Social versus Natural: An Image of 'Social' Science

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Understanding 'social science' has been central to the debate on 'modernity' as it is within this compendium that an assimilation of various theoretical trends on and about science are developed. An attempt to understand the anatomy of 'social science' would at one level have significant historical moorings, but at another level would depend upon a conceptual analysis that depends upon an understanding of what constitutes natural science. To understand 'social science', it is imperative that, the conceptions of 'natural science' and 'social science' be simultaneously understood and juxtaposed.

Historically viewed, the 'social' merely connoted the attempts during the post enlightenment period to enlarge and extend the Rousseau's formulations of the 'political'. Auguste Comte and the likes were used as mere harbingers of good tidings of social science. Whether they ever foresaw what came to be known as 'social science' for the last half a century is a question best left unanswered. That there developed a 'science' as a result of layers of theorizing subsequent to Comte and that such a science became a respected discipline to be pursued (at times argued as for its own sake) is today a truism, that many intellectuals refuse to view with suspicion.

Viewed from the historical perspective one may identify four different stages of social science. But the underlying principle determining the discourse of social science is that of assimilation, accommodation and equilibration.[1]

For the social science to be an exact science, the deviant phenomenon had to be *assimilated* in the existing framework provided by the long tradition of Ptolemy-Kepler-Galileo-Bacon-Newton. Prospective social scientist attempts to modify the observed environment so that it fits into the already developed ways of thinking and acting provided by established scientific methodology. Further, the observer (prospective social scientists) attempts to modify (change) established modes of thinking that does not fit the *observed the phenomenon.* This act involves *accommodation* whereby 'exceptional' characteristics of the phenomenon observed compel the social scientist to review the established methodological constructs. And finally, the observer ensures that he stays in balance (equilibration) while in the process of accommodation and assimilation by restructuring beliefs when they fail the test of praxis of science. This gives rise to a 'dialectics' between the natural and the social.

The first stage is the foundational stage whereby first seminal articulation takes place, which as post facto is seen as the beginning of social sciences. Auguste Comte (*The Course of Positive Philosophy*), Thomas Hobbes (*Leviathan*), Stephen Spencer (*First Principles* and *Principles of Ethics*), Max Weber (*The Protestant Ethic and the Spirit of Capitalism*), Emile Durkheim (*The Division of Labour*), Karl Marx *(Das Capital)* and Sigmund Freud (*The Interpretation of Dreams* and *General Introduction to Psychoanalysis*) are some of the individuals identifiable as unconscious masons who laid the foundation of 'social' science. Theirs was a journey to 'philosophize' empirically on what they regarded as hitherto unanalysed 'human action'.

The second stage is dominated by positivism, which led to acceptance of natural science paradigm as the only paradigm to be emulated by social sciences. Social scientists guided by the developments in behavioural sciences demanded that objectivity, preciseness, neutrality, etc., the characteristics of natural sciences, have to be found in social sciences and consequently social scientists have to emulate the feat of natural sciences.

The third stage is (chronologically post Kunhnian) and dominated by a demand for uniqueness of social science enterprise. The most significant characteristic of the period is the claim that social science, by their very nature, is hermeneutical and their conclusions essentially contestable (not as an

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aberration). This stage of development of social sciences is characterized by claims that phenomenological method is the primary method of social sciences.

The fourth stage is overcoming of the distinction between the two—natural and social sciences[2]—on the ground that the original claims that attempted to portray natural and social science similarity and contrast are themselves misplaced attempts. Neither the natural sciences are objective, precise etc., as claimed by natural scientists, nor are they non-hermeneutical as alleged by social scientists. Natural and social sciences are both hermeneutical and neither precise, objective etc. The nature (human or otherwise) seems to have a life of its own to 'give us' the impression that we are sure of ourselves at a particular given point of time. Sciences, like civilizations have the tendency to be sure of themselves at a given point of time only to be proved otherwise at some other time. 'Racial discrimination' and 'caste differences' were scientifically justifiable as much as 'Newton's law of inertia' and 'Ptolemy's flat earth'. The claim of essential differences between the natural and social sciences seems to blur in the context of blurring of the radical differences between the 'analytic' and the 'phenomenological'.

