# THE NOTION OF REASONABLENESS IN THE CONSTRUAL OF RATIONALITY IN SCIENCE

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**Doctor of Philosophy**

In Philosophy

by:

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## DEDICATION

A thought-provoking Advertisement by the *Child Relief and You* (CRY) Foundation on the Television…

**If you are not able to read this because it is written upside down, don't feel bad. You are more fortunate than millions in the world. For, those are the illiterate children and they will not even know that something is written in a language, but it will look like only a pictures of lines and curves!**

As I submit the thesis for the award of the Doctoral Degree
My heart goes out to think of such unfortunate children in millions,
Who never get a chance of stepping into
Even a primary school in their lifetime…
They are the beautiful flowers that bloom to be unnoticed,
Great potentialities sadly go unrealized!

I remind myself, and gently invite my Colleagues as well,
To be aware of our great responsibilities towards
The integrated development of the society
From whom we have received in abundance…

## DECLARATION

I hereby declare that the thesis entitled, ***THE NOTION OF REASONABLENESS IN THE CONSTRUAL OF RATIONALITY IN SCIENCE***, has been carried out by me for the award of the degree of Doctor of Philosophy in Philosophy, at the Department of Philosophy, School of Humanities, University of Hyderabad, Hyderabad.

This thesis has been written under the supervision of **Prof. Prajit K. Basu,** Department of Philosophy, University of Hyderabad, and has been approved by him for submission. It has not been submitted in part or in full, for any other degree in any university or institute.

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# CERTIFICATE

This is to certify that **S. Stephen Jayard** has carried out the research work embodied on the present dissertation entitled, ***THE NOTION OF REASONABLENESS IN THE CONSTRUAL OF RATIONALITY IN SCIENCE***, for the degree of Doctorate of Philosophy in Philosophy under my supervision.

I declare to the best of my knowledge that no part of this dissertation / thesis has been earlier submitted for the award of research degree in part or in full elsewhere.

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# CONTENTS

# *INTRODUCTION*

# INTRODUCTION

The gap between the popular understanding of science and the actual picture of science seems to be widening in the 21st century. The highly elitist image of science is being constantly and consistently questioned with better awareness of the actual proceedings of science through the history. As one of the consequences of this questioning, the contemporary debates in Philosophy of Science don't fail to focus on the notion of rationality in science[1]. By the turn of the 20th century it was taken for granted that science was the repository of rationality. However, Thomas Kuhn's stunning statement, "History, if viewed as a repository for more than anecdote or chronology, could produce a decisive transformation in the image of science by which we are now possessed"[2], predicted the drubbing of the received image of science and questioned the very rational picture of science. More knowledge in history of science revealed that many non-rational elements too shaped the course of science. That is why Ian Hacking also suggests that there is a crisis of rationality[3]. Soon there emerged two powerful paradigms of science, **rational and non-rational**, underscoring or underestimating the role of rationality respectively. The proponents of both these paradigms stood at the extremes and ***that triggered my interest*** to study this issue a bit closer to find out what the actual status of affair is. Further, rational paradigm overemphasized the role of rationality to the extent of sidelining the social and human elements in science. I want to arrive at a rather *integrated understanding of rationality in science,* which, perhaps, would include the strengths, and avoid the weaknesses of both the models.

The following **objectives** are in my mind as I begin this research. I make an attempt:

**a)** To show that the highly glorified picture of science given by the ***Logical Positivists*** is in fact an inaccurate view and similarly the opposing view of the ***Historicists*** is equally inadequate. While the former's view of science as ***the*** paradigm of absolute knowledge

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[1] The recent decade seems to see lots of research in two broad areas of ***rationality*** and ***realism*** the former includes the epistemological issues of what reason is, what evidence and method are, what the rationale behind giving special importance (if any!) to observation language over theoretical language, while observation itself theory laden; and the latter involves ontological questions such as what reality is (if ever we will be able to know it!), what is in the world, what is true about the world and so on *I am interested more in the former issues,* which are related to rationality, because what we know about the world largely depends on how we know it.

[2] Kuhn, 1970, p.1

[3] Hacking, 1983, p 1

is a distortion of reality, the latter's predominant emphasis on the subjective and social elements of science leads to the other extreme bias of total relativism and skepticism. In showing how the prejudices and the world-views of the scientists affect the actual process of science, the historicists go to the extreme of seeing no rationality, no stability, no methodology in science, so much so, one of them, Paul Feyerabend, declares 'anything goes' in science.

**b)** To show that the recent trends, specifically the projects of the ***Historical Realists,*** in the past few decades, give us a very reasonable and more realistic picture of science. They, for instance, Dudley Shapere, whose ideas I elaborate at length in Chapter III, make efforts to show that science is the most rational enterprise; but they hasten to add that there are changes possible, in the aim, procedures and the methods of science, including the criterion of rationality. However, these changes do take place in a very responsible way, as per the demands of the situations at hand

**c)** To arrive at an integrated picture of rationality in science, this holistic understanding suggests that we speak of '***Reasonableness in Science***' rather than rationality in science.

**d)** To investigate into some of the features of this notion of reasonableness and to elaborate on the feature of ***Consensus in the Scientific Community***, because this, in my opinion, assumes a greater importance in the modern scientific researches. (I discuss, for example, the experiments on Gravitational Waves to substantiate the special role of the scientific community in modern science).

I would like, at the outset, to begin with some general clarifications on the basic understanding of science, rationality and rationality as understood in science.

Etymologically, the English word '**science**' comes from the Latin verb *scire*, to know. Knowing is done through senses and the faculty of intellect. Many languages have two different verbs to know through senses and to know through intellect (***Tamil***: *arithal* and *Uithunarthal*; **Greek**: *epitamai* and *gnôskô*, ***Latin*** *scire* and *novisse*; ***French***: *savoir* and *connaître*; ***German***: *wissen* and *kennen*; ***Dutch***: *weten* and *kennen*; ***Italian***. *sapere* and

*conoscere*; ***Spanish***: *saber* and *conocer*). **Sensitive Knowledge** is obtained through the faculties of five external senses (sight, hearing, taste, smell and touch) and four internal senses (common sense, imagination, memory and the estimative sense) of animals and human beings. It is concerned with things in their individual concreteness, like, this table or that pen. **Intellectual Knowledge** is obtained through the faculty of intellect, which is believed to be unavailable for sub-human beings. Intellect enables humans to rise above the concrete individuality to the level of abstraction or universality and to form an *idea* or *concept*. By manipulating these two concepts, intellect helps humans to arrive at a *judgment* (e.g. Stone is hard). Through the act of *reasoning* intellect derives a new proposition from other sets of propositions. **Scientific Knowledge** involves both and still goes further; it must satisfy *three conditions*: **a)** it must be at the ***intellectual level*** (to ensure universality, not merely individuality of sense-perception); **b)** it must have at least some element of ***certainty*** and **c)** it must provide an ***insight into the causes*** of the object under study So scientific knowledge is not merely stating of facts but also knowing the causes and their working among themselves.

Speaking about the meaning of the term 'science' we see that there are several layers of meaning. ***In a subjective sense***, it implies the *actual operation* of the human intellect, by which one comes to have a scientific insight, for instance, into a mathematical theorem, a physical or historical problem. Also it indicates one's *habitual ability* or *an internal capacity* to tackle scientific problems with confidence. In this sense we may call one 'a person of science', 'a woman with a scientific mind'. ***In an objective sense***, it denotes the object of 'science in the subjective sense'. This is what is grasped by the intellectual operations. Science also means ***the whole of cognitive activities***, both intellectual and sensitive, by which humanity acquires knowledge about itself and the surroundings. In this sense it can be differentiated from other disciplines of human activities; e g. faith and science, science and art, science and politics. Science also denotes ***a particular realm of human knowledge***, with proper characteristics. Finally, 'Science' is used as a collective noun to mean ***the whole body of people devoted to science.*** E.g. Science needs to be responsible in its researches. Of course, all these meanings are closely related to one another. The common element in all these meanings is that 'science' is always somehow related to humans and their specific activities of intellectual cognition. Science has always elements of both subjectivity and

objectivity; it is never purely subjective or objective. For, though it is a result of human thinking, it can be spoken or written down for the others to work on it.

