EPILOGUE

SECTION I: AN OVERVIEW OF THE EARLIER DISCUSSION

Kuhn's philosophy of science has its own importance in the tradition of philosophy of science. In the hands of Kuhn, this tradition takes a new turn. His approach from the history of science as well as the sociological dimension of his framework, can very well be referred to as the turning points in philosophy of science. The sociological bearing of his thesis enables us to look at it from the point of view of sociology of knowledge. According to this perspective, the relation between human thoughts and society can be seen on two different levels i.e., as a causal one and a hermeneutical one. Kuhn's thesis is usually considered as a causal model. In addition, Kuhn emphasizes more on a 'consensus' on paradigm. It has to face a number of criticism such as being relative or irrational or subjective. However, the sociological variables of his theory open the possibility of its hermeneutical interpretation. Especially, his notion of a scientific community presupposes the concept of a community, as is seen in general sociological theories. We have,
therefore, interpret it from a hermeneutical perspective as well.

The notion of community, in general, can be interpreted from two points of views. It is explained either in terms of a consensus theory or a conflict theory. In the former the members of a community have a consensus on the beliefs and values of their own community. Whereas, in the later model, various groups in one community or society are in a conflict because they have different interests.

Kuhn emphasizes more on a consensus model. The consensus is necessary for the continuation of the values and norms from one generation to another. Similarly, it is also necessary for building up the individual members of that community. However, the consensus model fails, specially when a change in the social order is needed, as in case of Kuhn's theory of paradigm change. In case of such a transition period a conflict model appears to be more useful. The conflicting groups, with different interests are struggling for power, and hence are existing in a state of crisis. It seems that both, consensus and conflict models are necessary to maintain a social order. Hence these models should be treated as
complementary to each other, rather than as alternatives.

According to the consensus model the members of a community share the prevalent beliefs and values. While in a conflict situation, the members are critically evaluating these beliefs and values. One needs a critical attitude towards his own tradition. Such an evaluation may reject what was prevalent earlier and then, the members of a community may agree on a new way or new values and norms.

As far as Kuhn's model is concerned such an approach has an advantage. The complementarity between consensus and conflict model enables us to distinguish between two types of consensus reflected in Kuhn's theory. The first type of consensus is seen in his description of the socialization of an individual scientist which we can term as imposed consensus. Here a scientist learns the methods as well as values of existing paradigm. This learning is essential at the time of theory choice as, at this time he has to do a critical evaluation of two paradigms. With the acceptance of new paradigm he agrees on new methods as well as values. The consensus on a new paradigm he achieves by way of his ability of
critical evaluation. Hence, this second type can be called as an achieved consensus.

These two types of consensus, viz., imposed and achieved consensus are significant for another purpose. It indicates a new way to focus upon the dichotomy between consensus and criticism. They are mostly treated as polar opposite. The Popper - Kuhn debate is centered around this dichotomy. But the reflections of the imposed and achieved consensus suggest that the consensus and criticism are reciprocally related. Thus, the complementarity between consensus and conflict model implies the reciprocity between consensus and criticism as well.

Such an approach, from the hermeneutical point of view, throws a new light on Kuhn’s model. What previously seems to be doubtful or debatable may now move softly and swiftly. What is charged as irrational may now prove to be rational. The kind of rationality involved here is a practical rationality. The very understanding of this practical rationality underlies in the form of evaluative judgments. Kuhn describes the paradigm choice as a decision taken in terms of value judgments. The value judgments allow the freedom of choice, and as such there can be
disagreement about the decision. Though, there is disagreement, it can be further discussed and thereby rational persuasion is possible. Thus, practical rationality is of a kind where rational men disagree. It also indicates a different kind of subjectivity, which does not imply irresponsibility or irrationality.

Another advantage of this method is that it also softens the problem of incommensurability. As far as achieved consensus is concerned, it seems directly responsible for a change. But this does not mean that one should discard the imposed consensus. The imposed consensus, we can say, is instrumental to a change. Without a rational critical attitude towards the past, the further expectations can never be achieved. Hence, the roots of a new paradigm one can find in the old one.