I

In Defence of 'Naturalistic' Social Science

The problem of methodology is one of the most exciting debates to cover the pages of very theoretical work on social sciences. Social scientists continue to disagree on this central issue of social sciences. The disagreement is basically on the issue of the explanatory, rather than on the methodological model. On the one hand a social scientist tries to emulate the feat of natural sciences, on the other, he finds it difficult to put into practice the techniques of natural sciences in the actual social science research. We have in one camp, social scientists who believe that all our efforts should be towards achieving the exactitude of natural sciences. The other camp of social scientists comprise those "who think it is fundamentally inappropriate for the social science to seek explanatory theories that employ 'abstract' distinctions remote from the familiar experience and that require publicly accessible (or 'intersubjectively' valid) supporting evidence".[3]

The debate boils down to a single issue, i.e. whether social and natural sciences are different or identical. And if they are different, at what level are they different, methodological or explanatory? In what follows, I shall try to answer to these two questions making a case for those who believe in 'naturalistic' social sciences.

The issue that the two are different is based on a few notions that have been blindly accepted as dogmas by the social scientists. It is assumed that the main aim of the theoretical social sciences is to establish general laws, which can serve as instruments for systematic explanation, and dependable predictions, and consequently social scientists disgruntled by the inadequacy of social laws, take the position that the social science enterprise is different. Two reasons are immediately evident for such dissatisfaction: (a) "certain alleged distinctive features inherent in the subject matter studied, i. e. the social phenomenon; and (b) certain supposed consequences of the fact that the study of society is part of its own subject-matter."

To clarify the above it may be important to understand the following issues: (i) the notion of purposive action and role of values in social sciences; (ii) the subjective versus objective in social sciences; and (iii) the logic of explanation and the notion of emergence. The notions are so interlinked that discussion of one issue overlaps with that of another and hence I shall not try to compartmentalize the arguments.

Human action have both intended and unintended consequences, and to understand human purposive behaviour where the results are intended, it is argued that we need a method that is value-free (or regards actions with empathy). Max Weber's fundamental method of sociology, namely *verstehen*, demands such a requirement. The method however is subjective; what we require is a more objective method to understand the social and natural phenomenon. But the subject matter of social science is essentially subjective and value-impregnated, argue many social scientists. This is because the subject-matter of social science is often identified with the purposive human action directed to attaining various ends or 'values' whether with conscious intent or by force of habit or due to unwitting involvement. It is obvious that such social scientists identify 'giving reasons' for an action with the very activity of doing social sciences. "The problem of social sciences begins where the giving of reasons ends," argued IC Jarvie[4] while upholding the legitimacy of social sciences as an independent discipline and still refusing to legislate a subjective methodology.

The failure to observe and identify motives, dispositions, intended goals and values unlike in natural and behaviouristic sciences that do not

allow us to apply the objective techniques and procedures that are employed in natural sciences compelled many social scientists to assume that we can analyze these phenomena solely and purely from the subjective point of view and that meaningful dialogue is possible only when the subject has personally experienced the social science phenomenon. In brief, they claim that social sciences are regarded as radically 'subjective' so that they are forced to rely on 'non-objective' techniques of inquiry.[5]

What is ignored here is that 'logic of situation' would be able to overcome the general and theoretical difficulties expressed in the above defence of 'autonomy' of social science enterprise. Besides, the conclusion based upon the non-objective techniques are unreliable or at best personal impressions may be left to psychoanalysts for interpretation. The difficulties expressed by the above social scientists can be met by employing the 'logic of situation' as described by IC Jarvie and Ernest Nagel. Logic of situation takes into account the empirical description of the procedure of explanation, which goes on in social sciences. It also takes into account the normative prescription which does not fit the description particularly in case of holistic and psychologistic social science phenomenon. It is the logical analysis of what underlies plausible social science explanation. Nagel described logic of situation as a special case of the *deductive analysis of causal explanation* in general. In this context two fundamental questions are raised: (i) Are explanations of social phenomena in behaviourstic terms inadequate? (ii) Are we not capable of employing 'logical cannons' of natural sciences to study the 'subjective' states of human agents?

Answer to (i) depends upon one's position in relation to the debate between individualism and holism. Although at one level the debate has remained confined to conceptual dispute regarding reducibility of social theories to individualistic accounts, at another level the debate has been centered on the nature and status of behaviouristic explanation. Rational choice theory (supposedly the most developed and sophisticated approach supporting individualist programme) takes off from individuals and their preferences and then builds explanation of social phenomena. The basic approach, which goes back to Hobbes assumes (i) individuals are rational, self-interested and acting under constraints; and (ii) explain social phenomena by deducing them from these assumptions about individual behaviour. G Homans[6] and G Becker[7] are the best exponents of this position.

