Chapter 8: Conclusion

8.1 Introduction

In this concluding chapter, I present a discussion on how to understand Kant's philosophy of science and how the previous chapters of this thesis embody Kant's philosophy of physics. I argue that without understanding the nature and method of Kant's transcendental philosophy, it is not possible to understand his philosophy of physics from his own philosophical framework. As I have already mentioned in the previous chapters, Kant's philosophy of physics as a part of his universal or transcendental philosophy of science is based on his 'Architectonic Plan' in which the categories and forms of judgments through the faculties of knowledge constitute the system. In other words, the 'Architectonic Plan' is a 'Plan' of making his transcendental philosophy a 'Systematic Whole'. Every 'part' of the plan is a unit of the 'whole' and is related to each other. In the process of making the systematic whole, he has departed from his predecessors with the development of his revolutionary thoughts. Kant's revolutionary thoughts in the field of philosophy and his goal to lay a metaphysical foundation for natural science have made him the first philosopher of science in the history of philosophy of science. In this chapter, I have tried to explain how his inferential method and revolutionary way of thinking about nature has opened the door for his philosophy of physics. I also present a discussion on how his philosophy of science is a 'New Metaphysics of Science' or 'Universal science' and his philosophy of physics is a 'Universal Physics'. I have designed this

chapter in a way to present some interconnected and decisive conclusions of all that I have investigated, examined, explained and critically reflected on in the previous chapters of this thesis. I have done this, in the form of a discussion, by giving insights into how his transcendental philosophy embodies his philosophy of physics.

Many philosophers seem to doubt the possibility of *a priori* knowledge. But I have defended Kant thus. Kant in his two prefaces of the CPR has made it abundantly clear that his main concern in the book is with physics, mathematics and metaphysics. He is not directly concerned at all with the objects (or things) of the world. He has treated physics (natural science) and mathematics as the two bodies of knowledge, but metaphysics remains a doubtful science due to its controversies. Kant has never questioned the existence of physics and mathematics as the two bodies of knowledge. The truths of mathematical propositions (and judgments) are not dependent on experience and it should be regarded as independent of experience, i.e., *a priori*. David Hume has taught us that universality and necessity are not found *a posteriori*. Einstein has also agreed with this point. Kant has tried to make this point clear to his critics and detractors in several places of the CPR.

The dichotomy between '*a priori*' and '*a posteriori*' is a corollary of the distinction between rational and empirical. It is quite obvious that knowledge is possessed by human individuals. Moreover, knowledge as commonly understood is true for everybody (i.e. knowledge is universal) and it is also necessary (not contingent, i.e. sometimes true and sometimes false). Perception (or experience)

does not give us 'universality' and 'necessity' and the two must be of 'human origin'. We must remember that our senses can reveal only 'this and that of the fact' but not 'all of the facts'[136].

Kant has identified universality and necessity with objective validity in the PFM: when we apply *a priori* forms (space and time) and categories to particular objects and events, the propositions become universal and necessary. 'Universal' in this context refers to 'all' humans and not to 'all' objects. Similarly, the word 'necessary' does not refer to 'logical necessity' and 'contingently true' but what is necessary is 'uniformly' true. In this context, I disagree with Roderick M. Chisholm's view that when philosophers think about the possibility of synthetic *a priori* propositions they are thinking rather of the propositions which can be expressed naturally in English in the form of "All S is P" (Chisholm, 1977, p.58). In § 2.3 of Chapter Two, I have given a suggestion that in Kant's case we should not confuse universality with universal quantification. Chisholm's type of universal propositions beginning with 'all' and 'no' are universals in quantity (or quantifiers) and all such propositions are not necessarily true. This means, for Kant, objective validity is equivalent to universality and necessity and has the same notion in his philosophy of science. Thus, objective validity as inseparably connected with the two criteria of *a priori* is valid for all human beings (in general) and makes the 'social life' of human beings possible. It should not be forgotten by Kant's critics that this 'validity' is not of objects.

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[136]Kant, I., *Kant's Critical Philosophy* (*Prolegomena to Any Future Metaphysics*), Vol.III, J. P. Mahaffy (Tr.), London, Longmans, Green, And Co., 1872, p.69.

It is indeed true that Kant's '*a priori*' is an improved version of René Descartes' idea of innate that whatever is true of 'every' human being is of '*a priori*' origin. Thus, space and time at the level of intuition and categories at the level of concepts are *a priori* and hence they are pure intuitions and pure concepts (forms of sensibility) respectively. In this thesis, I have, therefore, started my investigations with a chapter on '*a priori*' because 'Kant's Philosophy of Physics' is solely concerned with the formal part of physics. Kant's philosophy of physics does not directly open with the question 'what is an object?' but 'how do we know the object?' It also does not formulate any principle and law of empirical physics but rather builds a presupposition upon certain principles and laws which are synthetic *a priori*. I have made a point in Chapter Two that a clear understanding of the concept '*a priori*' leads us to understand all the interventions of Kant's philosophy of physics as a part of his transcendental philosophy. Thus, the chapters of this thesis starting from chapter 2 on *'A priori'* to chapter 7 on 'Motion' adopt the Kantian inferential method[137].

8.2 The Inferential Method

Kant's philosophy of physics being dependent on reason confines itself to the *a priori* aspect of empirical physics. It investigates the truth of scientific principles and laws and deals mainly with the form of knowledge whose matter is always

[137]In the Kantian inferential method, we infer the *a priori* concepts and principles from the judgment of the object given to us in experience. In a similar way, we infer from the empirical and scientific principles to *a priori* principles. The empirical and scientific principles of physics are true of empirical objects and events.

presupposed. Kant has distinguished between the formal part of physics and the empirical part of physics. He leaves empirical and experimental physics to the physicists and scientists. His main intention was to show how pure physics and mathematics are possible as subjects of science and how metaphysics as a 'queen of philosophy'[138] fails to be a subject of science. He has tried to show how *a priori* propositions and judgments are possible in physics, mathematics and metaphysics[139]. He has declined to call his philosophy of physics a 'Theory of Science'. For him, a scientific theory influences and follows its own methodologies, observation, hypothesis, experiments, fundamental concepts (categories), principles and laws. The success of a theory is a social agreement (consensus) as a theory is never final. Many modern scientists, philosophers and scholars like Albert Einstein, Max Planck, Niels Bohr, Wolfgang Pauli, Werner Heisenberg, Henry Poincaré, Herman Wyle, Hillary Putnam, Imre Lakatos, Richard Feynman, Stephen Hawking, Lawrence M. Krauss, Immanuel Kant, Thomas Kuhn, Karl R. Popper, Paul Feyerabend, Michael Friedman, Eric Watkins, Konstantin Pollok, and Robert Palter, to name a few, have agreed with the point that there is no finality in empirical physics. However, I have argued from the very first chapter of this thesis that Kant's concern is only with the non-empirical part of physics.