But as far as the method of hermeneutics is concerned, it does not justify the problem of relativism. A shift from causal to hermeneutical model, shifts our point of emphasis. We now focus on the problem of meaning rather than the problem of
truth. But with this shift the problem of relativism does not rule out. In the causal model, knowledge is seen in relation with immediate source of its origin. Whereas, in the hermeneutic model, it is seen in the context of prevalent social order. This means, that with the hermeneutical mode, we can focus the problem from a different angle. The charge of relativism somehow, diminishes, but does not vanish. But apart from this limitation of a hermeneutical method, there are many more advantages which we have discussed above. It is useful for our purpose, as it opens a possibility of hermeneutical understanding of the sciences of nature. It seems a difficult task for the sciences of nature, as the hermeneutical interpretation is supposed to be confined to human sciences and not the sciences of nature.

Particularly, in the hands of Dilthey, the notion of understanding stood opposed to the notion of explanation. It is his method of 'Verstehen' which gives a specific turn to the hermeneutic tradition and with the result, the hermeneutic project seems to be relevant and appropriate only for the human sciences. In order to see its relevance for the sciences of nature, first, we have to see a
movement of explanation, in the very nature of human sciences. Ricoeur has suggested this possibility. For him, understanding and explanation are not antithetical but are reciprocally related. If, as per Ricoeur, there is a place for explanation in human sciences or in human understanding, then in parity, one can also argue that there is a movement of understanding in the natural sciences as well. In the later works of Ricoeur, we can find such a movement, where he adds the idea of temporality to his earlier hermeneutics of text and action. Here, temporality is seen within the framework of narrative organization. The notion of temporality, thereby, becomes historicity. Hence, within Ricoeur’s theory, one can easily speak of the history of nature. This may allow us to understand how there is a hermeneutical element in the sciences of nature themselves.

Still, in Ricoeur’s programme the hermeneutic of natural sciences remains an implicit possibility. Ricoeur himself does not spell it out, though gives hints about it. What is important to recognize, here, is that temporality of nature is not merely a datum, but it becomes significant in form of a
a narrative organization of time. It makes history of narrative a hermeneutic project. In order to explore it one may have to go beyond Ricoeur. This possibility of hermeneutics of natural sciences may be worked out in the following way.

SECTION II

One of the suggestions running through out the dissertation has been that the metascientific controversy between Kuhn and Popper as well as Kuhn's own philosophy of science, in terms of paradigm and paradigm change, may be understood hermeneutically. Particularly, in Chapter III, the possibility of such a hermeneutical interpretation of Kuhn's thesis has been suggested. This suggestion is made on the basis that for Kuhn, the basic feature of a paradigm is that it provides a framework of consensus. It is the result of a certain intrasubjective accord and therefore, consensus is precisely an agreement over the meaning of basic categories. As such, a paradigm is a hermeneutical device which allows a research community to identify the basic problems, as well as, specify the methods of their resolution, in terms of agreed upon criteria of relevance and
significance. All these elements of consensus, the problems, permissible methods and criteria of theory choice, indicate an agreement about what is meaningful and significantly relevant and what is not. Similarly, the basic category of Popper's approach is criticism and like consensus, criticism also is rational and hence, hermeneutically intelligible notion. The suggestion, therefore, has been made that both, consensus and criticism, can be accommodated within a hermeneutical point of view. This suggestion is further strengthened in our discussion of social context of scientific activity. Both, Popper and Kuhn have recognised the social background of scientific rationality. The discussion of sociology of knowledge in Chapter III has opened out a possibility of looking upon sociology of knowledge from a hermeneutical point of view. At that level, the argument was that such a hermeneutical interpretation of sociology of knowledge may overcome some of the usual objections of relativism, irrationalism etc., which are brought forward, against the Kuhnian thesis. So far as such arguments have been frequently employed in Kuhn - Popper controversy, the avoidance of such misplaced criticisms clears the real ground of dispute between Popper and Kuhn.
A further benefit of adopting a hermeneutical point of view is that this framework does not merely compare and contrast the Kuhn-Popper approaches, but, it may also be possible to formulate reciprocal relation between them.