The main argument for ontological reduction[8] is the claim that there are no social objects above, beyond or alongside individual persons and things. For the sake of convenience, we use two disciplines, namely 'sociology' and 'psychology as representative of science from which the terms and properties are reduced, and to which terms and properties they are reduced, respectively. The anti-reductionists forcefully argue that there should be 'full-blown' reliable theory of reducibles. But it is not logically necessary that the relevant expressions be known to enter into any significant laws of nature at all. But it is useful nevertheless to introduce the idea of reduction abstractly by way of assuming that one has theories about both that which one is reducing (the reduced theory) and that to which one is reducing (the reducing theory).

Assume that there are two theories T^1, reducing theory (i.e. psychological) and T^2, the reduced theory (i.e. the sociological). Further assume that a^1, a^2 . . . a^n are the various states of the system or systems (A) and T^1 is about, and similarly b^1, b^2 Ö b^n, are the states of the system or systems (B) that T^2 is about. Finally assume that a^i and b^i such that there is a recurrence of a given succession of states in a system (A), such as a^7, a^3, a^4, a^7, a^3. Now for the reduction to be successful, a connection should be established between the two theories, such that it has the following conditions:

(a) Every *b* is coordinated to one and only one *a* which occurs at the same time. (Thus, there is no necessity of *a*, having a *b* coordinated to it).

(b) No *a* is coordinated to more than one *b*. Consequently, every *a* is either coordinated to one *b* or not coordinated at all.

(c) Every *a* if it is coordinated to *b* at a given time, it must be coordinated every time *a* occurs and vice-versa.

Although we know the primary characteristics of connection to be established between the two theories, we are unsure as to what type of connection would meet the above requirements. There are two kinds of connections, namely, definitions and laws of coexistence. Reduction demands that property terms of theory T^2 should be connected either in *terms of definitions* or in terms of *laws of coexistence*. Further, the connection of laws of coexistence is tenable only between properties which are distinct from one another. Hence, a lawful connection between

T^1 and T^2 can be established if and only if logically either could exist without the other. The fundamental question in any theory of reduction is the inquiry into the nature and status of 'social' objects and properties. The issue is, are all social properties definable in terms of properties of individual entities or are there some social properties that are *unanalysable* in terms of individual properties. The answer to the above should perhaps be found in *descriptive individualism.*

Let us analyse the statement: "There are no simple properties of social objects". Denial of this statement would assume that there are social objects in addition to individual persons and things. Sociologists argue that there is no need of evidence to prove that there are social objects such as government, working class, etc. Commonsensically, we assume that there are such objects, however, ontologically speaking it is problematic and controversial, as there are two possible positions:

1) Social objects are really not objects, but ways of behaving and other properties of individual persons and things.
2) There are at least 'some' social objects (e.g. state), which is *more than* or *other than* any properties and relations between persons and things.

Logically extended, the second position, namely there are social objects, can mean one of the following: (a) there are some social objects that exist without there being people, (b) there are some social objects that have properties or characteristics which an individual or thing does not possess, (c) there are some social objects that have simple properties.

Regarding first possibility, there does not seem to be any serious sociologist who claims such a position. Regarding second, one offers various examples, which *prima facie* seem to justify the position. For example, a political party has the property of being united or disunited, which cannot be said of the individuals in the party. However, the property of unification or disunification can be understood as the ways in which members of the political party feel, believe and behave. Consequently, it is a shorthand[9] way of describing the various properties and modes of behaviour of the various members of the group. It is therefore accepted even by staunch collectivists that some of the properties of 'social' objects are definable in terms of individual persons and things. The issue, however, is: are all properties of alleged social objects reducible to properties of individual persons and things? If we deny such a possibility, then we can affirm that there are, ontologically speaking, social objects. If we accept that such properties are explainable in terms of individuals' properties, then we can say that there are no, ontologically speaking, social objects.

It is argued that we call social objects mere convenient fictions or logical constructions though they are not on par with nonexistents such as unicorns and mermaids. Unicorns and mermaids are different from existent objects because they are unexemplified, whereas the former are exemplified. The distinction between social properties and individual properties is the distinction between simple and complex properties. Again, the issue is whether there is a real distinction between simple and complex properties.

The position that there are no social objects, and that so called properties of social objects can be explained in terms of properties of individual persons and things be called *descriptive individualism* as opposed to *descriptive emergentism* which believes that there are simple properties of social objects.