Science is never static but dynamic, having birth, growth, modifications and it changes in its scope and depth. A ***descriptive definition*** of science[4], therefore, can be given as follows: Science is a logically ordered system of true or at least probably true statements They are universal statements concerning the essences, the causes and the nature of objects and processes in a definite field of knowledge. They refer to the investigations, arguments, explanations and demonstrations upon which the conclusions are based. [5]

**Rationality[6] in general** is understood in many ways. There is no one final understanding or definition of rationality. The three important conditions (logical, epistemological, and practical) that are usually given to determine rationality of a belief or a theory are: **the consistency** (for some it is a necessary and sufficient condition to be rational), **the truth** (therefore a false belief is irrational) and **the ability** to use the most efficient means to arrive at expected ends[7]. Some of the traditional views of rationality include taking rationality to be **the fundamental assumption for human existence** (the basic relationship among humans assumes that they are rational, and their rationality is seen as the 'gift' of the long evolutionary process) or taking **rationality to be equated with justification** (therefore, a justified belief will entail a rational belief; and when a belief is unjustified it is irrational) or

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[4] There are various ways of classifying sciences For instance, a) **Empirical Sciences, which include** Natural Sciences (Physics, Chemistry, Biology) *and* Social Sciences (Psychology, Political Science, Sociology etc ) and **Non-empirical Science** (Mathematics, Logic etc ) b) **Science of Living beings** (Zoology, Botany, Anthropology, Psychology, Sociology etc ) and **Science of non-living beings** (Astronomy, Geology, Physics, Chemistry etc.) Here we are obviously concerned with the Natural sciences in this study

[5] For a discussion on the notion of scientific knowledge here I rely on various sources, like *The New Encyclopaedia of Britannica – Macropedia,* 1997, *Routledge Encyclopaedia of Philosophy*, 1988

[6] In the ancient times reason and rationality have been understood as two different faculties, with a clear-cut hierarchy. Reason, as it provides first principles, is superior to rationality. Greek philosophers made a distinction between reason (*nous*) and rationality (*dianoia* or *logos*), in Latin it is *intellectus* and *ratio* respectively. The core of rationality is in giving argumentation but the argumentation has its limits, that is, the conclusion depends on the certainty of the premises Reason is the faculty providing the first principles, rationality is expected to operate upon those principles In the modern times and more so in the contemporary times, both are not seen as two different faculties, and even they are treated as two layers or functional modes of our reflective activity. In all our rational activity we always use reason, reason is the capacity which allows us to come to grips with the conditions we find ourselves in (For a short exposition on this, see **http://www.uni-jena.de/welsch/reason.htmll).** In my thesis I too don't stress on the difference, if any, between reason and rationality, but use it rather synonymously

[7] For more elaboration on this, see Sayeed, 2007

confining **rationality to goal-orientedness** of an action (therefore an action which undertakes the best means to arrive at the desired goal is rational).[8]

Philosophers nowadays generally make the distinction between *rationality of belief* (which is also referred to as theoretical / evidential / epistemic reasoning) and *rationality of action* (which is known as practical / pragmatic / means-end reasoning). The former deals with how well a person's network of beliefs represents the external world, while the latter gives us the account how well a person's actions maximize the satisfaction of their desires, given their beliefs. More analyses and reflections upon rationality seem to suggest that **not all our activities can be brought under strict scanner of such traditional understanding of rationality**[9]. I take up these and a few more traditional accounts of rationality for a critical evaluation to see how they are inadequate in capturing the notion of rationality, given the multi-dimensional and complex nature of human experiences.

Speaking about **Rationality in Science** it is usual that science is seen as the exemplar of rationality; and because it is a rational enterprise there is always progress within science. **Rationality is even equated with scientificity.** It always accumulates more and more knowledge, moving towards the true picture of the world. Therefore, Karl Popper observes: "But science is one of the very few activities – perhaps the only one – in which errors are systematically criticized and fairly often, in time, corrected... in other fields there is change but rarely progress".[10] Rationality in science consists in the unbiased applications of the scientific method, where each step takes towards the goal Scientificity and rationality are taken to be synonymous, so much so, that what is unscientific is seen as irrational ***All the proponents of rational model of science agree on the following basic tenets:*** **a)** science always strives to attain a particular goal, likes to know more about the facts of the world, or at least nearing the true picture of the world, or to produce theories with more truth content. The theory that comes later, being richer in content, always moves towards truth; **b)** there is

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[8] In Chapter 5, I briefly analyse such traditional views of rationality to show how they are inadequate to capture the holistic notion of rationality (reasonableness) in science

[9] The discussions on rationality become more crucial in the context of universality or relativity of rationality. Are there standards of rationality which are valid at all times, at all places, across all groups of peoples? Or are those standards culturally, as well as temporally, dependent? The traditional notion of universal, *a historical* and *a temporal* notion of rationality is being questioned by different trends in modern times for different reasons. However for our purpose I limit our discussion on rationality in the context of science as such, and don't trespass into the areas of socio-cultural, or religious or ethnic aspects of rationality

[10] Popper, 1963, p. 216.

a specific method to arrive at the goal; and **c)** theory choice is to be explained by *internal* factors, that is, it depends on the relation between the theories and available evidence

The above model of rationality in science has been severely criticized during the second half of the 20th century. Hilary Putnam defends the view that 'scientific' is not co-extensive with rational. He discusses three important areas of human lives, where science has nothing to say, not even it can affirm that those facts exist: **a)** the domain of objective values, **b)** the domain of freedom; and **c)** the domain of rationality itself [11] It is also claimed by the proponents of the non-rational model that the changes in scientific progress and the theory choice in science can't be rationally explained as there are many social, psychological and non-rational elements are at work. **A rationalist model has to tackle the following hurdles**[12]: **a)** the issue of incommensurability, which claims that with major theory changes, the meanings of the terms in those theories radically change; **b)** the goal of science has to be explicated; **c)** they have to show that the principles of comparison between the successive theories are in fact a means to arrive at that goal; **d)** they have to show that adhering to these principles ensures progress in future and also in the past; and **e)** they have to show that the actual history fits with this model and that the social and psychological factors have only a minimal role in the course of science[13]. In this study, as we are going to see, both the rational and non-rational models of rationality in science are assessed and efforts are made to arrive at a holistic understanding of rationality in science

My thesis has five chapters altogether. **The First Chapter** offers a brief presentation of the 20th century theories of scientific rationality. ***Section 1*** deals with the views of two important proponents of rational model of rationality in science, namely, Carl Hempel and Popper. While ***Hempel*** insists upon, among many other things, the goal-means relation to explicate the rationality in science, according to ***Popper***, rationality depends on method; science is rational because it has a unique method and that is the method of Falsificationism. In ***Section 2***, I present the views of two important proponents of non-rational models of rationality in science, namely, Kuhn and Feyerabend. ***Kuhn***, who is the most prominent critiques of rational model of science, agrees that science is a rational enterprise, though for

[11] Putnam, 1979, p 115.
[12] Newton-Smith, 1996, p 267
[13] More discussions on Science, Rationality and Rationality in Science are taken up in Chapter 5

different reasons (i.e. the principle of rationality emerges from the scientific community itself). He is convinced of rationality in science so much that he argues: "if history or any other empirical discipline leads us to believe that the development of science depends essentially on behaviour that we have previously thought to be irrational, then we should conclude not that science is irrational, *but that our notion of rationality needs adjustment here and there*"[14]. ***Feyerabend*** is the most vigorous and influential critique of the received view of science. He vehemently attacks the high pedestal-status given to science in modern times, to show that there is no unique method in science. He even appeals to save the modern society from science, as the society once needed liberation from religions.