In so far as taken as a chord over meaning, it is possible to distinguish between an achieved and an imposed consensus. An imposed consensus is an agreement, with which an inquiry starts, in this sense a sociological given. Since, all inquiry has to be presuppose and use a perspective or a framework, it follows that inquiry must start with imposed consensus. Of course, here, an imposed consensus need not be taken as an arbitrarily placed as a constraint on inquiry. To describe it as an imposed consensus, as a point of departure for scientific inquiry, Kuhn has always insisted for a need for such a point of departure in the form of a shared paradigm.

In a different way Popper also recognizes such a need, in the form of his ideal that science develops within a tradition of critical inquiry. To say that there is a tradition of inquiry, means that there is a common and shared perspective to
regulate the thought of the members. Hence, both Popper and Kuhn, in different ways, accept that scientific inquiry requires an imposed consensus. But, what distinguishes the rationality of science, is that it transforms the imposed consensus into an achieved consensus. Kuhn's picture of growth of natural sciences is a way of recognizing a movement towards an achieved consensus. Kuhn has further shown that how a paradigm is internalized by scientists and how it functions as an internal regulative mechanism. And also how, because of such an internalization, agreement about interests and about progress are made possible. These are the contributions of Kuhn towards the ideas of an achieved consensus. Far from denying the rationality of science, Kuhn has shown how rationality functions in growth of science, furnishing value judgments.

Popper, in his turn, has added an important aspect to the achievements of consensus. According to him, rationality of science is bound upon ended criticism. In his framework, by way of method of conjectures and refutations, not only any particular hypothesis is tested and accepted, but a very tradition of scientific rationality is built-up.
Looked at from this point of view, Popper and Kuhn are not contradicting each other, rather their respective contributions lies in the fact that each one of them can supply important aspect or dimension, not emphasized by other. It is, therefore, plausible that the hermeneutical interpretation of Kuhn - Popper debate may function as a form of reconcilement. However, it is also to be noted that the hermeneutic interpretation of Kuhn - Popper debate raises new problems.

Firstly, since, the framework emphasizes the consensus and intersubjective agreement, it is necessary to widen our frame of reference and to show how intersubjectivity and social agreement are themselves to be explained from a hermeneutical point of view. In other words, a hermeneutical interpretation of Kuhn - Popper debate will have to be placed within a broader context of hermeneutical philosophy of human sciences. But there is another consideration that necessitates broadening our perspective.

Both, Popper and Kuhn, differ from the earlier, positivistic understanding of natural sciences. One of the elements in positivistic understanding of
science is the doctrine of unity of methods. But inspite of their anti-positivistic stand, in both Kuhn and Popper, there is not an outrate rejection of the unity of sciences. Popper explicitly has defended the thesis of unity. While Kuhn is silent about it but some of his remarks and hits about it suggest that in his own way he also could accept the unity of scientific rationality. Hence, it is first necessary to show, why the dichotomy between sciences of nature and sciences of culture is inadequate. It is, in order to document such a separation, the discussion of early hermeneutics of Dilthey and Weber is undertaken. But having shown its inadequacy, we are faced with a fundamental issue. Dilthey, in affect, made a division of labour, between explanation and understanding. The overcoming of the separation between natural and human sciences, therefore, requires that we should bridge the gap between explanation and understanding. It is in this context, a consideration of a new hermeneutics of Ricoeur becomes relevant. For, in Ricoeur, we are able to see the circle from understanding to explanation and from explanation to understanding.
This circularity promises to be a common bond between human sciences and natural sciences. In this term, we can speak of a new principle of unity of science, different from the positivistic principle. Ricoeur's framework allows us to talk in terms of general hermeneutics of sciences, without divorcing human sciences from natural sciences. But, still, our discussion of Ricoeur has shown a more positive line of inquiry, it becomes necessary, in terms of which we can more concretely think of a hermeneutical dimension within the sciences of nature.