The whole argument in defence of descriptive individualism can be summed up in: (i) negatively speaking, we have no reason to believe that there are simple properties of social objects; and (ii) positively speaking, a predicate term can have a clear meaning only if it either refers to a property with which we are acquainted or can be defined in terms of properties with which we are acquainted.

These are some of the theoretical arguments in defence of a position that provided justification for the large amount of empirical work based upon positivist methodology that has taken place and is still going on under the official patronage of *research in social sciences.*

II

The Idea of Interpretative Science

The second stage mentioned above begins with the philosophical conflict between the followers of 'unity of method' and those who seek the 'autonomy of social sciences' as an essentially distinct discourse. For the interpretative social scientists the starting point is their inherent suspicion of the 'image of natural science' propounded by positivists and logico-empiricists of various types. Consequently, acceptance of the natural science model for social science is untenable. First, positivism itself is philosophically questionable for natural sciences and two, the phenomena of meaning and concept

of value and understanding cannot be accounted for by such a positivistic vision of science.

The starting point for the interpretationist social scientists is their claim that social sciences have a historical dimension (i.e. their origin is in a particular geographical region and period in history) which limit their articulation. Wilhelm Dilthey and his likes are the exponents of such a position. Sundara Rajan is another votary of this position who had extreme 'faith' in hermeneutical sciences of man. Dilthey distinguishes between *understanding meaning* as against *understanding causes* by claiming that natural science restricts itself to self-explanation and uses general laws for its discoveries, whereas social sciences 'study' human action and hence we can only *understand* social phenomena. The process by means of which the social scientists uncover the meaning of 'social action' is labeled as hermeneutics. Ricoeur for instance, upon studying interpretation of texts proceeded to say that hermeneutics is legitimately concerned with meaningfulness of human action. This led to include human sciences into the 'hermeneutical enterprise', qualitatively different from sciences of nature.

One of major difficulties in the way of acceptance of hermeneutics as a method of human sciences was the alleged subjectivism of hermeneutical method. Ricoeur's 'clarification' that hermeneutics is equally 'objective' paved the way for acceptance of hermeneutical method by the social scientists. Whether such an agenda was successful is a different story. But it has been argued by hermeneuticians that Ricoeur's basic contribution lies in providing a non-psychological (unlike in the case of early Dilthey) and objective interpretation to the method of hermeneutics. Further, Ricoeur had argued that hermeneutical understanding is 'perfectly' compatible with explanation and the two (understanding and explanation) complement each other in such a way that understanding (sic. interpretation) provides new facts and phenomena that require explanation. It is not the project of this paper to critically evaluate the distinct positions. It suffices to point out that interpretation calls for explanation and explanation prepares basis for interpretation.

Another distinctive contribution of Ricoeur in the context of methodology of social sciences is his claim of the linguistic nature of social phenomena. While showing how hermeneutical model may actually help the understanding of human action Ricoeur provided the model of text to the study of human action. Such an application of the model of text to human action provided three very interesting hypotheses: (i) The meaning of an action transcends the intentions of the actor himself. (ii) The Objective meaning of the act is given a variety of interpretations. (iii) The comparison of action to a text also raises the question of the reference of an action.

Now, the meaning of an action transcends the intention of the actor himself in such a way that the act means something other than or different from what the action himself intended. Such a claim for autonomy of meaning of act insulates the hermeneutical enterprise from being reduced to psychology. Regarding (ii) above, it may be argued that there is not merely plurality of interpretations but conflict of interpretations, and consequently Ricoeur's heremeneutics of trust and of suspicion. Regarding (iii) it may be said that for Ricoeur, it is not only speech but also action that give rise to a 'kind of disclosure of the nature of the world'. Human actions for Ricoeur are not only expressive but also practical.

There is an underlying suspicion of the enterprise of social science based upon positivistic or logical empiricistic model. The trust of the argument depends upon an understanding of the basic character of human behaviour, namely meaning. Sundara Rajan argues for the hermeneutical grounding of social science enterprise on the basis of a theory of meaning. Meaning, he argues, is (i) for subject, (ii) of something and (iii) in a field or context. Secondly, we can speak of human behaviour in terms of its sense or coherence. Thirdly, sense can be expressed in another form (an interpretation giving a clearer expression of the original sense). And finally, such a sense is that of the subject. Instantiating such a model, Sundara Rajan attempts to show how in political theory, explanations in terms of psychological properties of individuals may account for political behaviour as envisaged by empiricist tradition, but it does not consider meanings as being *constitutive.*[10] Positivistic social science cannot include this sense of 'constitutive meanings and interpretations'. And further they cannot be such because they are 'essentially contestable', and they require interpretations and such interpretations can always be 'challenged by alternative interpretations.' Sundara Rajan, like Charles Taylor[11], lays down conditions[12] for a hermeneutical science of man.