The inferential method of Kant's philosophy of physics starts from consequence to antecedence. Thus, there is less chance of claiming the fallacy (committing a

[138]It indicates that 'Metaphysics' is more attractive.

[139]Kant has called the three forms of knowledge, i.e., Metaphysics, Mathematics and Physics (Natural Science), as rational knowledge which presupposes empirical knowledge.

fallacy). We call Kant's critical philosophy as transcendental philosophy because it is not about objects but about the *a priori* aspects in our knowledge of objects. We have empirical and contingent knowledge as derived from the objects of experience. These kinds of knowledge cannot be necessary and universal, but as mentioned by Kant himself; his actual search was a search for necessary, universal and objectively valid knowledge and the relations among them. Moreover, Kant's arguments in the CPR pass from conclusion to premises (principles)[140]:

$$p \supset q$$
$$q$$
$$\therefore p$$

Kant's contention in the CPR and MFNS is that our faculty of inference (namely reason) enables us to deduce conclusions from given premises (principles). Those conclusions are materially (factually) true only if the premises themselves are true and if there is no fallacy in the arguments. Hence, reasoning by itself does not give us the truth. Yet metaphysicians have wrongly assumed that they can establish the truth about Heaven and Earth through abstract arguments. Kant has analyzed the nature and scope of the faculty called reason and has explained that what the metaphysicians tried to do was absurd because only by thinking, we cannot acquire information about actual existence. The *a priori* concepts and principles generated through understanding and pure understanding are grounded

[140]The principles and laws of empirical physics are conclusions and the *a priori* principles and laws of his universal physics are the premises.

on pure reason as their source is in pure reason. In connection to them, I have examined the difference between logical and material necessity as the two types of necessity under section 2.3 of Chapter Two. I have also argued that Kant's concern in his philosophy of physics is with the latter as one of the criteria of '*a priori*'. I have agreed that Kant's philosophy of physics is based (founded) on some epistemological implications because the question 'how do we know the *a priori* aspects of things?' is connected with the question 'how are synthetic *a priori* judgments possible in physics?[141] In other words, the latter question is founded on the former. In fact, we cannot directly know the *a priori* aspects of things until we put ourselves into it. The concepts of '*a priori*', '*a priori* knowledge' and 'knowledge *a priori*' give birth to a new kind of thinking in epistemology, metaphysics and science. The inferential method of Kant's philosophy of physics evolves with the understanding of this revolutionary way of thinking about nature[142] in order to know the synthetic *a priori* principles and laws of physics. Thus, I have agreed with Edward McKinnon when he says that what Kant attempted to reconstruct, however, was the conceptual foundation of science rather than the logical structure[143]. The reasons for this, as well as the particular way in which it was done, can best be understood in the light of Kant's own philosophical development (1978, p.18).

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[141]I shall be defending them in the later sections of this chapter.

[142]We ourselves involve our understandings to know the principles and laws of physics because to know the *a priori* concepts and principles in relation to the knowledge of the given object we do not scratch or dig the object.

[143]McKinnon, E., 'The Development of Kant's Conception of Scientific Explanation', *Philosophy of Science Association*, Vol.1, 1978, pp.18-30.

8.3 The Revolutionary Thought

Chapter Two investigates and examines the possibility of *a priori* principles in Kant's philosophy of physics. This chapter has implicitly expressed a revolutionary way of thinking about nature. Things are given in experience and experience itself is a species of knowledge that involves understanding and understanding has rules and hence is *a priori*. We cannot directly know the *a priori* aspects of things but we know only what we ourselves put into them. These rules must be presupposed as being in us, prior to objects and, therefore, as being *a priori*. Thus, that the objects of experience must conform and agree to their *a priori* concept gives an excellent touchstone of adopting a new method of thought. The method consists in looking for the elements of pure reason that are conformable and refutable by experiment. Even Einstein has agreed on this point: it seems that the human mind has first to construct forms independently before we can find them in things. Kepler's marvellous achievement is a particularly fine example of the truth that knowledge cannot spring from experience alone but only from the combination of the inventions of the intellect with observed facts[144] (Einstein, 1993, p.23). Kant's answer is found in the point that pure science of nature is possible because its laws are the principles which render all experience of nature possible.

The *a priori* knowledge of nature is possible only by a phenomenological interpretation of nature. We cannot prescribe a rule to things-in-themselves. We speak of the necessary and universal knowledge of nature only by means of the

[144]Einstein, A., *Ideas and Opinions*, C. Seeling (Ed.), New Delhi, Rupa & Co., 2002, p.23.

synthesis of some representations ordered under the *a priori* notions and laws of understanding (Schurman, 1899, p.227)[145]. It gives rise to the question—'Can we prescribe a rule to things-in-themselves?' because Kant's transcendental philosophy has been termed as a kind of higher empirical realism. I have answered this question in § 3.6 and § 3.7 of Chapter Three and even in § 1.2 of Chapter One.

Reason gives us *a priori* knowledge in physics but categories constitute the aspects of empirical objects. But in the absence of experience, the categories and proposition derived from them would be just without objects. The *a priori* propositions of physics, to become real pieces of knowledge, should be applied to the actual things (or objects) of nature. This is also one of the reasons why the method of Kant's philosophy of physics is not hypothetical. Since everything is available to us *a priori* there is no room for hypothesis in it. Thus, his philosophy of physics deals with the possibility of *a priori* concepts, principles and laws in physics and it is a part of his universal science.

Metaphysics has tried to use speculative means to determine the transcendental concepts of the things that are beyond our possible experience. But this is not possible in metaphysics. In fact, metaphysics as a subject transcends all limits of experience. Thus, Kant has declared in the CPR that it is not a system of science (or a doctrine) itself but a treatise on the method. This means its main purpose is the speculative inquiry on the possibility of physics and mathematics as the

[145]Schurman, J. G., 'Kant's *A priori* Elements of Understanding as Conditions of Experience', *The Philosophical Review*, Vol.8, No.3, 1899, p.227.

subjects of science and the critical reflection on metaphysics. This would not be clear until we get ourselves acquainted with the concept of 'Universal Science', which Kant has called 'New Metaphysics'. However, all the chapters of this thesis are also parts of his 'Universal Science'.

