TOWARDS A NON-WESTERN PERSPECTIVE ON SCIENTIFIC KNOWLEDGE

I

The available studies on the phenomenon and institution of science suffer from a curious limitation. It is as if all those who analyse the subject were overawed by the grandeur of modern science, and their studies were in the nature of tributes laid at the feet of this great saviour. All analysis starts from the assumption that modern science is a set of value-free theories that uniquely explain reality. After the scientists in the early 20th century started overhauling their theories in a big way, it was granted that the value-free theories of science that explain reality may do so only partially at a given time, but as science progresses, its theories explain more and more of reality and the process converges towards the ultimate , unique law that explains everything. Committed to this idealist picture of a unique value free science, the philosophy of science is reduced to a set of attempts at finding the epistemological criterion, internal to science, that allows the scientist, unencumbered by any extraneous considerations, to choose the *true* theory out of a competing set; the sociology of science is reduced to writing down the set of social norms, self-imposed by the scientific community, which ensure that the technical criterion that guarantees the selection of the *true* theory is strictly adhered to and the historiography of science is reduced to writing a catalogue of the achievements of modern science, discovering the contributions made by more ancient sciences to the modern science and , more recently, discovering why some of the ancient sciences did not evolve into the modern *true* science. Thus the task of philosophy, sociology and historiography of science gets reduced to providing a set of self-consistent theories that reinforce the original assumption about the modern science being a set of value-free theories that uniquely explain reality. Before describing the serious consequences of this type of analysis in inhibiting the development of a proper philosophical, sociological and historical perspective on science, let us first describe the limitations of this analysis in greater detail by looking at the present day status of the philosophy, sociology and historiography of science.

i) Philosophy of Science: The present day work on the philosophy of science is essentially a debate between the followers of Popper and those of Kuhn. However, the real difference between the two positions in this debate is rather marginal. Popper insists that the purpose of the philosophy of science is to search for a criterion that makes science real, certain, indubitable and demonstrable knowledge (\popper 1963. p.93) of the world; and excludes such pseudo-knowledge as is enshrined in, say, Marxism, Psycho-analysis and Astrology from the pale of science. Popper finds that criterion in the concept of falsifiability. Kuhn agrees with Popper as to the purpose of the philosophy of science, but proposes a different criterion, that of a puzzle-solving tradition-which also achieves the purpose of establishing modern science as the only scientific formulation of reality, and incidentally, also proves Marxism, Psycho-analysis and Astrology to be non-science (Kuhn 1970,p.7). Both criteria fail to fit the history of even modern science. So legatos amalgamates Kuhnian and Popparian positions and produces the concept of research programmes , which support puzzle solving traditions and are subject to falsifiability as a whole. The history still does not fall in. And the philosophers finally decide that the only way to arrive at the correct understanding of science is to forget about fitting the history of science with any chosen criterion; and instead to dealing, by fiat, the correct epistemological criterion to be the one that best allows the fulfilment of the Bacon-Descartes ideals of science as the set of theories that provide the ultimate explanation of truths (London School of Economics Position , Walkins 1978). At this stage, than, the philosophy of science gives up even the pretension of being an enquiry into science, and frankly becomes an apology for the claim of modern science to ultimate . unique knowledge.

Sociology of Science: The founding fathers of the sociology of knowledge treated natural sciences as a special case, beyond the scope of a through going sociological analysis. For example, Mannheim declared: The historical and social genesis of an idea would only be irrelevant to its ultimate validity if the temporal and social conditions of its emergence had no effect on its content and form. If this were the case, any two periods in the history of human knowledge would only be distinguished from one another by the fact that in the earlier period certain things were still unknown and certain errors still existed which, through later knowledge were completely corrected. This simple relationship may to a large extent be appropriate for the exact sciences (Mannheim 1936. p.271).