What the discussion of Popper-Kuhn has, in affect, accomplished is the idea that the philosophies of science, like that of Popper and Kuhn, may be understood hermeneutically. This is not so challenging issue, for among other things, a philosophy of science is an interpretation of the significance of scientific activity. Since, the scientific activity itself is a form of human action, it is, therefore, not very surprising that a philosophy of science is in one sense hermeneutical. But, what is more challenging is the possibility that the science of nature itself and not merely
philosophy of natural sciences seems to be hermeneutical. It is this issue which is the ultimate problem emerging out of our earlier discussions.

Suggestions towards a hermeneutical framework for natural sciences are given in two aspects of Kuhn's philosophy of science. According to Kuhn, the proper understanding of science is possible only if we consider the practice of science. This emphasis on the science as practiced, is contained in his emphasis on the history of science. For it is this history which gives us a clear picture of the choices and aims of scientific activity. But, apart from the larger historical perspective, Kuhn's philosophy also emphasizes the need for taking into account what scientist do, in the prosecution of scientific inquiry, e.g., one of the important meanings of a paradigm is said to be its regulative and guiding role in the scientific activity. A paradigm is not merely a theory, but also form as a maxim of scientific practice. It prescribes methods of investigation, suggests criteria for acceptable perspective, provides possibility of judgments for the members of a scientific community. Hence, it is
an active guiding principle. Similarly, when Kuhn discusses the values and norms of theory choice, he gives suggestions such as significance, economy, comprehension etc. Kuhn again emphasizes that these norms are not explicit rules. Rather, their foundation is to guide conceptual and theoretical activity of scientists. The criteria of theory choice are also regulative. If we emphasize this aspect of scientific practice, then the implication of Kuhn's philosophy is that nature of science is revealed more in patterns of activity than in abstract formulations. A clue to understanding of science, therefore, is the communal action of scientific community. For our purpose this aspect is significant for a hermeneutical understanding of science, as we saw in Ricoeur, action itself is open to a hermeneutical understanding. Although, Kuhn emphasizes on praxis of science, it is very clear in Kuhn.

In other way the same emphasis is found in Popper. There too, Popper recognizes the fundamental role of scientific practice. His emphasis on decisional element in science is an example of this. What is to be taken as an
observation, Popper tells us, is more a result of a decision. Similarly, contribution to falsifiability is an aspect of a decisional element in science. In Popper, greatest emphasis fall upon the commitment to critical activity. It is criticism, as practice, which demarkates science from other cognitive claims. Hence, in both, Kuhn and Popper, there is a clear recognition of the role of activity in the understanding of science and to that extent, one may, with suitable qualification, apply general hermeneutics of act to scientific practice itself.

There is another basis for a hermeneutical interpretation in Popper and Kuhn. One of the basic differences between Popper's and Kuhn's concept of science and the positivist's view, is that both, Popper and Kuhn, deny the empiricist's contrast between the observational and theoretical elements in science. For the positivists, the theoretical terms are basically auxiliary and observational are theory neutral. But Kuhn, particularly, shows how scientific observations are determined by theoretical principles. What is, scientific phenomena or scientific fact is itself determined by the theoretical principles which function as the selective principles.
Popper too, has recognised that a scientific fact becomes significant only in the context of problem situation and a problem situation is related to earlier theoretical anticipations and expectations. In Kuhn, this is broaden, in form of a constitutive role of a paradigm. A paradigm identifies the relevant phenomena and functions as a criterion of the relevant observations. In so far as theoretical and conceptual principles constitute the very category of scientific fact, one could argue that the facticity of science is bound-up with the background or prior framework. A broader implication of this is the notion of a scientific object or phenomenon, which is a constitutive category and not something given to mere observations, unconceit by any conceptual element. This theory dependence of observations is an idea, very close to a hermeneutical point of view.