8.4 Universal Science

The Transcendental (Critical) Philosophy is termed as 'Critique of Pure Reason' and the Critique of Pure Reason is termed as 'New Metaphysics of Science' and the New Metaphysics of Science is termed as 'Universal Science' and Kant's Philosophy of Physics as 'Universal Physics' is a part of his Universal Science. In a Kantian sense, the term 'Universal Science' means that its concepts, propositions and judgments (as principles and laws) are not solely derived from experience but applicable to it. According to it, *a priori* is our guide to the truth which gives the principles of connection. Certainty is objectively valid to all humans, that is, certain for everyone. It gives more importance to the unity of synthesis and uniformity in thinking. This is acquired from the connection of necessity and universality. This necessity and universality as criteria of *a priori* are equivalent to objective validity and differ from a subjective (or logical) validity.

Empirical physics is founded upon empirical principles. The universal science of nature as pure physics precedes empirical physics. Physics does not only presuppose *a priori* principles (propositions) and laws (judgments) to which nature is subjected, but also the application of mathematics to phenomena. The

pure propositions of universal science constitute the principles of empirical physics. In other words, the principles of physics are identical to the principles of empirical knowledge. Thus, empirical knowledge is pre-scientific and does not contain the items that form a system[146]. The main goal of modern physics has remained to successfully develop a system of concepts that can interpret everything in reality.

The concept of motion, mass, alteration, impenetrability, inertia and many others are not quite pure and independent of empirical sources. Kant has given "the principle of permanence of substance" and "the principle of causality" as the two examples of universal principles of nature that subsist completely *a priori*. This means that there is pure science of nature (pure physics) or synthetic *a priori* propositions in the science of nature. But how are these synthetic *a priori* propositions or judgments possible in physics as a part of universal science?

In physics, we are obviously concerned with nature. Even 'possible experience' is about the object of experience and that is why if anything given cannot be an object of experience, it can never be given by an example of possible experience. From the given objects, we ourselves form a list of concepts. The concepts that refer to the objects of nature or reality are either the concepts of objects or mere creatures of thought. A mere creature of thought could never be determined. In physics or the science of nature, we are not concerned with the objects whose cognition is beyond experience (if an object cannot be an object of experience, it would be hyperphysical). The *a priori* cognition of objects of experience gives

[146]But the main aim of the transcendental philosophy is to construct a unity of synthesis.

rise to a question—how the objects of experience can be cognized *a priori* as necessarily subjected to the laws of nature? The solution is that the *a priori* laws must be possible for the empirical cognition of things as objects of possible experience. An event perceived without the law (i.e., not perceived in reference to something that precedes) does not make a perceptive judgment of experience possible. When an event is perceived it always refers to something that precedes it and is incomplete without a universal law that every event is always previously determined by a cause. It should be kept in mind that the *a priori* laws, therefore, are of universal science and obviously of universal physics. Therefore, universal science establishes unity between mind and nature as the possibility of uniformity in thinking and synthetic unity.

Kant's critics have found fault with Kant in failing to see the true character of empirical knowledge and also in establishing a single scientific ideal and measuring all prospective sciences by it. They also accused him of forcing the view that the only true sciences were metaphysics and formal logic and attempting to rationalize a fundamental part of physics in an unwarrantable way by deducing its principles and laws *a priori*. They even criticized Kant for failing to distinguish between the presuppositions of physics and the general body of physical laws. But the possibility of synthetic unity and uniformity in thinking is the unity between mind and nature.

8.5 The Unity between Mind and Nature

Nature does not introduce its order and regularity in appearance but we introduce them ourselves through our cognition. We are able to find nature settled in appearance only by the nature of the mind. The unity of appearance, the unity of rules of understanding, and the unity of *a priori* are accomplished by understanding from reason (CPR, B359, p.303). The possibility of the unity of faculties is the possibility of '*a priori* knowledge' (*a priori* concepts, principle and laws). This has been proved from the following:

1. **Unity of Appearance:** Understanding being the faculty secures the unity of appearance by means of rules.

2. **Unity of Rules of Understanding:** Reason being the faculty secures the unity of rules of understanding under principles.

3. **Unity of *a priori*:** Reason secures the unity of *a priori* by means of concepts (unity of reason) through understanding.

It is clear from the above that 'understanding' as a faculty of knowledge has vital functions in the acquisition of *a priori* knowledge. Reason never applies itself directly to experience or objects but to understanding. Again, the understanding does not derive the principles and laws directly from experience but prescribes to them. Understanding itself is not reason but reason-like and what is reason-like is merely logical. Understanding is the faculty of rules, and the reason is the faculty

of principles. The question “What is a principle?” is instantly connected to the question “Why do we need a higher faculty of understanding?” The reason is the faculty higher than the faculty of rules of understanding because it gives concepts and principles without borrowing from sense and understanding. The reason-like understanding has dual characters as its functions: (a) Logical (as a faculty of rules) and (b) Transcendental (as a faculty of principles).

Kant’s philosophy of physics is concerned with the *a priori* aspects of physics and this *a priori* aspect is constituted by the categories given by him. Thus, I have argued that the categories have subjective (or *a priori*) origin and explained how they gain their objective validity in § 3.5 and § 3.9 of Chapter Three. There, I have also explained an issue raised by William F. Bristow on the question of the applicability of categories to things-in-themselves. Kant has urged in many places in the CPR that ‘*A priori* Origin’ means it is not derived from experience. Categories gain their objective validity when used in the form of a proposition or judgment. The application of categories in judgment is synthesis itself. When they are used in the judgments, they form principles and the principles are meant to be applied to the real situation of reality. This is the only way of application of the categories. They have meanings only in their application to the objects of experience. When applied they have objective validity. This objective validity is obtained through the validity of a concept to an object of experience. Objective validity is related to material necessity and universality. However, objective validity is derived from two types of universality: one is strict universality which is related to material necessity and another one is related to empirical universality which is an arbitrary extension of universality. This has been clarified by Kant in

the CPR (B4, p.44) that the second types of judgments are not called synthetic *a priori* judgments but judgments of experience (I have defended this in § 7.3). Therefore, the synthetic *a priori* judgments (*a priori* principles and laws) are possible due to the nature of the mind and the unity between mind and nature.

8.6 The Synthesis of Categories

Kant's famous quotation "Conception without perception is empty and perception without conception is blind" is well known to us (students and scholars of philosophy) but we often miss the right meaning of the argument that both the conception and perception make experience possible. Without the experience of an object, the conception and perception are incomplete. Thus, the judgments about the objects of experience involve concepts because when we think about the objects, we think of them in terms of categories (but his critics think otherwise). The application of categories is synthetic because the knowledge of objects is possible only through judgment and such judgment is possible only through the faculty of thinking. Categories as 'forms of thought' or 'pure concepts' make knowledge from given materials. But it should be kept in mind that the pure concepts themselves cannot give us knowledge of things because in the absence of intuition there is no scope for the judgment. We make a judgment on the basis of perception. We do not have any other direct communication of the knowledge of objects of experience but through our judgments. Valid and true judgments are instances of knowledge. Therefore, our knowledge of the objects of experience involves both conceptions and perceptions.