In short, there are more unsettled questions than attempted solutions in the hermeneutical enterprise. The 'grand structure' prima facie seems

to be promising, but it is engulfed in both theoretical and practical problems. One need not be fetish about the use of the terms science and non-science, nevertheless one may investigate into the necessity of use of the term 'science' to describe the hermeneutical enterprise. If the original use of the term referring to a 'systematic and logical investigation into an objective phenomenon' is unacceptable to hermeneuticians, then a set of 'interpretations' cannot take the place of 'brute facts'. Secondly overemphasis on 'self-definitions' as a hermeneutical operation has led hermeneuticians to pass over or even to ignore the fundamental distinction between 'self-definitions of a subject' and self-definitions of a group of subjects'. The expression 'group of subjects' presupposes history of such definitions, their origin and the subsequent changes of meaning if any, the capacity of a group subscribing to the definition on the basis of their collective consciousness and shared world-view, etc. In brief there is a case for 'objective' self-definition within the shared paradigm of the collectivity or group.

Further, history of science provides ample evidence for hermeneutical elements in natural sciences. The world had awakened from the positivist slumber long ago and consequently, the natural and social sciences have accepted the fact that they both are same for different reasons (not for reasons envisaged by the logico-empiricists). The radical shift is that all sciences are equally hermeneutic.[13] To assume that 'hermeneutics' is a definitional characteristic of a science is to deny the possibility of knowledge systems that are self-corrective as well as the possibility of truth of their statements. [14]

III

Neither Solely Positivistic nor Solely Interpretative

The fourth stage of development of social sciences is not characterized by some hitherto unknown features. The alleged 'unique' features of social sciences are legitimized on the ground that natural science enterprise is itself not what it was so dogmatically believed to be. The table of characteristics such as objectivity, preciseness, observability, universality, etc. which are said to be the essential features of science and scientific knowledge do not seem to feature both in the logic of discovery and logic of justification. Neither the natural sciences seem objective, precise etc. as claimed by natural scientists nor are they non-hermeneutical as alleged by social scientists. In fact, both natural and social sciences are hermeneutical and neither of them can claim preciseness or objectivity.

Since Kuhn developed the notion of 'paradigm', the inquiry into possibility of hermeneutics in natural sciences has been taken seriously. The analysis of history of science has taken away the lustre from the concepts such as 'objectivity', 'preciseness', 'neutrality', 'progress', 'continuity' as they appear in the methodology of natural sciences. Not that Kuhn's own concept of 'paradigm' was in any way precise.[15] If one wants to appreciate the 'hermeneutical dimension' of natural science, one has to reflect on the fact that the contents of perception and scientific observation are never *unique, final* and *absolute* and apart from the history and particular social and cultural milieu. Again, different models or paradigms of methods result in distinguishably different interpretations of the same physical phenomena. (For example, light at one instance is interpreted as wave motion and at another instance as constituting particles). Hermeneutics, therefore enters natural science through perception (observation) and through the study of literary, graphic and mathematical materials – which is the corpus of science.

One observes not only the hermeneutical elements in the act of perception, but also *a la* Kant, by way of causal elements. Patrick Heelan so succinctly notes: "Visual perception —and by analogy, all perception— is hermeneutical as well as causal; it responds to structures in the flow of optical energy but the character of its response is hermeneutical, that it has the capacity to 'read' the appropriate optical structure in the World ('texts') and to form perceptual judgements of the world about which these 'speak'".[16]

Two points need consideration at this stage. One, if hermeneutics enters into all perception, how are we to avoid the gross subjectivism and 'laissez-faire' interpretation that follow from it? Secondly, how do we retrieve the objectivist hermeneutics useful for the scientific community as a whole? The Kantian framework adopted by Patrick Heelan and others recognize perceptual judgements as both hermeneutical and *causal.* And further, they argue for the thesis that hermeneutical interpretation (i.e. reading', 'writing', 'speaking') of texts by nature share a common hermeneutical structure with reading and interpreting the linguistic artifacts of human authors. Again, the use of such interpretative expressions about perception and scientific observation does not amount to mere metaphorical expressions but probes into the *common primordial*

hermeneutical structure of all human understanding, an understanding which *subtends* both linguistic, perceptual and scientific activity.