The concept of a paradigm in Kuhn, lends itself to a hermeneutical interpretation. As suggested by Ricoeur, his theory of narrative organization has already remarked that the concept of a narrative, in his theory, is not restricted only to narrative in literature. Ricoeur, himself
extends the concept of a narrative to the historical accounts. This is significant because, on the basis of Ricoeur's theory of temporality and narrative, we could talk of a history of nature. If, the concept of history of nature is a permissible concept, then it could be fitted within the hermeneutical theory of narrative organization. The significant link between the Kuhnian concept of a paradigm and Ricoeur's concept of a narrative organization consist in the fact that a paradigm also prescribes the pattern of development of various natural entities e.g., it may be remembered that Kuhn talks of a Newtonian and Einsteinian paradigm. These frameworks are dynamic, for they deal with a process of change according to certain basic laws of nature. But apart from the dynamic physical theories, one can talk of evolutionary paradigm as does Toulmin. An evolutionary paradigm is also concerned with a process of change. Hence, concept of a paradigm deals with not merely structure but also a process. In Ricoeur's terms paradigm is an example of a narrative structure of physical sciences. This linkage between Kuhn's idea of paradigm and Ricoeur's idea of narrative, builds a bridge between Kuhn's concept of science and hermeneutics.
We have already seen that the concept of a narrative is not given as an objective datum. Rather, a narrative is an organization of a subject-matter given in temporality. It is by such an organization, that the events become meaningful and significant. Kuhn has already pointed out that a scientific discipline identifies its significant categories, its fundamental problems, and acceptable criteria of their solution, in terms of a paradigm. In short, it is a paradigm which constitutes the significance of a discipline. Kuhn has further shown that how a paradigm is not abstracted from the subject matter. It is, rather, a construction which is applied to the subject matter and it is its application that transforms it into a scientific discipline. In short, for Kuhn, scientificity is a function of a paradigm.

However, what is left undivided in Kuhn, is a question of how the paradigm emerges and how it functions as regulating the activity of scientific community. Here, the usual interpretation of Kuhn assumes that a paradigm is a result of the structure of a scientific community. This is what is in Chapter III, we described as the causal model of
sociology of knowledge. It is also pointed out that if, such a causal model is applied to Kuhn's theory, a number of problems and difficulties arise. It is also argued in that chapter, that the thesis of sociology of knowledge may be given a hermeneutical interpretation, rather than a causal one. If we take the paradigm as a result of certain causal forces, then, we are really going back to a positivistic framework. Hence, this particular understanding of Kuhn may create a certain incoherence, for, his antipositivistic insights will now be formulated within a positivistic frame of reference. This is the another reason, we feel, that it is desirable to have a non-positivistic framework for the structure and function of a paradigm. Understood as a hermeneutical device, a paradigm is a pattern of making sense of phenomena. And such a pattern of understanding is the result of what Ricoeur calls, the organization of narrative.

The other important insight of Kuhn is that there could be different paradigms. This idea is easily accommodated now, for, given the same sequence of events, there could be different narratives. A narrative is not a descriptive notion and therefore,
there could be a plurality of narrative forms, dealing with the same subject matter. Particularly, in the field of literature, it is easily seen, for there could be different plots dealing with the same story. Each plot is a kind of organization which expresses a distinctive point of view. Within that organization, certain questions may emerge and they could be resolved within that kind of organization. Similarly, some new phenomena could be conceptualize in the light of different paradigms. Each paradigm argue in a certain way and gives a coherent meaning and sense. Each paradigm also gives rise to certain problems which within that paradigm can be settled. The function of a paradigm is thus, similar to the function of a narrative organization.