In **the Second Chapter** I proceed to evaluate those theories. ***Section 1*** critiques the proponents of rational model, Hempel and Popper. I take up two prominent critiques, Kuhn and Kitcher, to evaluate Hempel and then I try to spell out how rationality in science can't be confined only to goal-means relation. Similarly, while gratefully acknowledging Popper's immense contributions to philosophy of science, I do attempt to show how the theory of falsification has serious lacunae. In ***Section 2***, I evaluate the ideas of Kuhn and Feyerabend. Regarding the views of Kuhn, I try to show how certain precautionary steps need to be taken to help avoid Kuhnian position from slipping into relativism. Then I critically look at Feyerabend claim, 'anything goes'. I argue to show that though there may not be any universal a-historical and a-temporal method in science it is not the case that anything goes, as there are elements in science to prevent extreme relativism and skepticism.

I discuss in **the Third Chapter** the ideas of Dudley Shapere His ideas, in my opinion, deserve a lengthy discussion because I find his analyses of rationality in science and methods of science seem to be very helpful to arrive at a comprehensive account of rationality in science. In ***Section 1***, I present ***Shapere's evaluation*** of the ideas of the proponents of the rational and non-rational models of science, discussed above. Among other things, he sharply criticizes the Logical Positivists' notion of pure observation as the foundation of science. He argues that observations are theory-infected The theory-ladenness affects the relevance of observation, what counts as observation and the very interpretation

[14] Kuhn, 1970c, in R S Cohen and R C Buck, 1971, p 144 Italics mine

and meaning of observation terms.[15] While assessing Popper, among many other things, Shapere focuses on his notion of background knowledge The position of the background knowledge is not as temporal and tentative as Popper thinks, it is more lasting and secure than Popper argues for. ***Section 2*** presents salient features of Shapere's contribution. I look into his idea of background information and the concept schema of observation. He explicates the notion of reason in science in terms of Goal success of the domains in science. He also analyzes both empiricism and rationalism and arrives at a new view of empiricism, which he calls, ***Rational Descendent of Classical Empiricism*** [16]

**The Fourth Chapter** is set aside for assessing the contributions of Shapere. Four important critiques of Shapere, namely, Leplin, Losee, Doppelt and Linden, are taken up in ***Section 1***. Leplin questions Shapere's notion chain-of-reasoning connections between the usages of scientific terms at various stages. Since Shapere sees no inviolable principles in science, Losee argues to that a normative account of philosophy is not possible without at least one inviolable principle, without which Shapere's non-presuppositionists programme gets very weak. While Doppelt charges, among many other things, Shapere of moderate relativism, Linden finds fault with Shapere's analysis of the notion of observation ***Section 2*** deals with Shapere's specific response to all these critiques Shapere clarifies some of the misconceptions of his critiques, while dismissing some other criticisms as baseless. I come out with my personal evaluation of Shapere's ideas in ***Section 3***. I look into Shapere's notion of observation in detail; his case-study of neutrino experiment has direct relevance to my efforts to understand a similar case-study on gravitational wave experiment. With both these experiments I try to figure out how the scientific community comes to have a consensus to call something as observation or observable. This notion of consensus, I am going to argue, plays a very important role in the research frontiers of modern science.

In the final and **the Fifth Chapter**, I attempt to arrive at a **Holistic Understanding of Rationality** in science, basing on the analyses in the previous Chapters. I now argue that

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[15] Shapere, 1984b, in 1984a, p 106

[16] As the term suggests there are elements of both rationalism and empiricism in his approach. It agrees with the classical empiricism that all our knowledge is based on the *interactions* with the world, but at the same it departs from it, in understanding what that interaction means an interaction is determined by our knowledge, it means differently in different fields and it may exclude or ruthlessly limit the role of sense perception. I focus on a few important concepts of Shapere like the Chain-of-Reasoning and the Rejection of Essentialism, by which he circumvents the issue of the thesis of incommensurability

rationality does play a role in our lives and in science but that is not everything. "Rationality helps", as Henry Harris has it, "but it is not a prescription for making discoveries"[17]. In ***Section 1***, I briefly analyse some of the traditional accounts of rationality to show their limitations. Often rationality is taken to be the fundamental existential experience, which may be treated as the gift of the long evolutionary process. But this, in my opinion, would simplify the concept of rationality and one may not be enthused to explore the great potentialities of humans. Often rationality is identified with truth or very popularly, with scientificity. But a bit deeper analysis will help us to realize that rationality/irrationality cannot be merely identified with true/false beliefs, nor that it can be reduced to scientificity. As Putnam asserts, "'Scientific' is not coextensive with 'rational' There are many perfectly rational beliefs that cannot be tested 'scientifically'"[18]. Popper also shows that "poetic inventiveness" and "the invention of criticisms"[19] are also main components of rationality. Rationality cannot be reduced to logical consistency and justification, or to mere goal-means relationship. I also focus on the notion of equating rationality with deducibility to bring out its limitations. As I criticize the traditional accounts of rationality I am not under the illusion that every aspect of the received view has to be rejected or reformulated. For instance, Inductive Reasoning, a positive legacy of the Received View, is still a very meaningful and essential part of rationality. However the notorious problem of inductive reasoning is quite alarming. Having briefly examined some of the solutions and dissolutions, I offer a short discussion on ***Bayesian theory of reasoning,*** which seems to be rather a convincing solution to the problem of induction. Induction may be seen as a part of our neural wiring. No logical or deductive evidence is needed to support its working. 'Inter-subjective' testing enables us to remove the subjective elements and biases to the extent of making science **(reasonably!) rational**. Basing on such analyses I try to show that science is rational in spite of inductive reasoning.

***Section 2*** takes up the views of some philosophers, who being convinced of the short comings of the traditional views of rationality, look for an alternative account of rationality. Philosophers like, **Hilary Putnam** ('Integrated View of Rationality'), **Stephen Toulmin** (denial of over-reliance of rationality), **Christopher McMahon** ('Collective Rationality')

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[17] Harris, 1981, p.46.
[18] Putnam, 1979, p 115. For instance he gives the beliefs in the area of human freedom (More on this, in **5.1.4**).
[19] Popper, 1994, p.40.

and **Stephen Nathanson** ('Reasonable form of Rationalism') propose alternatives to the traditional accounts of rationality, which captures the notion of rationality in a much more adequate manner. In ***Section 3***, I present my understanding of rationality in science in terms of ***Reasonableness***. Though it is not easy to define the notion of reasonableness, the features of reasonableness, I am sure, will enable us to understand it better. Reasonableness plays a very important role, as in the common day-to-day life, in the world of science as well. I see its role, in science, at three levels, though they cannot be strictly demarcated, nor that they are exhaustive: **Reasonableness at the Personal Level** of the Scientists – Imagination, the Agent, Judgment and Intuition; **Reasonableness in Scientific Methodology** - Rejection of Zero-tolerance, An Enriched Notion of Objectivity, The Need for Skeptical Attitude, and The Need for Common Sense; and **Reasonableness in Scientific Practice** – Embracing Pragmatism and the Consensus of the Scientific Community. These features, though overlapping sometimes, as I attempt to show, constitute the notion of reasonableness in science. **These features are, I argue, so important and constitutive of science that it is more meaningful to speak of 'Reasonableness in Science' rather than 'Rationality in Science'[20].** I also highlight how reasonableness is important in other domains like, Skepticism and Critical Thinking

***Section 4*** is entirely devoted to a discussion on the notion of *Consensus in the Scientific Community*. For, of all the features of reasonableness, the consensus, as I am trying to show, plays an important role especially in the context of research frontiers in modern science, where the experiments or empirical observations often don't seem to arrive at unambiguous conclusions. Certain experiments need the consensus of the community to reach some meaningful and useful conclusions, without which those experiments are incomplete and unproductive. With the insights from Shapere's analysis of neutrino experiment and my analysis of gravitational wave experiments, **I try to explicate how the role of scientific community begins to have a very prominent role in deciding upon important concepts in science, for instance, observation.** So we are forced to include the aspect of consensus in the holistic understanding of rationality (reasonableness) in science.

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[20] However, one can still use the term of 'Rationality' in science, provided that account of rationality includes all these features of reasonableness that are explicated here!