Kant's conception of an object is that it is only known in terms of categories. It means that an object cannot be thought without categories. In the scientific sense, the categories must be recognized as a condition of the possibility of experience. This condition contains the objective validity of categories. The representations are synthesized in consciousness through categories. There would be no object without synthesis and categories are the modes of synthesis. For example, the categories like cause and effect and substance and accident are nothing but the ways in which representations are united with one another. The experience of an object would not be possible without such a synthesis.

In Chapter Three, I have argued that according to Kant, the data of perception has to be ordered by means of inner sense in time (i.e., the different moments and aspects of the manifolds). I have explained how synthetic unity is achieved. The different moments and aspects of the manifold have to be received in human consciousness and the manifold though many are a unity (whole). The data is collected successively, i.e., in temporal order. This act of data being apprehended is due to imagination. But we have knowledge of objects when the object is actually given in experience. Thus, it becomes obvious that actual knowledge depends not only on empirical data but also on their synthetic unity affected by the imagination by means of schemata as well as conceptual unity affected by the apperception. Therefore, when we have images and schemas, and when we judge them through categories (substance-accident and cause-effect) we have conceptual synthetic unity. But the figurative synthesis and intellectual syntheses like the constructions of geometrical figures in imagination and imaginary space and time in theoretical physics are transcendental.

The objects of experience are subsumed under categories through the mediation of transcendental schema giving coherence and order to our sense representations. Therefore, this proves that Hume was wrong to consider *a priori* knowledge to be derived from experience[147].

8.7 The Functions of Categories in the System[148]

Human beings perceive objects spatio-temporally and think of them by means of categories. The uniformity that we get in our nature is due to the uniformity that we have in our minds. So long as our sensibility and understanding remain the same, space, time and categories form the foundation of human knowledge. Kant has expressed this view in the portion on Transcendental Deduction of the CPR (A 126, p.147).

By 'Deduction' Kant means nothing but the demonstration in the sense of proof of a right or the establishment of a legal claim. In the epistemological sense, it is the transcendental deduction that shows how the categories not derived from experience are still valid of the object of experience. The transcendental deduction shows the possibility of synthesis *a priori* (synthesis) but the empirical deduction does not because it is mainly (only) concerned with the fact of

[147]The existence, therefore, of any being can only be proved by arguments from its cause or its effect; and these arguments are founded entirely on experience. If we reason *a priori*, anything may appear to be able to produce anything. (David, H., *An Enquiry Concerning Human Understanding*, Calcutta, Progressive Publishers, 1976, p.130)

[148]The word 'System' refers to the logical construction of Kant's philosophy of physics.

possessing certain concepts, not with their objective validity. Categories are our fundamental vehicles of thought. Kant has entitled the explanation of the manner in which concepts can thus relate *a priori* to objects as 'Transcendental Deduction'.

The category of substance cannot be used as an analytic *a priori* proposition like 'substance is permanent', but it should be a synthetic *a priori* proposition because when we use it as an analytic *a priori* proposition we have to prove the permanence of substance. But we cannot have such proof dogmatically from a category (since it concerns synthetic *a priori* proposition). The solution is that we need to postulate it on the basis of experience (B228/A185, p.215).

I have explained the above in § 4.4 of Chapter Four. I have also critically explained how the categories like 'Substance-accident' and 'Cause-effect' give rise to principles and how principles give rise to laws in § 3.11 of Chapter Three and in § 7.4 of Chapter Seven. Reason gives us *a priori* knowledge in physics but categories constitute the conceptual aspect of empirical objects. In the absence of experience, the categories (and propositions derived from them) will be without objects. The *a priori* proposition of physics must be applied to actual things if they are to be called knowledge. Categories do not generate principles and laws of physics but give rise to them. The *a priori* principles of universal science are generated from a higher faculty through pure understanding. We do not derive categories from experience but they are of *a priori* origin. The empirical knowledge does not supply judgments bearing true universality and strict necessity. Sensibility, causality and community are the three different ways of

acquiring knowledge of things. Things have to be discovered through perception but their relations have to be determined (known) by means of the categories of substance, cause and community (interdependent). These categories enable us to anticipate the experience. But this does not mean that they can be altered as per the need of our experience and change of our theoretical frameworks. Thus, I have defended the inalterability of Kant's categories in Thomas Kuhn's paradigm shifts in § 3.7 of Chapter Three. I have argued that the categories survive the shift. The application of the fundamental concepts of a paradigm may be extended in another paradigm but their conceptions remain unchanged[149]. I also have disagreed with Einstein when he says that categories are alterable. We could have asked him—which categories has he altered? For Kant, the categories are fundamental concepts without the application of which no empirical knowledge is possible. Einstein and Kuhn have used the word 'category' in a broader sense in which many other concepts are included in the Kantian list of categories. Kant and Kuhn have agreed upon the points that a scientific theory cannot be logically proved in reality and there is no finality in empirical science. Kuhn thinks that the constitution of *a priori* changes in every paradigm shift; otherwise, there is no such real conflict in the movement of categories from one paradigm to another paradigm.

Kant's epistemological consideration shows that as a philosopher he cannot make assertions about the actual objects (or things) because they are met with only in experience. According to Kant, all categories are grounded as logical functions

[149]According to Thomas Kuhn, there is no complete change in theory in the movement of a scientific paradigm. The possible change in the movement is in the capacity of problem-solving.

of judgment, and in this function, the combination and unity of a given concept are already thought. Thus, the categorizing already presupposes combination (B131, p.152).

8.8 The Permanency of Substance

Kant's critics (Hegel and Popper) have criticized him on the grounds of the negative argument: "substance is not permanent (momentary) and we have no complete idea of its origin". But his critics are not aware that they are dealing with the question of fundamental substance which is shared by both philosophy (metaphysics) and science (including sophisticated science). But on the scope of Kant's transcendental philosophy, I have defended Kant's permanency of substance as a necessary postulation and necessary condition for empirical knowledge in § 3.5 and § 4.6 of Chapter Four. To acquire knowledge of an object we need to presuppose (postulate) permanency, otherwise, we cannot be sure of its knowledge. The principle of permanency of substance provides us with the principle of constant. Space and time as the first principles of permanency of substance make the knowledge of objects possible. They are parts of Kant's transcendental system. Transcendental Analytic as the philosophy of physics enquires into the source of *a priori* judgments in physics. But the two editions (1781 and 1787) of the CPR have created some confusion in the minds of his readers. I have presented a possible resolution for Dennis Sweet and W. Curtis Swabey's criticisms of Kant's regarding indecisions created by the two editions in § 4.4 of Chapter Four. I have also urged a point that we do not think the permanence of substance in the concept of matter but only its permanence in the

space that occupies it. Thus, the principle of permanence of substance is not an *a priori* analytic judgment but evidently synthetic.