The historical and social genesis of scientific truth thus being declared irrelevant to their ultimate validity , the sociologists could deal only with the effects of the scientific knowledge on the rest of the

society, or at most try to specify the social conditions which help or hinder the development of scientific knowledge. And sociology of science, till recently, has remained true to the limits imposed by its founders. Most of the sociological analysis is limited to finding the appropriate normative structure of the social institution of science that will ensure that the ultimate goal of science, that of achieving knowledge, which is closely and increasingly isomorphic to the structure of reality , (Merton 1957) is implemented. The analysis goes on to isolate the social and political conditions that allow the existence of such a normative structure, and thus finds the social conditions that help or hinder the progress of science. The analysis has repeatedly failed; no ideal community of open minded, disinterested, impartial, independent self-critical scientists has ever been found. But inspite of these failures the sociology of science remains in its pre-established grooves.

iii) Historiography of Science: Taking modern science to be the unique description of reality, this historians of science had only to catalogue the theories and concepts of modern science and trace their development from the Greek past onwards (e.g. See, Sarton). When later it became obvious that there were other scientific theories - scientific by the criteria evolved by the modern sociologists and philosophers themselves in other cultures, which over centuries of development showed no signs of becoming identical with modern science, the historians acquired a new task. Since modern science is axiomatically the unique knowledge about reality, if other scientific theories did not evolve into modern science, then there must be some external causes which stopped them in their natural evaluation . The new task of the historian of ideas in general- to ignore the significance of a number of theoretical achievements of the ancient physicians. But it is equally impossible for the historians to overlook the basic fact that the promises of science remain unfulfilled in ancient and medieval India. These do not lead to the creation of science in the modern sense, as expected in the normal course of their development. Evidently there is also something in ancient India which inhibits or injures science (Chattopadhyaya 1977,p.212; emphasis added). Notice that the objection against Indian medicine is not that it did not work, or that it did not flourish, but that it did not become modern science (as it should have done in the normal course). And then the historian goes on to document the cultural aspects that differed from the Western- liberal , ideal, and therefore did not allow Indian medicine to take the normal course . Needham had earlier done a similar, though much more extensive, job on Chinese science and society. Thus this painstaking analysis of the historians into the non-Western sciences and cultures, instead of becoming a study of the social historical genesis of scientific theories, becomes an indictment of these cultures for not having been identical with the Western-liberal culture and therefore, having failed to produce modern science.

II

We have seen that the conventional analysis of science takes it for granted that modern science is the ultimate knowledge of reality and constructs philosophical, sociological and historiographical theories which prove that modern science could not be anything but the ultimate knowledge of reality . This type of analysis is no different than, and no worse than, the analysis found in all social sciences which are busy creating theories of the given socio-political-economic reality without going into the genesis of such reality. However, such analysis becomes highly dangerous and misleading when applied to the natural sciences, because of the predominant position occupied by science in modern culture. Philosophers, having first established a criterion that excludes anything but modern science from being called science , take this construction as a proof that no other culture ever had any reliable knowledge of the world. Sociologists, having written down the set of norms that supposedly prevail in the scientific communities of the West, take this as a proof that no other socio-political organisation is compatible with the development of certified knowledge about the world. And historians, having shown that the sciences of other cultures were not (and did not evolve into) modern scientific to say about the world. Such one-dimensional analysis devoid of any socio-historical perspective of the object being analysed, of course does not prove anything. However, when all intellectuals working on science repeat that only the Western culture could produce genuine knowledge of reality (in modern science), the noise combined with the fact that the Western world actually dominates the rest of the world today, becomes a powerful ideological argument for the continuation of this domination. These intellectuals seem to be inviting the non-Western

world to castigate their cultures because these cultures did not and could not produce modern science the only true knowledge of the world.

It is this ideological force of the present day social, philosophical and historical analysis of science which makes it imperative that a more proper view of science be evolved. It is imperative that social, philosophical and historical enquiry into scientific knowledge be carried out without preconceptions about the uniqueness and ultimate truth of modern science. Such an enquiry will involve a comparative analysis of the scientific knowledge of various cultures and various epochs in terms of the social-cultural reality of those cultures and those times. It shall try to answer questions like, Why Indian medicine is different from modern medicine? rather than asking, Why Indian medicine did not become modern medicine? In short such an analysis will endeavour to bring modern science to the purview of serious analysis and subject it in all its ramifications not only the consequences it has on the rest of the society, but also the consequences the rest of social reality has on its content and form- to a proper philosophical, sociological and historical enquiry.