When one considers the various features of Reasonableness seriously, science obviously becomes a very reasonable enterprise. Perhaps, more awareness of the social elements and the actual practice of science seem to suggest that **as long as those features of reasonableness** (discussed in Chapter 5), **are part and parcel of science, it seems not to be of much use to speak of Rationality** (in the traditional sense) **in science, but only of Reasonableness in science.** To look for rationality where only reasonableness is possible would be like looking for a right thing at a wrong place, and vice versa! Further, as we realize that for a comprehensive picture of science we need to look at it in sociological terms. Social factors, however, are not all that is there to decide the rationality of science, as there is a 'hidden-hand editor' of reality. **There is reality out there, no matter how limited our understanding of it is, to influence the scientific theories.** For instance, if the whole humanity decides on one fine morning that hereafter the earth will revolve the sun from West to East, will that make the sun rise in the West? Surely not! Can we change the reality just by our social consensus? Not at all! **Thus, the consensus among the scientific community and the social factors make the notion of rationality (reasonableness!) definitely social, but certainly not irrational, nor arational.**

In **Conclusion** I briefly recapitulate of the main line of arguments of the dissertation. I would sound arrogant, or better ignorant, if I claim that my account of rationality in science is final and absolute. As of now I seem to be convinced of the central notion of reasonableness (perhaps, instead of rationality!) in science. I am, however, indeed liberally open with regard to the features of reasonableness. The list of the features I have given here is not exhaustive and their description is not complete either. The notion of reasonableness is very important in many other domains as well Therefore, I do mention some of the possible areas for my further exploration in future. I am interested, for instance, to see the role of reasonableness in the domains of *Feminism, Judicial Systems Scientific Mysteries and Limitations of Science*

# *CHAPTER 1*

# THEORIES OF RATIONALITY IN SCIENCE OF THE 20TH CENTURY

## 1.0 Introduction

In this Chapter, I offer a brief survey of the important theories of Rationality in Science, proposed in the 20th century. The diverse approaches to understand rationality in science may be broadly grouped under two categories: rational and non-rational models. ***Section 1***, *'Proponents of the Rational Model'* focuses on the works of ***Carl Hempel*** and ***Karl Popper***, while ***Section 2***, *'Proponents of the Non-Rational Model'*, is devoted to discuss the ideas of ***Thomas Kuhn*** and ***Paul Feyerabend***. For Hempel rationality in science is guaranteed by the goal orientedness of all its activities, while Popper argues that falsifiability of scientific claims makes science *par excellence*. Kuhn argues that the rationality in science has to take into consideration the historical context also, as theory choice cannot be made purely on logical grounds. It very much depends on the decisions of the scientists in the field. Theory choice in science is like a 'religious conversion' or a 'leap of faith', which is governed by social, emotional and religious considerations and not so much by logic or reason. According to Feyerabend, science does not enjoy any special status as a rational enterprise since it does not have any specific method to be followed. I now proceed to present their ideas here and then in **Chapter 2**, I appraise their views.

## 1.1 AN OVERVIEW OF RATIONAL MODELS OF RATIONALITY IN SCIENCE

### 1.1.1 A Hempelian Account of Goal Oriented Rationality

Logical Positivism[21] was a highly influential school of philosophy of science in the beginning of the 20th century. I take Hempel to be the representative of this school. For my purpose here I focus on his ideas having relevance for the rationality in science

[21] With the arrival of relativity and quantum theories the classical scientific theories (and classical philosophies which tend to interpret science, its methods, and its goals) seemed to have been refuted By 1920s, the Vienna Circle (VC), which is said to be the origin of Logical Positivism, and later Logical Empiricism, aimed to come out with new views of the nature of knowledge and the methods of reasoning by which the knowledge-seeking

### 1.1.1.1 Major Paradigms of Scientific Rationality

According to Hempel, there are two major schools of thought regarding methodology: ***the analytic-empiricist school (Prescriptive)*** and ***the historic-sociological school (Descriptive).*** One of the first models of rationality in science within the first school was developed by the Logical Positivists. For them the methodological principles serve as the criteria for rationality in formulating and in testing scientific claims and for theory choice. "The methodology of science, thus understood, is concerned solely with certain logical and systematic aspects of science which form the basis of its soundness and rationality – in abstraction from, and indeed to the exclusion of, the psychological and historical facets of science as a social enterprise"[22]. One of such methodological criteria is the 'testability in principle' of the claims. Therefore, for instance, they reject neoviatlism (as entelechy is not testable), the doctrines of Marxism and psychoanalysis. On the other hand, according to the ***second school***, methodological principles cannot be formulated merely on *a priori* basis and the actual practice of the scientists is to be considered· "It insists that an adequate theory of scientific method must be based on a close study of the practice of scientific inquiry and should be able to explain at least some aspects of actual scientific theorizing, past as well as present"[23].

These two trends can also be seen as: ***methodological rationalism*** and ***methodological naturalism***. The methodological rationalists demand *a priori* norms to which all scientific claims must conform. For example, Hempel claims that these "norms are established on *a priori* grounds, by logical analysis and reconstruction of the rationale of the scientific search for knowledge"[24]. On the other hand, methodological naturalists, like Kuhn and Feyerabend insist that scientific inquiry has to be understood in terms of actual practice of the scientists. An important focus of both the trends is 'theory choice'. And questions like, 'Are there

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enterprise must proceed It also wanted to clarify the ideas about the goals of such knowledge-seeking enterprise. In short, its major theses were The nature of science, and the 'meaning' of what it means to be scientific can be fixed in advance, and independent of science itself, To understand this nature one must use the tools of the new logic to analyze the limited metascientific terms and that analysis will specify what counts as science; and To use the same tools to determine what counts as a legitimate scientific reasoning Philosophers of science of this school styled themselves along these lines and thought that specific rules of logic (deduction / induction) to be followed in scientific reasoning.

[22] Hempel, 2001a, in Fetzer (ed ), 2001, p 357

[23] Hempel, 2001a, in Fetzer (ed ), 2001, p 358

[24] Hempel, 2001b, in Fetzer (ed.), 2001, p 375

general principles governing the choice between two competing theories?" and 'If so, can those principles be the criteria for rationality as envisaged by logical empiricism?', preoccupy the debate. Logical empiricism looks for criteria to establish general rules to determine higher probability or rational credibility, while the historicist schools reject such an effort. They argue that there are certain general considerations which do influence scientists in the preferability of theories. But these considerations are the shared preferences or values of the given scientific community and never can act as absolute binding principles to adjudicate upon the theory choice.

### 1.1.1.2 Hempel's Evaluation of Kuhn's Notion of Rationality

Hempel's evaluation of Kuhn's ideas throws some light on Hempel's own understanding of rationality. Hempel **agrees with Kuhn** on two accounts. **First**, a normative account of science has to be compatible with actual practice of science. The aim and function of a normative account is to improve the particular domain. Therefore a normative account cannot lead to improvement unless it is compatible with practice. **Second**, scientific inquiry is always a social event, taking place in a socio-historical milieu. To comprehend science rather well only logic and other *a priori* considerations are not enough; rather it needs to be understood in terms of what the scientists do in actual practice of science.