Things cannot be reduced to their qualities because 'thing-qualities' or 'substance-accident' relation is not a logical relation but a cognitive relation. Since the principle of permanence makes empirical knowledge possible under no circumstance, it can be violated. The reason being so, philosophy and science presuppose the possibility of empirical knowledge. If this is the truth the 'creation' of substance is out of the question. This is the point that must be born in mind by astrophysicists who constantly talk of the 'creation of the universe out of nothing'. If we allow such creation, then what Kant calls 'the unity of experience' would be impossible. Kant has expressed this thought in the CPR (pp.215-6). But there is no such difficulty in accepting the 'Big Bang' as the beginning of the universe and time because every kind of (objectified and descriptive) space and time is included in the *a priori* form of Kantian space and time. The theories like Relativity and Quantum do not accommodate *a priori* space and time as the forms of intuition (sensibility). The Theory of General Relativity and Quantum Theory do not accept *a priori* space and time as the forms of sensibility. But Kant's notions of indeterminism of things-in-themselves and final cause have relevance to Quantum Theory. Therefore, theories like 'Theory of Relativity', 'Quantum Theory', 'String Theory' and 'Theory of Everything' do not fit in with some areas of Kant's philosophy of physics.

In contemporary science, we have sub-atomic particles, molecules, elements and matter. The word 'matter' is equally substituted with the word 'substance' and

has been defined as a durable object. Science has assigned some properties to matter: (a) It occupies (or takes up) some space. (b) It has weight. (c) It has volume. And (d) It has density. The other qualities like colour, feel and taste are not taken in generalization as a property of matter. These qualities are subjective and change from individual person to person. This has made it clear that 'matter' is more scientific (systematized) because it has a definition. Matter as substance exists spatio-temporally but space itself does not exist. It cannot be substantive and substantial like matter. In the same manner, a substance is perceived but its permanency cannot be perceived. Permanency of substance does not exist like substance because it is also a necessary condition like space and time for having the knowledge of empirical objects. In Kant's case, existence is not a predicate of substance. Kant's principle of substance is different from the definition of substance and its generalized properties. But the latter presupposes the former because empirical knowledge is presupposed by both science and philosophy.

'Permanence of substance' has been made clearer by Kant in this way: if we remove all properties which experience has taught us from our empirical concept of an object, we still cannot take away the properties through which the object is thought of as a substance. Matter (as substance) is perceived and its permanence as 'concept' of it is not perceived because it goes beyond our perception. Matter as an object of experience is not its concept but its permanency in the space that it occupies. Therefore, the principle of permanence of substance is not only *a priori* but also synthetic and closely related to the principle of causality.

8.9 The Principle of Causality

Kant's principles of permanency of substance, causality and community as analogies of experience are applicable to the perceptible objects of the world. The synthetic *a priori* principles of Kant's philosophy of physics are not applicable to the physics of sub-atomic particles. Hence, atomism as a theory of science is avoided by the transcendental philosophy of science, and the laws of causality, conservation of mass and the principle of certainty are avoided by the physics of sub-atomic particles (and contemporary theoretical physics). Kant's inquiry was not completely theoretical and ontological but essentially epistemological. That is why I have also maintained in this thesis that the so-called 'epistemological implication' cannot be completely neglected by science. After all, we talk about the human world and universe and human knowledge about them. How do we know the objects of the world? How is human knowledge as such possible? And what is the role played by reason in the case of knowledge? These questions are taken together by the philosophy of science and the sciences at the level of presuppositions. Therefore, the question 'what is it?' presupposes the question 'how is it?'

Kant's inquiries into nature in some sense are similar to the inquiry 'how do we know the reality?' The latter has a theoretical significance. The theory of the universe relies on this question of knowing reality very closely. Almost all big theories try to interpret reality. Kant has also attempted to interpret the reality of the object and human knowledge in his own philosophical scheme.

A category like ‘cause-effect’ can be used only regarding the objects of experience. In other words, the categories like ‘inference and subsistence’, ‘causality and dependence’ and ‘community’ are valid only for the objects of reality. They cannot be applied to the objects that are only thought to exist like other empirical objects. Knowledge requires both intuition and concept. When the category ‘cause-effect’ represents an event or changes the relation, it becomes synthetic. For example, the judgment ‘Anopheles’ bite causes malaria’ is a synthetic judgment because ‘what caused what’ is not known through the concept of ‘Anopheles’ bite’. The causality based on the principle of sufficient reason allows us to look for effects (if we have already rejected the causal principle). Science even looks for a chain of causal relations in order to find out the final (real) cause of the effects.

8.10 Space and Time

In the seventeenth century, the question of the ontology of space and time in the form ‘is it a substance in its own right or merely a property of some substance?’ was considered within the purview of dogmatic metaphysics. This framework suggested that if space and time co-exist and characterize the physical world they must be either substance in their own right or else properties of some substance. But Kant was not attracted to those options. Rather, he freed them from ontological interpretations. In Chapter Six, I have done an exegetical analysis of his metaphysical and transcendental arguments for establishing the possibility of *a priori* space and time as forms of intuition. I have argued for Kant’s space as metaphysically ideal and transcendentally ideal in § 6.7 of the chapter. I

defended the argument that the transcendental expositions of space and time show the possibility of pure mathematics. I have also argued that his space and time are both conceptual and intuitive. More importantly, I have taken the position that Kant's space and time are not similar to the discursive space and time of physics.

Kant has repeatedly reminded us that space and time are part of our sensibility, and without sensibility, no object can be represented in human consciousness. Had space and time been 'thing-like' they would be given only in perception (through sensations and intuitions). Propositions given by mathematics would have been 'contingent' propositions. But by no stretch of imagination can we regard '7+5=12' as contingent. Space and time being part of human sensibility can be dealt with independently of experience. Thus, both Euclidean and Non-Euclidean geometries are possible because space can be 'determined' *a priori*. Geometrical propositions do not describe 'actual objects' but they do describe space which means geometrical figures actually exemplified in the 'forms of object' are to be ascertained through experience. Actual objects are to be discovered empirically. If such objects have forms 'congruent' with the empirical forms of objects then the geometrical propositions transform into judgments. Mathematics gives us knowledge only in this sense.

Space and time as forms of intuition are conditions for all our experiences. There are differences between an independent existence and existence itself and similarly between a formal intuition and form of intuition. The forms of intuition and condition cannot be something like reality but we define them in terms of

relation to the principles. Therefore, in the Kantian sense, we cannot ascribe reality to space and time.