It is not my objective to analyse the varied hermeneutical interpretations of science. What is important is to recognize that hermeneutics enters science in a very *crucial* manner. But the existence of alternate and valid ways of interpreting the natural world does not diminish or compromise the results of scientific research.[17]

Hermeneutical interpretations in social or human sciences have for long reflected upon the centrality of language, its 'place' and 'significance' in our lives. One recognizes three distinct roles language plays in the common primordial hermeneutical structure of all human understanding.[18] Sundara Rajan (following Ricoeur) points out how there is a shift from 'language in the world' to 'the world as constituted by language'. Secondly, communication as a social fact assumes that in communicative practice we negotiate a 'social transaction'. Thirdly, we recognize that there exists a self-constituted (formed) by language prior to the 'expression of self'. In short, we begin to recognize 'self' as being formed by language or that self or person emerges from the network of speech. The recognition of these three roles or 'dimensions' of language bring about a radical change in our viewing of the social and natural reality. The image of science we have is at one level the result of fragmentation of language into various disciplines and at another level an abstraction that has lost the connection with both reality and the observer. There is therefore the need of viewing science as 'subject' rather than 'object' and the relationship between person and scientific enterprise as that of a continuum of 'fellowship' or 'participation'.

Let me articulate this conception of science from another context. Theoretically most significant use of language is to 'create' world capable of being meaningfully communicated to others. The resultant linguistic expressions may not have strict identity of meanings. At one level, for instance in general discourse, such an identity is neither envisaged nor verifiable. Besides, what is verifiable at one level is axiomatic at another. And in spite of a possibility that what is axiomatic at level one may be verifiable at level two and vice-versa, communication does not suffer and science 'progresses'. 'Metaphors' which were looked upon as intrusions in the hitherto precise language of science, function as such linguistic expressions that are both theory, constitutive and capable of making 'scientific progress' possible. Metaphors are shown as the essential part of the enterprise of science. Further, the growth and progress of science seem to be essentially linked with the capacity of scientists to use metaphors to break away from the established structures of thought and allow revolutionary changes.

Some may question the existence of such theory-constitutive metaphors. They may even argue that such metaphors are pre-theoretical as they lack the 'explicitness' or 'precision' attributed to scientific theories. What type of 'explicitness' or 'precision' is expected of new and developing sciences such as cognitive psychology and computer sciences has never been articulated. What one observes is that metaphors employed by these new sciences are theory-constitutive to these disciplines as there are no literal paraphrases representing their theoretical claims.

Literary metaphors (when used for the first time) have their 'home' in the original work of the author, and when used by others, have reference to their original use. But this 'implicit to the original use' loses its exactness when metaphors are used in science to convey meaning that hitherto was not known to exist. Their use is pedagogical as well as insightful, in the sense it affords to break new grounds, create new language, and express new and hitherto unknown relations. These metaphors, in due course of time when accepted by the community of scientists become concepts. And as concepts, they feature not in one literary work or the other, but through the work of an entire generation or more of scientists. Linguistic expressions, which were hitherto known as metaphors and hence imprecise, are now treated as concepts, precise and theory-constitutive.

Some philosophers of science like Richard Boyd[19] recognise the use of theory-constitutive metaphors only in relatively young or immature sciences. But analysis of language of most mature sciences such as physics, show greater use of 'theory-constitutive' metaphors, than in other sciences. Advance sciences make greater use of 'theory-constitutive' metaphors to break new grounds, develop new frameworks, articulate new insights as the existing vocabulary and linguistic expressions seem to limit their conceptual articulation. 'Theory-constitutive' metaphors provide one (if not the only one) and best strategy for accommodation of language to discover and describe the undiscovered causal features of the world.

'Science progresses by correcting

concepts', argued Mary Tiles while offering a cumulative model of scientific progress as alternative to Kuhnian 'incommensurable alternative'. Mary Tiles[20] recognized three dimensions of science: the empirical, theoretical and metaphysical. The empirical dimension concerns itself with the concepts that are empirically developed in a scientific context and are often taken for granted. Scientific investigations are never given purely empirically, as one has to accommodate and incorporate changes occurring in the non-empirical (theoretical and metaphysical) dimensions of science. This accounts for the non-empirical framework determining what kind of thing or phenomena it is investigating. If the existing linguistic expressions can account for both the empirical dimension and non-empirical one, science continues to work within the existing framework - it only adds or subtracts scientific knowledge by the 'in built mechanisms' it has developed. But if the existing framework cannot account for both the empirical and non-empirical dimensions of the scientific concept, *metaphors will have to be used,* resulting in a new dimension. This new dimension, though initially alien to the theoretical dimension, in due course of time when scrutinised in the light of newly developed explanatory ideals, results in correction of concepts. It is by this increased co-ordination and unification of the initially radically different theoretical dimension, that science progresses.