Hempel, however, **disagrees with Kuhn** on several grounds. **First**, to understand whether an action is rational or not, we need to have a clear notion of rationality. To analyze the notion of rationality, one needs to know what kinds of considerations support or deny attributions of rationality. Hempel is not able to see any clear notion of rationality in Kuhn's account. **Second**, Hempel sees Kuhn's desiderata to be infested with problems. Take, for instance, the notion of simplicity. All the hitherto attempts by logicians and philosophers, argued Hempel, to arrive at a clear notion of simplicity for theories don't seem to have rendered any satisfactory result so as to use simplicity as a criterion in choosing theories[25]. Further, one cannot arrive at one overall criterion of rational preferability for competing theories. If, as it happens sometimes, each of the two competing theories fulfills various desiderata in different degrees, then it becomes difficult for one to prefer one theory over the

[25] Hempel, 2001a, in Fetzer (ed.), 2001, p 364

other. According to Hempel, "to secure one general standard of comparison, the various desiderata would have to be rank-ordered in point of relative importance: and there is no plausible way in sight to achieve such an ordering"[26]. Moreover, a well-established theory sometimes determines test findings as acceptable data. Significant deviations in experiments are overlooked in order to suit the theoretical predictions and expectations. For example, in the famous Millikan's oil drop experiment[27], often the observed motion of the oil drops did not match the theoretical predictions, but they were overlooked and were not mentioned in the final publication of the results. All these were swept under a big carpet, called 'disturbing factors' of the experimental set up, upholding the intactness of the theoretical predictions. As it is quite natural that individual scientists would differ in their tastes and relative priorities these norms cannot be deciding factors in all the situations. Therefore, Hempel argues that in the case of theory choice "commitment to those norms does not ensure a uniform decision as to which of two theories outranks the other, by way of satisfying the entire set of desiderata"[28] Therefore, according to Hempel, the desiderata are not sufficient conditions to determine the theory choice. When there is a conflict of desiderata, theory choice can however, be decided by larger considerations, which are traceable to goal. But Kuhn does not take into account the goal of the scientific community.

**Third**, there is no adequate explanation in Kuhn's account to consider current practices as a normative one. Hempel argues that "the assignment of prescriptive reading to a descriptive account of scientific research is not ... straightforward".[29] Purely descriptive account of scientific rationality is impossible. It is impossible for the same reason as pure observation is impossible. Any kind of explanation or understanding of descriptive realm is in some sense a kind of interpretation of it. And an interpretation must have a certain basis other than the descriptive realm. Therefore an account of methodology of science must have both the justificatory (goal-means relations) and descriptive aspects (context-related elements of the action).

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[26] *Ibid*, p. 365
[27] For details: Holton, "Subelectrons, Presuppositions, and the Millikan-Ehrenhaft Dispute", in Holton, *1978a*, 25-83.
[28] Hempel, 1998, p.457
[29] Hempel, 2001b, in Fetzer (ed ), 2001, p 383

**Fourth**, Hempel argues, contra Kuhn, that the behaviour of scientific community can't be the only yardstick for the rationality of science. Kuhn tries to supplement the desiderata with other factors like learning from experience, demanding for consistency, considerations of language in which scientific terms are expressed and so on. In spite of all these Hempel asserts, "there cannot, of course, be a definitive, unconditional justification" [30] ***Kuhn attributes a prescriptive reading to a descriptive account of scientific research***. Hempel charges that Kuhn assumes science to be the best example of rational enterprise and this is a broad epistemological valuation. Kuhn gives much importance to the behaviour of scientists, but unfortunately often we find their behaviours not as contributing to scientific growth, but interfering with it – for instance, out of jealousy they may conceal their methods or results; or just for a short-cut victory they may create or manipulate evidence and experimental evidence or overlook falsifications. How can all these, Hempel argues, be included as prescriptive account of science?

**Fifth**, Hempel nevertheless does not accuse Kuhn of irrationalism. For, one can be irrational only if one goes against any well-established standards of rationality. Hempel claims that he is "not aware of any rule or standard that could be seriously held to be a binding requirement of scientific rationality that has been neglected or rejected by Kuhn".[31] In the same breath it should also be noted that though Hempel defends Kuhn from the attacks of irrationalism, Hempel does not seem to be at ease to call Kuhn's view of science as rational either. It is because, ***rationality consists in adopting appropriate and well-reasoned out means to obtain desired ends,*** and Kuhn's desiderata include social and psychological elements as noted above. So Hempel prefers to call Kuhn's position "*adaptive*, but surely not *rational*: they are not adopted as a result of goal-directed *reasoning*"[32].

### 1.1.1.3 Features of Rationality in Science

For Hempel an account of rationality requires a reference to goal-means relationship. He further elaborates the notion of rationality with the notion of context-dependence. He also proposes conditions which make a claim rational.

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[30] Hempel, 1983, p 572
[31] Hempel, 2001a, in Fetzer (ed ), 2001, p 366
[32] Hempel, 2001a in Fetzer (ed ), 2001, p 369

**1.1.1.3.1 Rationality in terms of the goal of an action:** An action by itself can't be judged to be rational or irrational. Rationality of an action is decided upon three factors: i) with the reference to the goal the action is supposed to lead to, ii) the relevant information available to the agent prior to performing any action, and iii) the beliefs entertained by the agent regarding the pursuit of his goal. Therefore, for Hempel ***the concept of rationality is decided by the goals and the means (methods) to achieve them***. A rational account of scientific inquiry must stipulate certain goals and some appropriate methodological principles to be pursued. It has also to show how these principles can be used in an effective manner to obtain the intended goals and "only to the extent that this can be done does the conception of science as the exemplar of rationality appears to be viable"[33] In this understanding the methodological principles don't give us the rules in absolute categorical norms to dictate what is to be done, but "rather what way of proceeding is rational in the sense of offering the best chance of attaining a certain scientific objective"[34].

**1.1.1.3.2 Context-dependence of Rationality**: Rationality of an action does depend on its context; an action which is rational in one context may be irrational in another. However, **in any context the goal of an action renders the action rational.** To quote Hempel, "A given action or a mode of procedure cannot be qualified as rational or as irrational just by itself, but only in considerations of the goal that it is aimed at"... He gives an example: it is obviously rational when one jumps into a river to save a drowning child, though it is a big risk for one's own life. But will we see one's action rational if one jumps into the full flooded river to get to the other side faster, say, instead of using the long-winding bridge?... Thus he makes it clear that "A mode of procedure is rational, relative to a certain goal and a given body of means-end information, if, judged by that information, the procedure offers an optimal chance of attaining the goal".[35] Hempel acknowledges that the methodological principles are necessary but not sufficient to decide upon rationality. This is to an extent compatible with some aspects of the Descriptivists' position. Hempel also points out that the logical positivists, by mistake, thought them to be sufficient. They expected the direct implementation or conformity of these methodological principles in the practice of science. But it is not the case. The adherence of scientists to the methodological rules is quite

[33] Hempel, 1998, p. 463.
[34] Hempel, 2001a, in Fetzer (ed ), 2001, p 362.
[35] Hempel, 2001a, Fetzer (ed.), 2001, p 361

embedded in the socio-historical context. To sufficiently explain whether a particular scientific activity as rational or not, one has to analyze how the standards are elaborated or understood or interpreted in that particular context. Thus the analysis of the context as well as the conditions of goal is necessary to determine the rationality of an action.

**1.1.1.3.3 Conditions for Rationality:** Hempel delineates a few conditions to rationally accept a claim: **a)** if the claim is testable or has actually been tested, **b)** if there is a logical consistency among the claims in a set of which the claim under consideration is a member, and **c)** if there is a deductive closer for every acceptable set (*meaning, if K` is a subset of an acceptable set K and S` is logically deducible from K`, then S` must be included in K The reason is that the deductive consequences of sentences that have been accepted as presumably true must be presumed true as well, and thus included in K*). These conditions are not for theory choice but for the more fundamental issue of ascertaining rationality of science. These, for him, are "some modest necessary conditions of scientific rationality"[36]. These conditions are applicable if the goal of science is to arrive at empirical belief of the world with more accuracy, comprehensiveness, simplicity and so on. In case, if we aim at the knowledge of the world with more emotional security and aesthetic satisfaction then different standards of rationality would have to be brought in. Perhaps, in that case, factual accuracy need not be insisted upon. If the goal of science is to obtain a reliable knowledge about the world, which enables correct predictions, a knowledge which helps us to escape or prevent harm, a knowledge that indicates means for achieving desired ends, then we need to check the hypothesis / theories with the relevant data derived from the world.