Space and time are not substantive or substantial. Things can be said to be existing permanently (in space) but space and time cannot be said to exist. They are part of our cognitive nature and so long as this (human) nature does not change we cannot free ourselves from the forms of senses (space and time); we must perceive things as existing in space and time. Kant has declared that concepts like space and substance have *a priori* origin (CPR, B6, p.45). Again, formal intuitions are given according to the forms of sensibility. This means that space and time together with categories enable us to have empirical knowledge (CPR, p.60). Thus, there is a difference between space and time as the forms of intuition and formal intuitions. Kantian scholars taking these two terms for a similar meaning would step on the path of misunderstanding.

Modern physicists have taken space as a quantifier and excluded *a priori* entity from it. We can agree with them because Kantian space as an *a priori* intuition does not fit in their activities. But in the broader sense, there is no harm in taking Kant's view because his space is not against any other kinds of discursive and relative spaces that are dealt with by the physicists. However, Kant has shown in a different way that space exists in us and the whole visible world also exists in us, in some sense. This helps us to understand the role of the human mind and the place of human beings in the universe. The extensions of universes and galaxies are not in our ability to observe and verify. We can have an ideal consideration of space where everything is included and enclosed. This ideal space is one and

unique. The space defined and explained in accordance with an individual theory of theoretical physics is preceded by *a priori* space. Thus, we cannot think that there are laws of physics but no space and time.

I have agreed with Michael Friedman's opinion that we should not miss the 'transcendental elements' in the Kantian conception of space. Friedman in his paper 'Einstein, Kant and the Relativized Elements' (p.256) has correctly pointed out a weakness of Hermann Von Helmholtz's program of transforming the Kantian conception of space into a psychological one by missing the transcendental element in it. I have also argued that the spatial order of things is not dealt with by geometry as a branch of mathematics because space as space is devoid of any characters. Entities or things are always perceived or at least perceivable in principle but space and time are not perceived. Hence, space and time are not like substances because they are causally inert (their aspects or properties cannot be altered by interacting with any other substances) and causally inaccessible (they cannot be perceived like objects or things). They are often regarded as infinite. Moreover, some thinkers have doubted that they could be substances as God is often thought of as the sole infinite substance.

Physical space as a physical entity is equivalent to our world and universe. To Kant, the idea of the world or the universe is not an object but an aggregate idea of everything that exists. The knowledge of the world or the universe is just an 'Ideal Totality' and he calls it 'regulative of thought', not 'constitutive of thought'. Our perception and knowledge are confined to this or that part of this ideal totality. It is merely heuristic in nature and we have no complete knowledge

of the world and universe (indeterminism continues). Therefore, Kant has maintained that the laws of physics presuppose space and time only on the ground that they are forms of intuition.

8.11 The Laws of Motion

The concept of motion is not possible without *a priori* representation of time because it makes the concept possible. The alteration of place as an example of motion is possible only under the succession of time. The alteration of the place of something is empirical but the succession that determines the representation of time series is a pure concept. I have pointed out in § 7.2 Thomas Soren Hoffsmann's view that there exist both empirical and pure elements in the concept of motion. I have defended Konstantin Pollok's view (2006, p.560) that these two predicates (empirical concept and *a priori* concept) cannot be collapsed into one. Only time has two contradictory opposite predicates: (a) time is an alteration of place and (b) time is not an empirical intuition. I also have explained how the concept of motion is applicable to the motion of our outer intuition.

Kant's three laws of mechanics as 'laws of motion' are found in his MFNS. He has analyzed the concepts of nature and science and explained the criteria of pure science so as to establish what conditions must be met for a body of knowledge to constitute natural science in general. In connection with Kant's three laws of motion, I have agreed with Eric Watkins and Michael Friedman on the point that Kant has tried to give the metaphysical foundation to the Newtonian three laws

of motion in the MFNS. I have also explained in the chapter how this foundation is made possible by his Metaphysic of Physics (Universal Physics). In § 7.3, I have argued that the Newtonian three laws of motion as judgments are the judgments of experience from a Kantian perspective (because the principles of empirical physics are equivalent to the principles of physics). The Newtonian laws of motion are to be taken as higher forms of judgments on the ground that objective validity possesses the concepts from both understanding and generalization. They are about the object of outer intuition in space bearing both pure and impure concepts in them but the synthetic *a priori* judgments are valid of the objects of experience or possible experience. There are also some differences between Newton and Kant's three laws of motion. I have presented their laws in a table and analyzed them with explanations in § 7.4 and critically examined how the Newtonian laws are not like the Kantian ones because the extended universality that they bear in them is not of *a priori* origin or strictly free from empirical admixture. In § 7.4.1, I have investigated the problem created by Kant on the consideration of only Newton's third law of motion as synthetic *a priori*. I have given a possible solution to the problem and explained Kant's objectives behind the consideration.

All of the above is to show that Kant was not doing Newtonian science in the proper sense but a philosophy of science to lay the foundation of physics. The foundation, here, indicates that both physics and Kant's philosophy of physics presupposes empirical knowledge.

8.12 The Presupposition of Experience

Empirical and scientific principles presuppose *a priori* principles and vice versa. Again, all of them presuppose experience or possible experience. Kant's pure understanding is a faculty of rules, according to which we determine the objects and events of experience. This pure understanding is a source of *a priori* principle. It should be kept in mind that without such rules, appearance would never produce knowledge of the object corresponding to it.

The laws of nature apply the higher principles of understanding to particular cases furnished by experience. The instances given by experiences stand under the rule. In this way, categories as giving rise to laws of nature depend on those higher principles of understanding. The pure understanding is not derived '*a priori*' from the pure concept but from pure intuition. These principles as derived from pure intuition are intuitively certain and evident. Empirical knowledge is not possible without understanding. According to Kant, our empirical knowledge is due to the characteristic of our mind as well as nature.

That empirical knowledge involves understanding also means that it is subjected to *a priori* principles and laws. The *a priori* principles of pure physics constitute the principles of empirical physics. Empirical physics not only presupposes the *a priori* principles and laws to which nature is subjected but is also founded upon empirical principles. The principles of physics are identical to the principles of empirical physics. This implies that both empirical physics and universal physics presuppose empirical knowledge. This empirical knowledge is pre-scientific and

does not contain the items that form a system. To form a system, we need fundamental concepts. In modern theoretical physics, one of the searches is that for the final system of concepts that can describe everything of our world and universe. Kant's system of concepts, on the other hand, seeks to describe the possibility of universal science and to lay the metaphysical foundation of physics.