We are aware that even in the West some philosophical, sociological and historical work outside the dominant tradition sketched above has been done. But this work, bound as it is to the Western parading, fails to evolve an alternative perspective. Thus Feyerabend, while strongly disagreeing with the London school of Economics (LSE) position (Watkins 1978, quoted earlier), has to invoke-just for the sake of scoring a point, as it were aristotlean Science as an example of an alternative knowledge system consistent with the LSE position (Feyerabend 1978). Again Mulkay, a modern sociologist of science, does make a strong case for a sociological analysis of the content and form of science: There is. Nothing in the physical world which uniquely determines the conclusions of that (the modern scientific) community There seems every reason to explore how far and to what ways scientific knowledge is conditioned by its social milieu (Mulkey 1979,p.61). Yet he has to be content with carrying this exploration within the framework of modern Western Intellectual tradition, and end up merely establishing the need for dying the process of social negotiation in the scientific community has not even if the effort is made to rid the analysis of the Western preconceptions (about modern science being the absolute value free transcript of reality), yet it remains difficult to evolve a proper perspective on science unless a full sociological and historical analysis of science outside the Western tradition is undertaken. It one wants to look at science as being conditioned by social milieu, one must look at scientific knowledge produced in different social-milieu. This even the heretic tradition of the West fails to do. Outside the Western tradition, we are aware of just one attempt-inspired by the recent historical data on Indian and Chinese technologies generated especially by Dharampal (1971) and Needham respectively at an analysis of different technological systems in terms of their social milieu (Alvares 1979).

III

The problem of arriving at a comprehensive non-Western perspective on scientific knowledge has to be tackled at two levels. One, to clearly articulate the Western view of science. Two, to explicate the view of scientific knowledge exhibited by scientific systems other than the Western science. For the first objective it may be useful to start by re-examine the early philosophers of modern science (e.g. Bacon, Hobbes, Descartes, Locke, etc) and to search for the historical genesis outside the theological circles, of the ideal of a knowledge system, that is the ultimate , unique and value free transcription of reality. It may be interesting to look for the socio-political values cherished by the philosophers that first generated this ideal. Such an analysis would lay bare the hidden values in the supposedly value free modern science. Indeed it is to be expected that the early philosophers of science would have been much more explicit about the values they cherished and the social functions they wanted the modern science to perform.

A clear articulation of the Western view of science is indeed found in the very writings of Francis Bacon. He is generally recognised as the first philosopher of the industrial society. Writing during the late

sixteenth and early seventeenth century, he seems to have given compendious expression to the project. Western society launched around that time. Modern science was to be an essential component of this project. And the knowledge that was to be called modern science had two aspects. Firstly, it was to be a study of nature, and man as a component of nature, with a view to reduce both to controllable entities. Secondly, this knowledge of control was not to be regarded as any merely human acquisition, but as the absolute truth of nature and man, in fact as a transcript of the mind of whoever created the universe. Francis Bacon gave clear expression to both these aspects of the new understanding of scientific knowledge. He in his *Advancement of Learning* laid down detailed plans for the orientation of learning towards knowledge that was to be sheer power. And in his *Novum Organum* he constructed an epistemology to indicate how this knowledge could be seen as a peep into the divine nature.

This view of science as a search for power that was also at the same time a search for absolute truth had explosive political potential. It at once provided the means of total control, and also a total justification of such control in the name of diving truth. It is clear from Bacon s writings and his actions he was a considerable exponent of the art of exercising power over other people and other nations which such politics is what he was aiming at through this new orientation of learning. This Baconian project was perhaps not entirely new for the Western society. Perhaps the idea of absolute control in the name of absolute truth has always been inherent in Western society, and it may be possible to trace it back to the Greek philosophers. But around the time of Bacon a new articulation of the western project in the form of modern science was begun. The fact that what Bacon was saying was essentially an articulation of the Western project is obvious from the actual history of Western domination of the world through and in the name of modern science. In fact Hobbes, a one time secretary to Bacon, gave blatant expression to this politics of absolute control that necessarily followed from the Baconian view of knowledge, in his *Leviathan*. And even in J.S.Mill, the renowned liberal philosopher and democrat, we find the same adherence to the idea of control in the name of truth though considerably whitewashed with the later liberal terminology.