### 1.1.1.4 Relaxed Rational Reconstruction of Rationality

Due to the status of the desiderata, as proposed by Kuhn, there is a danger that the objectivity is lost. But though the desiderata are vague, and though they can't impose an algorithmic procedure in the choice, Hempel argues, they can impose certain considerations as to direct science towards certain goal, thus providing an objective orientation. External factors influence the theory choice but those factors are constrained by desiderata, and methodological principles; they are necessary (though may not be sufficient); the external

[36] Hempel, 2001a, Fetzer (ed.), 2001, p 363

influences need not violate the necessary conditions of rationality. Hempel introduces what he calls ***'relaxed rational reconstruction'***, where some methodological principles are explicit and precise but others are vague, though they may be important ones. In this relaxed but objectivist enterprise, scientific claims are appraised not by mere subjective standards, but also by objective norms, "like the demand for conformity with the standards of deductive logic, and the prohibition of logical inconsistencies"[37]

This notion of 'relaxed rational reconstruction' leaves open the possibility of having methodology of science with more precise standards, it sees the goal of science not as something fixed once and for all but changes as scientific inquiry advances Though there may be some constraints on objectivity and those standards may be partly vague, it is not "a view of science as an enterprise in which 'anything goes'".[38] It is possible to maintain science as an exemplar of rationality, only when scientific inquiry is shown to have specific goal and methodological principles to achieve it; and the means "will have to exhibit the instrumental rationality of the principles in relation to the goals".[39] Finally, for Hempel, ***goal-oriented action decides the rationality of the scientific inquiry***, and if it is not so, "scientific inquiry would have to be viewed neither as rational nor as irrational, but as arational"[40]

### 1.1.2 Karl Popper - A Falsifying Rationalist

In the 20th century Karl Popper is another important proponent of rational model of science. According to him, Philosophy of science would do well if it confines itself only to the realm of the context of justification. The context of discovery can be relegated to the non-rational domains. The latter is concerned with the process of creation of a theory, which may be explained by sociology, psychology, creative imagination, intuition, inspiration and even dreams. [41] But a scientific theory is justified by falsification and thus falsification becomes the corner-stone of Popper's philosophy of science.

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[37] Hempel, 2001b, Fetzer (ed.), 2001, p 389.
[38] *Ibid*, p 391
[39] Hempel, 1998, p.463.
[40] Hempel, 2001a, in Fetzer (ed ), 2001, p 370
[41] Frederick Kekule serves as a striking example, as he stumbles upon the idea of the molecular structure of benzene in a dream – six carbon and six hydrogen atoms are positioned in a ring shape, as though a snake tries to sink its teeth into its own tail.

I discuss below some important features of the theory of falsification. The problem of demarcation between science and non-science and the problem of induction are, according to Popper, inter-related. When the former is solved the latter gets dissolved. [42] First I discuss how he dissolves the problem of induction and then proceed to see how he vouchsafes for scientificity based on falsification.

### 1.1.2.1 Falsification – The Solution to the Problem of Induction

The most severe attack on induction, as we know, came from Hume. He put forth the problem of induction first in his *Treatise of Human Nature* (1739)[43]:

> Let men be once fully persuaded of these two principles, that there is nothing in any object, considered in itself, which can afford us a reason for drawing a conclusion beyond it; and, that even after the observation of the frequent or constant conjunction of objects, we have no reason to draw any inference concerning any object beyond those of which we have had experience.

Further, Hume shows, in his *Enquiry concerning Human Understanding*, that nature consists of innumerable regularities. But from the observed regularities one cannot logically infer a conclusion about future. Thus he shook the very foundation of all cognitive exercises as he showed that inductive inference was not rational

Popper, along with Hume, agrees that that the experiences with the known instances cannot justify a conclusion about the unknown ones. He acclaims Hume for the same: "I found Hume's refutation of inductive inference clear and conclusive"[44]. But Popper, though he acknowledges the clash between the probable nature of inductive reasoning and the empirical demand for certainty in science, does not end up with anti-rationalism, as the scientific theories depend on *critical reasoning*. That is why, even scientific revolutions are rational, because "it is rationally decidable whether or not a new theory is better than its

[42] Popper brings out this idea in many of his writings For instance, Popper, 1959, p 54
[43] As quoted by Indurkhya, 1990, pp 95-114.
[44] Popper, 1963, p. 42.

predecessor"[45]. However, unlike Hume, he does not think that induction is essential and necessary in our reasoning process.

For a critical rationalist, like Popper, the inability to justify a theory is not at all the main concern. Therefore he says, "(the inability to justify) never worries the critical rationalist"[46]. Since all our human knowledge, including scientific knowledge, is only conjectural and hypothetical, we don't need any validity for that knowledge. Only deductive arguments are legitimate in guaranteeing certainty, and therefore for Popper, the method of science is basically 'proposing conjectures and refuting them'. Though scientific theories are always beyond conclusive verification yet he is sure of providing a rational footing to science, for, "while theories cannot be logically proved by empirical observations, they can sometimes be refuted by them".[47] Though the universal theories are perpetually conjectures and hypotheses, ***we have a right for preference based on falsification***. The testability of theories differentiates a scientist from a lunatic. It is not that the scientists always propose their theories on firm observational basis and the lunatics lack that; rather the only difference between them is that the scientists' theories are able to pass the tests (based on observation), whereas those of the lunatics easily fail the tests[48]. **This leads to the next aspect of falsification as the foundation for Scientificity and Scientific Rationality.**

### 1.1.2.2 Falsification – The Foundation of Scientificity and Scientific Rationality

Though falsificationism can be contrasted against Positivists' *Verificationism*, Popper proposes the former also as the criterion of demarcation between science and non-science. For instance, Einstein's theory of relativity is falsifiable, and therefore it is scientific, whereas Marx's theory of history, Freud's psycho-analysis and Alfred Adler's so-called 'individual psychology' "...though posing as sciences, had in fact more in common with primitive myths than with science; ... they resembled astrology rather than astronomy"[49]. The proponents of these three theories would turn any relevant phenomenon as verifying their claims and practically no instance is given which can falsify those theories. This

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[45] Popper, 1994, p. 12
[46] Popper, 1992, p. 28.
[47] Howson and Peter Urbach (ed ), 1993, p 5
[48] Schilpp, 1974, p. 1021.
[49] Popper, 1999a, p.66.

constant verification was taken to be the source of their being scientific but, Popper argues that "this apparent strength was in fact their weakness"[50].

Falsification is, therefore, a criterion for *scientificity*. It is not a criterion for *meaningfulness* as the Positivists would hold. For, "...if a theory is found to be non-scientific, or 'metaphysical' (as we might say), it is not thereby found to be unimportant, or insignificant, or 'meaningless', or 'nonsensical'"[51], though they cannot be given the status of science as it is not backed by empirical or observational evidence in the normal sense of scientific evidence. So the criterion to find out whether a statement is scientific or not depends on whether the statement is falsifiable or not. His criterion does not demand actual refutation of a statement, but it is enough that that statement be *refutable in principle*. Though Popper denies any epistemologically special set of statements he leaves a margin for a set of 'basic statements'. They are basic not in the sense of assuring us of epistemological certainty but they belong to the set which act as 'potential falsifiers', i.e. a single or a set of basic statements. These basic statements are necessary to make a theory truly scientific. For example, the theory 'all Indians are rich' is incompatible with the basic statement 'here is a poor Indian'. The latter serves as a potential falsifier. Therefore he clearly states: "A statement or theory is, according to my criterion, falsifiable if and only if there exists at least one potential falisifier..."[52].