8.12.1 The Objects of the World in the System

Kant's philosophy is also an epistemological investigation of the validity of synthetic *a priori* judgments in physics. When we relate Kant with physics, we are relating him with the pure part of physics, which is universal physics. In this sense, the containment of synthetic *a priori* judgments in physics indicates the containment of such judgments in Kant's philosophy of physics. I have also argued that the *a priori* principles are synthetic[150]. They are not only necessary and universal but objectively valid propositions. And it has already been made clear that objective validity is gained by the pure concepts only by the act of synthesis. The act of synthesis is responsible for the unity of synthesis. The unity of synthesis is possible only because of the uniformity of mind, and therefore, the uniformity of mind makes possible unity between mind and nature.

The world is full of objects and all the pure concepts and *a priori* principles of physics are meant to be applied to them. The synthetic *a priori* propositions are

[150]The essential role of a principle is its applicability to the objects of experience. A principle as applied to an object of experience is synthetic, as argued by Kant.

applied to or applicable to experience or at least possible experience, and when found valid of experience, we have empirical knowledge. Thus, they presuppose empirical knowledge. Therefore, the objective of this thesis would be unclear without concluding the possibility of empirical knowledge and their presuppositions because all the previous chapters presuppose the objects of the world.

8.12.2 The Objects and their Experience

We claim knowledge of an object when an object is given in empirical intuition. Knowledge involves judgment and in judgment, we 'subsume' the object under a concept (e.g. a table). But a given table is a spatial object with shape, size, etc. which make up its empirical intuition. In the absence of perception (which involves sensations), there is nothing for us to subsume under the concept 'table'. In other words, only when an ostensible object is given, the concept can be applied to it: something is perceived through sensations and intuitions (e.g. I perceive something and I judge it to be a 'table'). Thus, in the absence of perception, there is no object for us to judge. And accordingly, we do not know the object.

The categories which are considered as not conditioned by the formal conditions of sensibility are 'pure' categories. Such categories cannot have any objective significance. There are particular objects and the concept 'object in general' is a mere abstraction of them. Logically, however, it is flawless. If we 'suppose' that corresponding to the pure categories there are objects, then those 'hypothetical'

objects are not conditioned by space and time (which are the human forms of sensibility). The concepts of such objects are free from contradictions. Kant calls them intelligible objects (noumenon). They are objects 'merely' thought of by understanding. Contrasted with noumena, we have phenomena that are appearances (empirical objects) considered as determined by the application of categories.

Primarily, experience gives us knowledge and this experience equivalent to empirical knowledge contains both *a priori* and empirical factors. The former is the contribution of the subject (knower) but the latter is dependent on the object. Thus, the two faculties of knowledge, 'sensibility' and 'understanding', are the human instruments of knowledge that guarantee 'communication', and as a consequence, we talk about the common world, though the data differ (sensibility and intuition) from person to person.

To have empirical knowledge, we require the principle of permanence. There can be no empirical knowledge without the assumption of something that is permanent. The empirical judgment is possible only when we apply the substance-accident relation (category) to our judgment. Without this application, we cannot have an empirical judgment. Thus, the principle of permanence of substance makes empirical knowledge possible.

Kant's principles of permanency of substance, causality and community as analogies of experience are only applicable to perceptible objects of the world. Kant did not go to the atomic and sub-particle level because they are not

perceptible to our naked eyes (bare senses). We need the help of scientific instruments to see and study them. Hence, the principle of causality is vital in pre-scientific thought. Kant's inquiry about the possibility of synthetic *a priori* principles in physics is also connected with human cognition. How do we know the objects of the world? How is human knowledge as such possible? And what are the roles played by pure reason and experience in the case of knowledge? These were a few questions that relate his analogies of experience as the principles of physics. And these questions are taken together by science and philosophy.

Kant's inquiries are important in many ways because a question like 'how do we know the reality?' is theoretically significant. The theory of the universe importantly carries this question of knowing the reality. In connection with the acquisition of knowledge of a cosmological event, I have critically shown the two problems—(1) from Ball's interpretations of making reality; and (2) from Ravelli's interpretation of knowing reality without an observer in § 5.5 of Chapter Four.

Scientists and philosophers should be clear about the difference between empirical knowledge and scientific knowledge. Empirical knowledge of the object of experience is the base of scientific knowledge. Systematized knowledge is scientific knowledge and pre-scientific knowledge is empirical knowledge.

8.12.3 The Perspective of Transcendental Philosophy

Reason in its narrower sense indicates sensibility, understanding and judgment, but in the widest sense, it indicates the faculty of all the three. In conjunction with experience, it gives rise to knowledge of things (or objects), but when we consider the faculty in isolation, we have 'pure reason'. It lacks pure intuition and hence the principles and conclusions of pure reason are merely formal (or *a priori*). More importantly, it enables us to explain how knowledge of things is possible. In this context, the three analogies of experience help us to anticipate the possibility of experience. In Chapters Four and Five, I have critically explained them.

For Kant, knowledge is experience plus reason. Transcendental (critical) philosophy concerned with reason gives us knowledge that is necessary, universal and objectively valid and presupposes empirical knowledge. His critics (like Hegel, Strawson, and Popper) have wrongly understood that his transcendental philosophy gives knowledge of things-in-themselves. Kant has made an epistemological distinction between things (objects) and things-in-themselves. Kant has repeatedly declared in the CPR that things as the objects of experience are spatio-temporal but things-in-themselves are not. It neither follows a causal rule nor is a category applicable to it.

I have argued that the 'Transcendental Deduction' of the CPR (Transcendental Philosophy) explains how the synthesis of categories is made possible by 'transcendental schemata' in imagination. Nature, to repeat once more, is the

‘lawfulness’ of data of experience. The role of causality is quite vital as it enables us to transcend subjectivity on the occasion of the reception of sensation.

8.12.4 The Conjunction of Concept and Intuition

I have already examined, explained and defended that categories are meant to be applied to objects of experience. But how is this application of categories to objects made possible? Categories as pure concepts of understanding are legitimately used when we have perception. The application of a category to the objects of perception in principle is independent of intuition. Whatever we know is known through concept and empirical intuition. Unless we make judgments, we cannot have knowledge proper. Kant has hammered on the point that if a truth is merely formal (and independent of intuition), then it is a philosophical truth. Without accepting them as such the true employment of categories to objects is not possible. Our understanding employing categories judges objects on the occasion of perception. Thus, the application of categories to objects is made possible by (as conceived by Kant) Transcendental Philosophy. Therefore, the principles of pure understanding as conditions of objective employment of categories make the application of categories to the objects of experience possible.

There are differences between ‘Understanding’ and ‘Pure Understanding’ and between ‘Reason’ and ‘Pure Reason’. Understanding is related to empirical intuition (perception and experience) in which sensation is present. Pure understanding as the faculty of understanding is without empirical intuition and

sensation. That is why the principles of pure understanding are purely formal. They are the epistemological principles discovered by transcendental or critical philosophy. The knowledge of a thing (or object) requires both concept and intuition, but Kant's philosophy of physics is merely conceptual, and hence transcendental judgments are not about things, though their knowledge is presupposed. Similarly, when 'Reason' is considered in conjunction with experience, it gives rise to knowledge of things, but when it is in isolation we have 'Pure Reason'. The principles of pure reason are explanatory. They explain to us how knowledge of things is possible.

