words, we do not know how reality is for other creatures, but that we know reality only through our sensibility and understanding, and this urges us to think about our place in knowing our world and universe. In this regard, Emily Wilson writes in his article 'Finding Our Place in the Universe'[86]:

> Ravelli and others have undertaken to find out. Their journey has led them into the depths of human mind and its relationship with physical reality, throwing up surprising

[86]Wilson, E. 'Finding Our Place in the Universe', *New Scientist*, Vol. 245, No. 3269, 2020, p.34.

> and profound connections: to the mysteries of entropy and following time, to reality and consciousness, and to the nature of physical law itself. Get to grips with what underlies our everyday acts, and we could be on the way to a deeper, all-inclusive understanding of both the cosmos and our place in it. (p.34)

Can we think of our reality without an observer? There is an intimate relationship between the observer and the facts of the world. Reality may or may not be what we observe, and when talking about reality, we are talking about our understanding of the reality of the world (nature). Now, quantum theory suggests alternative facts or also a fact of nature[87]. Therefore, we have no complete idea of how consciousness is made up of things in them. This is very close to the Kantian notion of the reality of the objects of the world.

5.6 Conclusion

In this chapter, I have tried to show how causality is not free of empirical admixture, although its relation is determined completely *a priori*. The principle of causality establishes a necessary and universal relation. It is a necessary

[87](1) The uncertainty principle states that light sometimes acts like a particle (called a photon), which explains how it travels in straight lines, and sometimes light acts as a wave, which explains how it bends or diffracts around an object. This principle as a fundamental platform allows Schrodinger's cat to be both alive and dead, and also means two particles can speak to each other across a galaxy's distance. (2) The position and velocity of the electron (in the motion of the sub-component of an atom) cannot both be measured, exactly, at the same time. The point is that both Kant and quantum physics' conceptual and methodological outlooks on reality are similar. But the principle of causality is not applicable in quantum physics.

condition for knowing the objects of the world. I have explained the five arguments derived from the principle of causality and how the connection between cause and effect must follow a rule.

I have argued that the principle of causality applies only to the objects of experience, and it is synthetic *a priori*. The three analogies of experience as principles lay the foundation of physics. Therefore, they are the universal principles of pure physics. They even presuppose the various theories of science from the cognition level of human knowledge of reality. I have also shown that the principle of anticipation presupposes the concepts of ‘quanta’ and ‘quantum vacuum’ of quantum theory. There is an indispensable relation among substance, causality and community. The facts of reality are also dependent on the observer. Therefore, the exclusion of ‘causality’ by quantum theory is also an alternative theory of nature.