To this extent, Ricoeur's general heremeneutical theory, seems perfectly adequate to the Kuhnian perspective. But, when we bring together Kuhn and Ricoeur, in this manner, we must also meet that in one sense Ricoeur's perspective may be helpful in illuminating certain aspects of Kuhn's thesis. It is equally possible that Kuhn's theory may illuminate certain aspects of Ricoeur's position as well. The relation between two is, thus, reciprocal, than one
sided. In the particular case before us, Kuhn’s insistence upon the kind of issues involved in paradigm change addresses certain problems which are not central in Ricoeur’s perspective. Ricoeur recognizes alternative forms of organization. But a question would arise, why such alternatives arise and when they do arise? How do we go about responding to such alternatives and in what terms can we move from one to other type? These issues of change which are important in our interpretation are not central to Ricoeur’s theory. He, of course, does not deny such possibilities. But a theory of hermeneutic change may be stimulated by Kuhn’s reflections of scientific revolutions. In Kuhn, shifting from one paradigm to other obey different principles and employ different norms than transition within a paradigm. This is the meaning of the fundamental contrast between normal and revolutionary science. Kuhn does not, as we pointed out, hold that changes in paradigm are arbitrary. He distinguishes between two meanings of subjectivity and sensibly recognizes the role of judgments in paradigm change, as a contribution to reasonableness of changes. So also his idea that criteria of theory choice function as values and not as rules, is an
important recognition of a flexibility of such judgments.

Equally, Kuhn's attempt to connect the rationality of paradigm choice with other disciplines, in the form of multi-disciplinary paradigms is an attempt to recognize how a certain way of interpreting one set of phenomena may be influenced by interpretations in other domains. This idea of how different hermeneutical styles may influence each other, is an important addition to the hermeneutic theory itself. For, in general, hermeneutical tradition has been monolithic. It has generally formulated its insight in terms of a single frame or style of understanding. In Dilthey particular this style of monistic hermeneutical interpretation is very clear. But the fact is, at any given time, there are multiple understandings. Therefore, Toulmin's idea that plurality of paradigms, involved in a quasi-Darwinian situation for the struggle for existence, is an important contribution to not merely history of science but to the history of hermeneutic theories themselves.

Kuhn's idea of internalization of a paradigm, i.e., how this internalization shapes the members of a
scientific community, how the members of the scientific community committed to a paradigm, by this training and also the sensitivity to change the paradigm, are further important contributions of his philosophy of science. Hence, as far as structure of a paradigm and the structure of a narrative organization in sciences of nature is concerned, the idea of Kuhn and Ricoeur, reciprocally depend on each other.

One can notice a place for a very fruitful dialogue between hermeneutics and Kuhn's philosophy of science. But even more importantly, this dialogue between the hermeneutics and philosophy of science may also deepen our understanding of the process of scientific discovery. It may be said that it is the phenomena of the growth of knowledge which inspired both Kuhn and Popper. Hence, if, the notion of scientific discovery could be understood within a hermeneutical frame of reference, then we would have a powerful consideration for suggesting a hermeneutical point of view in the natural sciences. We can briefly work out such a hermeneutics of scientific discovery in the following manner.

As far as the context of scientific discovery is concerned, it has an important role in both
Popper's and Kuhn's philosophy of science. The problem, central to their theses is the growth of scientific knowledge. Both approach it by way of history of science and also actual scientific practice. As such, in their frameworks the context of discovery has an equal importance, along with the context of validation. At this juncture, both Popper and Kuhn differ from the viewpoint of the logical positivists. With the principle of verification, the logical positivists were more interested in the context of justification. Another important aspect of this disagreement is their notion of a scientific discovery. The positivists believe in the ontological privilege of the scientific discovery and thereby, theory neutral observations. While, Kuhn and Popper insist on the theory dependence of observations, and so believe in the epistemic base of the ontological character of scientific discovery. Both of them agree on the point that a scientific discovery is always in response to the problematic situation inherited within a particular scientific tradition. The tradition of science thus provides the history of science. It is this historicity of scientific discovery which opens out the possibility of its hermeneutical interpretation.
In our earlier discussion, we have seen that a paradigm functions similar to that of a narrative organization. Here in the case of scientific discovery, not any single paradigm is dominating, but there are many paradigms existing simultaneously. All are responding to the problems, which the earlier paradigm fails to solve. The situation of crisis or these problems provide a context for a scientific discovery. Such a contextual analysis of a scientific discovery makes its hermeneutical interpretation possible.