At the level of epistemology, as is well known, Bacon was much less successful.[*] However, this lack of success did not mean that his ideal of epistemology as an attempt to prove the unique claim to truth of modern science was given up in the West. It is possible to record the history of philosophy of science since Bacon to show that the Baconian ideal was indeed taken very seriously. It is even more revealing to look at the modern Western critics of science, the critics who have seemingly despaired with the attempt to rigorously prove the uniqueness of Western science. Even in these critics the Baconian ideal seems to remain intact. In fact be it Husser or Hedger, Kuhn on Needham, or any of the most enlightened and accepted critics of modern science and the philosophy and history of it, all of them t end to take seriously the Baconian ideal of proving the unique claim to truth of modern science, and having failed to do this at the level of epistemology, they take the attempt to the level of history and ontology.

The most important step in our endeavour to evolve a non-Western perspective on science would be the explication of the view on scientific knowledge exhibited by the scientific systems other than the modern/Western science. For this we need to pick up various scientific disciplines from other cultures, compare them with modern science. Tracing the development of different theories and different categories in different cultures, we expect to get a clear idea of the influence of the social political-cultural values on the content and form of science.

However, once the claim of Western science to unique truth is rejected, it becomes important to first explicate the idea of science in general; because, once the relativity of different sciences is accepted seriously, neither the content nor the methodology of modern science can be taken as the standard for determining the scientificity or otherwise of any other knowledge system. In that case, what standard does one have for calling any knowledge system as a science ? Or, does one still need the concept of science as distinguished from other knowledge systems?

[*] For further details on this and other aspects of the work of Bacon, see the article, The Root of Modern science An appraisal of the Philosophy of Francis Bacon in this issue.

For our purposes, having granted the relativity of sciences, the problem is no longer one of looking for a strict exclusive criterion that includes modern science alone into the domain of scientific knowledge systems. We have to look for criteria that allow us to mark a set of knowledge systems as science and therefore comparable among themselves and with modern science.

While searching for such criteria we need only to bear in mind that the Western conception of science (say as enunciated in Bacon) associates two distinct features with the term. Science is seen as the body of absolute truths (or best approximations to the absolute truths) about nature. And, it is seen as the body of knowledge necessary for living in the world. Once we allow the possibility of alternative sciences, association of any science with the absolute truths must necessarily be dropped. However, the property of being a body of systematic knowledge necessary for competently living in the world must remain a necessary feature of any system of scientific knowledge. In fact it is this feature that makes it worthwhile to retain the notion of science as distinct from other knowledge systems, say with exclusive spiritual or aesthetic orientations, which exist in a society and are related to the other pursuits in the society. This when we may take as a defining criterion for the scientificity of a knowledge system. What we look for in a system of scientific knowledge is therefore an orientation towards this world, and institutional and theoretical structures that make this orientation successful.