Scientificity consists in testability. This testability is rationality of science, which is identified with falsifiability. Testability cannot be identified with verifiability or probability[53]. Falsifiability has nothing to do with the content of the statement, rather it is an entirely logico-empirical characteristic of any statement to be scientific. Popper gives many examples[54] – from ancient times of Parmenides, through the modern times of Galileo, Newton, and as late as 20th century's Quantum Physics – to show that science advances by falsifications, which lead to problem-situations. These, in turn, compel the scientists to come out with new innovative and ingenious hypotheses. Therefore, problems, not observations, are the starting point for science. When the scientific community encounters a problem, it

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[50] *Ibid.*, p. 67.
[51] *Ibid.*, p. 70.
[52] Popper, 1992, p. xx.
[53] Popper elaborates on this idea in Sections 4 & 6 of Chapter I of 1959
[54] Popper, 1992, pp. xxvi-xxx.

proposes a solution, which may be out of an intense intuition or a creative imagination. Then tests are carried on to falsify it. If it passes the test it is tentatively accepted (Corroborated) or else it is discarded. Therefore falsifiability plays a crucial role and progress of science depends on highly falsifiable hypotheses

Thus the corner-stone of Scientificity and rationality in science is falsification. For only falsity of universal laws or theories can be logically, conclusively deduced, but not their truth. *A sophisticated version of falsificationism* demands not just a falsifiability of a hypothesis but demands that "A hypothesis should be more falsifiable than the one for which it is offered as a replacement"[55]. More falsifiability is always better for a theory. For instance, 'Students of the Hyderabad Central University are hard-working' is more falsifiable than 'Students of Philosophy of the Hyderabad Central University are hard-working'. For, any instance that refutes the latter refutes the former too and the former gives us more information than the latter. Therefore, once a refuting instance occurs one must mercilessly dethrone that theory, however successful and attractive in the past the theory might have been. Fro Popper, "Once a mistake, or a contradiction, is pin-pointed, there can be no verbal evasion: it can be proved, and that is that".[56] Sometimes modifications are made in a theory to improve upon the problematic theory. These modifications are not *ad hoc*, as they are independently testable. For the growth of science *falsifying* a cautious conjecture is more important than *confirming* a cautious hypothesis. For "If a *bold* conjecture is falsified, then all that is learnt is that yet another crazy idea has been proved wrong.... Similarly, the confirmation of cautious hypotheses is uninformative. Such confirmations merely indicate that some theory that was well established and regarded as unproblematic has been successfully applied once again"[57].

Popper's contribution in the area of rationality in science is very interesting and crucial. I'll come back to Popper's ideas in the next chapter for evaluating them. Now I proceed to the next section to discuss the views of the proponents of non-rational model of rationality in science.

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[55] Chalmers, 1992, p 50
[56] Schilpp (ed ), 1974, p 248
[57] Chalmers , *1992*, p 55

## 1.2 AN OVERVIEW OF PROPONENTS OF NON-RATIONAL MODELS OF RATIONALITY IN SCIENCE

Historicist theories of rationality are proposed as an alternative to the traditional theories of rationality. The historicist theories of rationality demand that an adequate theory of rationality must in some way fit the history of science and show that most of the episodes in the history of science are rational. In this Section, I take up the views of two important proponents of non-rational model of rationality in science, namely Thomas Kuhn and Paul Feyerabend.

### 1.2.1 Thomas Kuhn - A 'Paradigm' for Paradigms

Here I discuss Thomas Kuhn's ideas in two broad categories – *Early Kuhn* and *Later Kuhn*, focusing on the important Kuhnian concepts like **Paradigm, Incommensurability and Theory Choice.**

#### 1.2.1.1 Early Kuhn (Till late 1970s)

##### 1.2.1.1.1 Science as a Cycle

The notion of scientific rationality saw a radical change with Kuhn's *The Structure of Scientific Revolutions,* (hereafter *SSR)* (1962). Science, for Kuhn, is basically a long period of normal science, occasionally interrupted by crises which lead to short periods of revolutions: Normal science – anomalies get intensified - crisis – revolution – emergence of a new paradigm – normal science – anomalies get intensified - ... The main preoccupation of normal science is the puzzle-solving activity. A scientist is primarily a puzzle-solver, who is always busy trying to apply the known solutions to the problems at hand, and not so much of an innovator. "Under normal conditions", opines Kuhn, "the research scientist is not an innovator but a solver of puzzles, and the puzzles upon which he concentrates are just those which he believes can be both stated and solved within the existing scientific traditions"[58]. When the existing theories get into conflict with the fresh observational data, anomalies

[58] Kuhn, 1977d, in Kuhn 1977b, p 234

arise and mostly anomalies are overlooked. Not that every anomaly is expected to lead to a crisis. A normal scientist must learn to ignore them, or else she can't carry on with her research. So Kuhn says, "... if an anomaly is to evoke a crisis, it must usually be more than just an anomaly.... The scientist who pauses to examine every anomaly he notes will seldom get significant work done"[59]. She needs to have a basic faith in the puzzle solving ability of the present theory; for "without that faith their work would be wasteful of time and talent"[60] Kuhn, therefore, looks at an anomaly, not necessarily as an obstacle in the research, but a source of growth. Therefore as Rouse puts is, "They (anomalies) need to be resolved to the extent necessary to get on with research. If an anomaly is sufficiently obstructive, or interesting in its own right, it can replace the original research topic"[61]. But when anomalies grow too many in number and too strong in their intensity to tolerate, a crisis sets in leading to a revolution. After this short period of revolution, once again a long period of normal science ensues.

With the emergence of a new paradigm a lot of changes in the belief system takes place. For instance, when the phlogiston theory of combustion was replaced by the oxidation theory of combustion, a great change in the world of chemistry took place As James Ladyman points out, "Up until this time (of oxidation theory) it had been thought almost universally that there was really only one kind of 'air', although it could be of different degrees of purity; after this revolution it was accepted that oxygen is but one among the constituents of ordinary air"[62]. It is not, therefore, a piecemeal or a gradual change. Change is always a whole-sale change, not just bits and pieces.

#### 1.2.1.1.2 Paradigm - A Primary Concept

Paradigm is almost synonymous with a scientific community, in the sense of both the logical and physical closeness. Here are a few examples of a paradigm Aristotelian physics, Copernican astronomy, Newtonian physics, Ptolemaic astronomy, the phlogiston and the

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[59] Kuhn, 1962, p. 82
[60] Kuhn, 1977d, in Kuhn 1977b, p 236.
[61] Rouse, 1987, p. 33.
[62] Ladyman, 2002, p.103

Oxygen theories of combustion, (Daltonian Chemistry)[63], the fluid theory of electricity, the caloric theory of heat, particle physics, wave optics, relativistic physics, quantum physics. In a narrower sense the communities of physicists, chemists, botanists can be said to belong to different paradigms. Within the paradigm of chemistry, major sub-groups, like organic chemists, protein chemists or physical chemists are possible.

Each paradigm imposes its own ontology on scientific thinking and has its own empirical data, so much so that one scientist working in a paradigm cannot understand the data of another paradigm. Each paradigm has its own facts: [64]

> Led by a new paradigm, scientists adopt new instruments and look in new places. Even more important, during revolutions scientists see new and different things when looking with familiar instruments in places they have looked before. It is rather as if the professional community had been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well.

**Paradigms are constitutive of science**. Each paradigm has its own problems, its solutions and methodology. It binds the scientists so deeply that the scientists belonging to different paradigms "disagree about what is a problem and what is a solution; they will inevitably talk through each other when debating the relative merits of their respective paradigms".[65] **Paradigms are constitutive of meaning**. Paradigms determine the meanings of the terms used in scientific theories. And finally, **paradigms are constitutive of subject matter of discourse**. Within a paradigm there is a strong consensus-thinking. It is present in mathematics and astronomy from the very beginning. But in modern science such consensus is only a recent phenomenon[66].

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[63] *The phlogiston theory* was first proposed by Becher (1635-1682), and developed by Stahl (1660-1734), according to the theory phlogiston is the 'combustible principle', which is present in all flammable objects, it is emitted out while burning. By itself it is unobservable, colourless, tasteless and with no smell But when it is found in a material object it may give that object observable properties. *The Oxygen theory* of Lavoisier was the first step towards the chemical atomic theory of John Dalton (1766-1844), according to which matter consists of indivisible atoms; though there are different kinds of atoms, atoms of the same kind are identical in every respect, like shape, size, weight etc Most of the things in the world are compounds rather than basic elements.