Kisiel has also explained the process of scientific discovery in a similar way. According to Kisiel, a scientific discovery is not a pure invention, nor is a discoverer searching a novelty without any purpose. Rather, a discovery is always in response to a problematic situation within a scientific discipline. A discoverer has to cope with the old problems and a new discovery. The scientific discovery is a process practiced under the guidance of its historicity, responding to its problems and at the same time submitting to what is yet unsaid, but implicit in its history.¹
An important element of this saying which was previously unsaid is its tacit dimension. Polanyi, in particular has recognized this tacit element of a scientific discovery. According to him what the history of science or a paradigm provides a scientists is knowing how to which Polanyi calls as a personal knowledge. But in the context of a new discovery a scientist needs a tacit knowledge along with the personal knowledge. Even Kuhn has accepted this tacit element in his later works. This tacit element also suggests the ultimate ontological character of a scientific discovery, which is essential to look at nature. However, it does not suggest the ontological primacy of a scientific discovery, as this tacit knowledge also has its source in the personal knowledge.

Kisiel further explains that a similar line of thinking is also found in Heidegger's phenomenological hermeneutics. But point of difference between Polanyi and Heidegger is that like Polanyi, Heidegger does not talk about the tacit dimension of our knowledge. Instead, he explores the hermeneutical theory. Hence, what is now important is to show the possibility of the hermeneutical interpretation
of the tacit knowledge. But for Kisiel it is not so difficult a task. Tacit knowledge is also in a form of language which can be explained hermeneutically.

The scientific discovery thus fulfils the four traits or facets of any hermeneutical interpretation.

1) It needs a subject to interpret the unsaid, which an existential aspect of the hermeneutics.

2) It needs a referential world or a context which it conceals. It is an ontological aspect.

3) Every scientific discovery has a particular referential world, existing in a particular time sequence. This is the idea of the temporality of a scientific discovery bound up with its historicity.

4) Finally, there should be a language to transmit the unsaid to others. It may be either in form of an oral speech or as a text.

With these four facets of a scientific discovery one may argue that there is an intrinsic relationship between a scientific discovery and its history. This
This relationship Kisiel explains in terms of parts-whole, i.e., in order to explain the parts one has to refer to the whole, while the whole is furnished in terms of its parts. This part-whole relationship further suggests a circularity among explanation and understanding.

Kisiel further explains that this circularity is not vicious. This part-whole relationship suggests a different sense of logic of scientific discovery. It states the most natural way of proceeding further, a way very close to actual scientific practice. It is called as a retroductive inference which operates somewhere in between induction and deduction. N.R. Hanson has developed it following the suggestions first given by Peirce.\(^\text{3}\)

With the new scientific discovery a new tradition begins in the culture of science. This means, with this new tradition, a new 'referential context or world' is prepared, for the further advance of science. Such a hermeneutical interpretation of a scientific discovery suggests an important aspect of the scientific enterprise, i.e., if the contextual interpretation of the nature and function of a paradigm is concerned, it may result into a
kind of incommensurability within different paradigms. However, the contextual interpretations of a scientific discovery can provide the commensurable points between the old paradigm and the new.

In a nutshell it can be said that the nature and function of a paradigm as well as of a scientific discovery suggests the possibility of hermeneutics of sciences of nature. In fact, it goes a step further to Ricoeur's insight of the possibility of hermeneutics of sciences, as it illuminates the hermeneutics of scientific change.

NOTES

2) Ibid, p.271.