It seems that within the Indian tradition, there are any number of knowledge systems that exhibit this characteristic of a successful orientation towards the world. For instance, if we study the texts of Ayurveda we find a marked this-worldly orientation. The texts explicitly define the project of Ayurveda to be the maintenance of the health and curing of the sickness of the man in the world, through the study and appropriate use of everything that is in the world. And the Ayurvedic physicians depicted in the texts evolve a detailed institutional framework for putting this project through. We find the texts laying down elaborate rules for admission into the community of physicians and for training as a physician. The texts also prescribe modes of communication within the community and codes of conduct for members of the community, adding up to an impressive institutionalisation of the science of Ayurveda. The Ayurvedic literature evolves an extensive theoretical framework to facilitate the gathering of data about the world, and to help systematize these data and their use in therapy. The Ayurvedic texts spread over centuries, provide conclusive evidence of the success of this institutional and theoretical apparatus in carrying through the Ayurvedic project of knowing about the world in order to use this knowledge for the health of the man in the world. All these features go to make Ayurveda a system of scientific knowledge. However what is important about the Ayurvedic texts is that while they are scientific in the sense described above, the science they evolve is *qualitatively different* from modern science. Even in a cursory study of Ayurveda one would find that the texts are talking about a different approach to the world. The differences are multifarious. However, one characteristic that seems to clearly differentiate Ayurveda from Western science is the Ayurvedic attitude towards theoretical formulations. The texts make it explicit that in the Ayurvedic view of knowledge and reality, truth always belongs to the concrete particular, and all theoretical generalizations are cataloguing devices for apprehending and systematizing the concrete. The texts are emphatic in their declarations that truth does not reside in the theoretic generalization, and that the particular can and does always transcend it. This explicitly stated attitude towards knowledge implicitly pervades all the Ayurvedic literature. It can be seen in the very organization of the texts, and in the way the texts continuously transgress their own theoretical categories. It can be seen in the approach of the Ayurvedic physicians to therapy, and their acute consciousness of the limits of therapy. Best of all it can be seen in the attempt of the texts to incorporate folk wisdom and to accept current morality and current ethics, even at the cost of their own stated theoretical and professional principles.

This attitude towards theoretical knowledge sharply separates Ayurveda from Western science. For the latter a theoretical generalizations is always an idealization of the contaminated concrete particular, an idealization that takes one nearer the absolute truth of nature. If we have to find phrases that characterize this distinction then we shall like to call the Ayurvedic attitude the pragmatic-systematic attitude as opposed to the theoretic-absolutist attitude of Western science. We suspect that these differing attitudes are embedded deep into the world-views of the Western and Indian civilizations, and mark everything that these two civilizations attempt to achieve.

In conclusion we should emphasise once again that the idea of modern science being the unique body of knowledge isomorphic to the structure of reality is a principle that forms an integral part of the Western view of the world. That is why continuous attempts at providing a justification for this belief have although been made in the west. The non-Western societies, who have no reason to be enamoured with the Western project, must reject t least the idea of the West being the repository of absolute truth about nature and man. This rejection in fact is a necessary condition for the dignified survival of the non-Western world. Further, the non-Western Societies must now work out and clearly articulate an alternative to the prevalent Western perspective on the phenomenon and institution of science, which is largely based upon the assumption that Western science, and that too in its modern phase, is the paradigm for any viable theoretical reflection on science. Such parochialism renders the whole Western standpoint inadequate and unilluminating at best, and dishonest and misleading at worst. We have seen how this parochialism is reflected in the philosophical, sociological and historiographical dimensions of the Western standpoint. We have also tried to expose how this parochialism has rendered ay genuine understanding of science impossible, and has essentially served as a handmaid of the cultural imperialism of the West.

What we have tried to emphasize in our discussion is that the Western/parochial view on science does not stand the test of any serious comparative analysis of the sciences of the West and those of the non-Western cultures. It is in this connection that we briefly touched upon an analysis of Indian medicine. What we really look forward to establish from this kind of analysis is that the same phenomenon (that of human health in the case of medicine) is interpreted and explained differently - in terms of different categories and different theories by scientists placed in different cultural contexts; and that all these interpretations of reality are equally valid and equally scientific by any unbiased epistemological and sociological criterion. This analysis will answer the oft-repeated question, Why societies other than the Western society did not evolve modern science? We hope to prove that sciences of those other societies (Indian medicine, in particular) had no reason to become identical with modern science, because those sciences were evolved by other societies, which wanted to achieve their own different sociopolitical-cultural goals. Their science was just one tool to achieve their own goals, just as modern science is just one of the tools that modern Western civilisation employs to achieve its goals. Once we can establish the validity of different scientific knowledge systems, we can then authentically claim that the non-Western cultures are entitled to evolve even now a science commensurate with their needs and relevant to their social-cultural-historical context rather than being forced to adopt modern culture in order that they may produce modern science.

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