E. Pietruska-Madej[21] while arguing for logic of discovery pointed out that anti-psychologism is the root-cause of nihilistic attitude. She tried to answer a series of questions: Why does science sometimes manage to ignore insights of genius only to rediscover them years later? Why does it at other times explode a series of simultaneous discoveries? How should we account for 'premature' discoveries that fail? How can we distinguish between discovery in subjective psychological sense and scientific discovery proper? Her answer is: "there is some internal logical determination in science by which science proceeds from established knowledge to new elements of knowledge, and that there comes into play something like a *logical necessity* conducive to a new discovery. (Further) . . . for a given discovery, and that so long as it (science) is not *mature* enough for this (discovery) even the most ingenious ideas are doomed to be regarded as irrelevant for scientific progress . . . (and finally) when the stage is reached the discovery is *inevitable* resulting in something "several scientists may make the discovery simultaneously." The three concepts (logical necessity, maturity and inevitability) that Pietruska-Madej claim to account for a newly discovered idea may be better understood with reference to the development of language of science and its acceptance by community. The absence of 'metaphors' both for exegetical purpose and insights, seem to account for why 'discoveries' or 'new ideas' fail to catch the imagination of the scientific community. They have to 'wait' for appropriate period when adequate linguistic expressions or metaphors are available.

An unbiased journey through 'hermeneutics' in natural and social sciences raises a very crucial question regarding the status of natural science as a discipline involving interpretative elements. We have seen that it is not only social sciences that are interpretative and essentially contestable, but natural sciences have an unexpungeable interpretative component. However, the agenda of interpretation whether in natural or human sciences presupposes search for 'consensus' or inter-subjective agreement. And the entire epistemological exercise for consensus presupposes that the accepted inter-subjective agreement is what the world is. In other words, truth (what the 'world' is) makes consensus possible. There would be no direction for the on-going rational discussion and the entire human scientific activity (both in and outside laboratory) if truth were not posited as its objective. Besides the agreed interpretation of meaning would not be conceivable, if we were not to accept the ideal of truth as the supreme standard of belief. It is said that truth is unachievable as a state of knowledge. *But truth is indispensable for knowledge to exist.*

Notes and References

1. I have borrowed the three concepts from Piaget who uses them to explain development of knowledge in his treatise on genetic epistemology.
2. One may enter into a dispute regarding the terms. But some philosophers of social science have interchangeably used the terms 'social sciences', 'human sciences' and 'cultural sciences' as if these all are nomenclatures of clearly identifiable 'sciences. There are still others who use the expression 'sciences of man' to refer to all discourses other than that of natural sciences.
3. Ernest Nagel's work (*The Structure of Science*, Routledge and Kegan Paul, London, 1974) is probably one of the best work that deals with the debate without rhetorical arguments generally associated with the issue of natural versus social sciences.
4. In *Concepts and Society*, Routledge and Kegan Paul, London, 1972. I. C. Jarvie pointed out that unlike the phenomenon of suicide rate and birth rate, unintended events such as traffic accidents, stock market crash or breakdown of institutions, the phenomenon of war or

labour strike cannot be explained by forwarding individual's reasons, what one requires is sorting out the logic of situation.