Transcendental philosophy explains how much we know things independently of experience, that is, *a priori*. Kant has given the example from mathematics that we have *a priori* knowledge of things in mathematics but this knowledge is knowledge on the presupposition that there are actual things with empirical forms that are 'congruent' with geometrical schemas. Physics is different from mathematics. It applies mathematics in addition to *a priori* principles. The categories with principles enable us to acquire objective knowledge which is universal (true for everybody) and necessary (not contingent). Therefore, categories enable us to transcend the subjective data (private and relative data) of perception which is the background of human social life (on which knowledge and other things depend).

8.12.5 The Dual Employment of Pure Concepts

We have knowledge of objects only when pure concepts are applied to empirical intuitions. We humans become aware of or are conscious of objects when we are affected by (through) our senses. Thus, only when sensations (and intuitions) are actually present, we are justified to apply pure concepts of these sensations (and intuitions), and such application is to be called an 'Empirical Employment'. This employment is justified because without it, we humans remain cut off from the objective or public world. That is, we end up in solipsism[151]. The very fact that we have empirical knowledge has proved that solipsism is untenable. Contrasted with this empirical employment of pure concepts (which is the employment of pure concepts to appearance) any non-empirical employment is to be called a 'Transcendental Employment'. But such employment is not conditioned and hence it amounts to the application to things in general and in themselves (i.e. not conditioned by space and time, the forms of human sensibility). But no such object is available to us because we never come across things which are not in space and time. We confront objects (things) only in empirical intuition. The transcendental employment is no employment at all.

[151]Solipsism as a philosophical idea accepts only the self to be real in itself (only my mental states are real), and anything else outside it is unreal (whatever is outside of it is only the modification of my mind).

8.13 The Synthetic *A priori* Judgments of Physics

I have mentioned in the introductory chapter of the thesis that Kant's whole philosophy of science is founded on the general problem of his transcendental philosophy—how is synthetic *a priori* judgment possible in physics, mathematics and metaphysics? That is why I cannot do away with his general question of how synthetic *a priori* judgments are possible in physics. I have already argued that the problem of 'containment' is not a real issue because it refers to a 'presupposition'. The physics that contains synthetic *a priori* judgments are presupposed by empirical physics and vice-versa. The words 'presuppose' and 'contain' refer to the same thing. Therefore, the difference is only in the language used, not in the agreement.

Kant's philosophy of physics (universal physics) as a part of universal science contains synthetic *a priori* judgments as principles. The Newtonian laws of motion cannot be regarded as synthetic *a priori* judgments because of not being free from empirical derivation. The laws of empirical physics depend on *a priori* principles and become laws when universally generalized in experience as objectively valid. Those kinds of laws of empirical physics are not synthetic *a priori* judgments. I have defended the possibility of synthetic judgments in the previous chapters. Hence, the principle of permanence of substance and the principle of causality given in the CPR are the two examples of synthetic *a priori* propositions. These two propositions as principles are not only necessary but also synthetic and *a priori* in origin. Such kinds of propositions, though being thought of as *a priori*, are not analytic but synthetic (CPR, p.45). Popper and Chisholm

have failed to understand Kant's distinction between the '*A priori* Analytic Judgment' and '*A priori* Synthetic Judgment'. According to Kant, the distinction is not only confined to the 'Subject-predicate' type of judgments and the 'Universality' as a criterion of '*A priori*' is not similar to 'Universal Quantification' as the thought of by them. I have explained Kant's position in Chapter Two of this thesis. Analytic truth is different from synthetic (material truth). Such truth can be established only through experience. Therefore, the philosophers are misled by the 'logical certainty'.

'Understanding' is the faculty of thinking and 'Pure Reason' is the faculty of understanding and the so-called 'Judgment' is made through this faculty of thinking. The world where we live is full of objects and if an object is to be known by us it has to be given not only in our intuition but also to our faculty of thinking. This means the objects of the world are subjected to our mode of thinking.

The judgments of physics, which constitute *a priori* principle of empirical physics, are subjective and are also valid for the objects of experience. These judgments are valid for the objects of experience because they are the fundamental forms of objective thinking of the subject. Objective thinking is a kind of thinking about the objects of experience or possible experience under pure concepts. The possibilities of synthetic *a priori* judgments (principles) of physics are made possible by our understanding through thinking with pure concepts (unity of synthesis).

The thinking faculty thinks of objects in its own way, i.e., by subsuming them under pure concepts. This thinking of objects by subsuming under a pure concept gives rise to an *a priori* principle of physics and we get such kinds of principles in physics. This question breeds some other questions, such as:

1. How is a category like 'cause-effect' completely without any empirical element?

2. How are the principles of physics synthetic *a prior*i judgments?

3. How do the principles of both scientific knowledge and empirical knowledge presuppose experience?

Kant has nowhere mentioned that there is no empirical knowledge. There are empirical judgments about empirical objects. This type of judgment is an instance of contingent knowledge. He proves the five points:

(1) Physics is not possible without the objects of reality.

(2) Experience is the foundation (or the basement) of his 'Architectonic Plan'.

(3) The design of his transcendental philosophy is built on this foundation.

(4) The *a priori* categories, principles and laws are meaningless without the existence of the objects of experience or possible experience.

(5) Both pure physics and empirical physics presuppose empirical knowledge.

Hawking thought that going back in time is possible at least in theory and in the same way the distinction between perceptible things and non-perceptible things-in-themselves is theoretically possible. Even the imaginary space-time incorporated in a theory is not excluded from the Kantian space and time. According to Kant, things-in-themselves are intellectual and methodological objects brought to curb the pretension of human knowledge, i.e. how much we can know of an object. This implies that what we can know and what we cannot know was clear in Kant's mind. Thus, Kant's philosophy of physics, though a kind of new metaphysics of physics or universal physics is not all about what we cannot know. It follows, as a consequence, that the known object is not 'wholly' independent of us because it is subjected to human forms (space and time). In the end, I once again repeat that the knowledge of all the pure concepts, space and time, and *a priori* principles of the transcendental system are philosophical knowledge founded on the possibility of empirical knowledge. All of them presuppose the concepts, principles and laws of empirical physics, and both universal physics and empirical physics presuppose experience. Thus, Kant's universal physics is a body of *a priori* concepts, principles and laws. Therefore, to conclude in a sentence, Kant's philosophy of physics is a philosophy about the possibility of knowledge of physics and the objects of the world.