5. The social scientist in this context must interpret the materials of his study imaginatively identifying himself with the actors of social processes, viewing the situations they face as the actors themselves view them, and constructing 'models of motivation' in which springs of actions and commitments to various values are imputed to these human agents. The social scientist is able to do things, only because he is himself an active agent in social processes, and can, therefore understand in the light of his own 'subjective' experiences the 'internal meanings' of social actions.
6. G. Homans, *Social Behaviour*, Harcourt Brace and World, New York, 1961.
7. G. Becker, *The Economic Approach to Human Behaviour*, Chicago University Press, 1976.
8. I had on another occasion classified individualism into four types: conceptual, explanatory, ontological and methodological and had argued that social scientists have time and again confused the four types of individualism and have used the term 'individualism' to mean either of them in various discussions. (Essays on *Methodological Individualism*, Chetna Prakashan, Bombay, 1986).
9. W.N. Watkins in the context of explanation refers to social science explanations as 'half-way' explanations that require ultimately 'rock-bottom' explanations which are possible only when all individuals in the 'system' and their complex relations are taken into account. Further, in the context of explanatory potential, such explanations are distinguished on the basis of 'greater' or 'lesser' explanatory potential. "The Two Theses of Methodological Individualism" in *British Journal of Philosophy of Science*, 29, 1958; "The Alleged Inadequacy of Methodological Individualism" in *Journal of Philosophy*, 55, 1958.
10. Searle's notion of *constitutive rule* (regulative versus constitutive) is employed by Sundara Rajan to argue for types of rules that are not separable from acts. For example, institutions and practices by which we live are constituted by certain *meanings* and *distinctions* between them and consequently, a certain discourse is essential to them. The practice of voting have both a political and social significance, and the distinction between forced choice and free choice is dependent upon our self-interpretation.
11. Charles Taylor, "Interpretation and the Sciences of Man", *Review of Metaphysics*, 25, 1971.
12. C1 (condition 1): It would not be founded on brute data; its most primitive data would be readings or interpretations of meanings which are constitutive.
    C2: These meanings are self-definitions of a subject or a group of subjects.
    C3: These self-definitions are constitutive of the practices and in this sense, they are embodied meanings.
    C4: A hermeneutical science of social life seeks to clarify and articulate their sense and coherence.
    C5: In the process of such articulation they change the orientations of the actors.
13. It may be not be proper to say that all sciences are equally hermeneutic. One may at one level argue that some sciences are more hermeneutical than others; or some sciences are less hermeneutical than others. Such a distinction may perforce allow some sciences to organize their conceptual structures with elements that are more dependent on interpretations not 'mindless' interpretations. Although, theoretically the hermeneutic vision seems to drown itself into a laissez faire interpretation, there is a constitutive element of interpretation that does not allow this. Let me explain this in the following: Interpretation has this duality—the subjective and the objective elements. The most subjective elements have the road-markers' in the form of shared language and shared history of consciousness.
14. The disinclination of referring to 'truth' by hermeneuticians is not accidental but due to their incapacity to reconcile the same with the essentially of plurality of interpretations. If only we were able to recognize the fact that what transforms 'looking at the text' into 'understanding' is the act of placing the text in a context. One may overlook the debate between various hermeneuticians whether objectivists (like Schleiermacher, Dilthey or Betti) and the subjectivists (like Heidegger, Bultmann or Gadamer), but the idea of 'truth' or 'consensus' remains a basic presupposition of all discourse. Objective understanding appears as a substitute for practical control over the situation and in cases where there is no felt need for such a control, urge for the objective understanding is minimal, if not altogether absent. Therefore, attempts to gain objective understanding will always be repeated and for reasons cited above they will always fall short. Paradoxically, a truly objective understanding would be accessible only in conditions which do not require it; which do not posit such an understanding as a problem.
15. Margaret Masterman identified 21 different senses of the term paradigm in Kuhn. These sense ranged from paradigm being a 'myth' to 'a universally recognized scientific achievement'. ("The Nature of Paradigm", in *Criticism and Growth of Knowledge*, I. Lakatos and A. Musgrave (eds.) Cambridge University Press, Cambridge, 1978).
16. Patrick Heelan, "Natural Science as Hermeneutic of Instrumentation", *Philosophy of Science*, 50, 2, 1983.
17. Joseph Anthony Mazzeo in *Varieties of Interpretation* (Notre Dame: University of Notre Dame Press, 1978) observes: "The quantum physicist may use matrix of algebra and wave mechanical formulations with relative indifference, since both formulations are isomorphic and both permit him to interpret physical data. The fact that an electron may be viewed as a charged particle, or a charged cloud, or even as the area under a curve, that it may be imagined as "solid" point or a "disturbance" spreading out in a region of space, simply means that the scientist has moved a little closer to the exegete confronted with a plurality of valid interpretations of his text".
18. Sundara Rajan labels this as the *third context of language* that allows the possibility of a new transformation of human sciences ("New Images of Science", *Social Sciences Research Journal*, 4, 1, 1996.)
19. Richard Boyd, "Metaphor and Theory of Change: What is "Metaphor" a Metaphor for?" *Metaphor and Thought*, (ed.) Andrew Ortony, Cambridge University Press, Cambridge, 1979.
20. Mary Tiles, "Correcting Concepts", *Ratio*, 27(1), 1985.
21. E. Peitruska-Madej, "Should Philosophers Consider Scientific Discovery", *Ratio*, 27(1), 1985.