[64] Kuhn, 1970a, p.111

[65] *Ibid.*, p.109

[66] Kuhn explains this with the example of *Optics* from antiquity till the end of the 17th century one cannot trace out any single or a set of paradigms for optics, Newton's particle theory of optics ruled the world of optics throughout the 18th century till the beginning of the 19th century, wave theory was accepted during the second half of that century; now in the 20th century there is a consensus in optics, where light is seen both as

Paradigms, thus, play an essential role in the process of scientific inquiry Kuhn demands a very strict adherence to the paradigm on the part of the scientists. They would do anything to be faithful to it. They seem even to be 'immoral' in maintaining the value of a paradigm. As James Ladyman puts it, "According to Kuhn, scientists are often very much attached to a paradigm, and sometimes particular individuals will do almost anything to retain it in the face of contradictory evidence, including perhaps, distorting experimental data, using institutional power to stifle dissent, using poor reasoning and bad arguments to defend the status quo, and so on."[67]

#### 1.2.1.1.3 *The Essential Tension*

Kuhn agrees with the normal expectation that a scientist essentially needs flexibility and open-mindedness. But he points out another need, which is equally important, if not more, which he terms as 'convergent thinking'. He observes, "'Convergent thinking' is just as essential to scientific advance as is divergent"[68] He elaborates further that only the traditional concepts of flexibility and open-mindedness are not enough for the revolutionary growth of science. It badly needs a firm rootedness in the present tradition: "Only investigations firmly rooted in the contemporary scientific tradition are likely to break that tradition and give rise to a new one"[69]. From the very beginning a sort of training in convergent thinking has been taking place in the world of science and without that the present developments of science are well nigh impossible. The convergent thinking is instilled in the fresh minds through the students' text books, which contain the accepted problem solutions. It is ensured by paradigms The student is then made to solve the new problems that resemble the ones taught in the textbooks and lectures, with the same methods. Therefore a paradigm can be said to be a blessing in disguise, in the sense, for though it does not easily allow new creative ideas, it certainly ensures the steady movement of science. Edwin Hung gives an analogy: "Perhaps taking paradigms as railway tracks

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wave and particles. In these three phases all the problems and solutions in optics were framed only in accordance with the then prevalent theories in mind [Kuhn, 1977d, pp 231-2]

[67] Ladyman, 2002, p 119.

[68] Kuhn, 1977d, in Kuhn 1977b, p 226

[69] *Ibid.*, p 227

would be a better analogy. The rails in one sense constrain the movements of the train, but in doing so guide it smoothly in a definite direction"[70]

Having said all these, therefore, one realizes that a scientist, worthy of her name, must be an enthusiastic innovator and a faithful traditionalist at the same time! She needs to possess the qualities of openness and conservatism at the same time. So Kuhn observes very clearly, "the productive scientist must be a traditionalist who enjoys playing intricate games by pre-established rules in order to be a successful innovator who discovers new rules and new pieces with which to play them"[71]. And precisely this is the *essential tension* Kuhn speaks of.

**1.2.1.1.4 Paradigm – Re-visited!**

Kuhn received varied criticisms against his notion of paradigm. He himself points out that Shapere's criticism[72] on the concept of paradigm is the most thought provoking and thoroughly negative account[73]. Masterman[74] finds about 22 ways of using the concept of paradigm in Kuhn's *The Structure of Scientific Revolutions*, ranging from "a concrete scientific achievement" to "a characteristic set of beliefs and achievements including instrumental, theoretical and metaphysical commitments together"[75]. With his 2nd edition of *SSR* (1970) he preferred a ***'disciplinary matrix'*** to 'paradigm', in which, "All or most of the objects of group commitment that my original text make paradigms, parts of paradigms, or paradigmatic are constituents of the disciplinary matrix, and as such they form a whole and function together".[76] In his "Second Thoughts on Paradigm" also he tries to clarify the doubts and answer the queries raised by the critics.[77]

With the notion of 'disciplinary matrix' Kuhn attempts to solve many confusions concerning the notion of Paradigm. He explains: "(Disciplinary matrix is) 'Disciplinary' because it is

[70] Hung, 1997, p.358.
[71] Kuhn, 1977d, in Kuhn 1977b, p.237
[72] Shapere, 1964b, pp. 383-394
[73] Kuhn, 1977a, Suppe (ed.), 1977, pp 459-482
[74] Masterman, 1970, in Lakatos and Alan Musgrave, 1970a, 59-90
[75] Kuhn, 1977a, in Suppe, 1977, p 460
[76] Kuhn, 1970a, p. 182.
[77] Kuhn, 1977a, in Suppe (ed ), 1977

the common possession of the practitioners of a professional discipline; 'matrix' because it is composed of ordered elements of various sorts, each requiring further specification"[78]. The disciplinary matrix includes these important elements: a) symbolic generalizations, b) models, both ontological and heuristic, c) values, and d) exemplars – which are essential for the scientific community to obtain or validate genuine knowledge. All sciences have their own set of symbolic generalizations, which are used without any qualms for justification. He gives an example from physics: f = ma. A student of physics uses this formula without any question about its validity or so, because everyone in the community at a given time accepts it without any difficulty. When a new problem is shown to be analogous to a problem that has been already solved, the members try to apply the same solution to the present problem. These exemplars make the newcomers learn about the fundamental and already accepted concepts, like force, field, element, compound etc., and these will not clear without the exemplars of the given community[79].

The scientific community agrees upon certain assumptions which can't be tested (like giving preference to field theory over particle theory). These assumptions show the direction of further research. They all agree with the characteristics of a good scientific theory[80]: **a) Accuracy** – that is, a theory's consequences should be in demonstrated agreement with the results of existing experiments and observations; **b) Consistency** – a theory must be consistent, not only internally with other theories of the paradigm, but also with other currently accepted theories applicable to related aspects of nature; **c) Broad Scope** – a theory's consequences should extend far beyond the particular observations, laws, or sub-theories it was initially designed to explain; **d) Simplicity** – the theory must be able to bring order to phenomena that in its absence would be individually isolated and, as a set, confused; and **e) Fruitfulness** – it should disclose new phenomena or previously unnoticed relationships among those already known[81].

I now discuss the view held by Kuhn during the second phase (early 1980 onwards), where several of the above discussed notions seem to undergo some important changes.

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[78] Kuhn, 1977a, in Suppe, 1977, p 463

[79] *Ibid*, p. 471

[80] Kuhn, 1977e, in Kuhn 1977b, pp 321-22

[81] Kuhn even in his earlier phase, thought of these five elements as possible grounds for comparison, despite incommensurability. See. Kuhn, 1970b, in Lakatos and A Musgrave (ed ), 1970a, p 261

### 1.2.1.2 **Later Kuhn** (Early 1980s Onwards)

Most of the criticisms against Kuhn, brought out till 1977, may now be softened, in my opinion, as Kuhn published *The Road since Structure*, in 1990. The same phrase is the title of a well-thought out collection of Kuhn's essays produced between 1970 and 1993, published posthumously in 2000. Most of the essays here portray Kuhn in a new outfit, which we call 'Later Kuhn'. The collection also includes an interview with him (in 1995). Further, as Rupert Read points out in his review of *The Road since Structure*, "It (the book) also evidences a wish to be comprehensible (on their own terms) to the 'Analytic' philosophers by whom Kuhn was most harshly criticized (e.g. Davidson)".[82] Thus the Later Kuhn seems to have modified his position. For instance, he suggests that he will omit the issue of incommensurability from any more consideration: "(for) a larger project, the book on which I'm currently at work. ... [A] theory of what I once called incommensurability – will have to be omitted entirely"[83]. Further, "If I were now rewriting", he admits, "*The Structure of Scientific Revolutions*, I would emphasize language change more and the normal/revolutionary [science] distinction less"[84].

From the essays in *The Road since Structure* we learn the four fundamental themes[85] emerging out: **a)** Science is undoubtedly a cognitive empirical investigation of nature, endowed with a special sort of '**progress**'. But this progress is not to be understood as though science moves towards the fullness of truth, but progress in ever-improving technical puzzle-solving ability, functioning under the strict criteria of success and failure; **b)** Science is to be understood as basically **a social enterprise**, where the scientists work within the community and only occasionally they move out of it to find solutions for certain anomalies; **c)** Modifying the earlier notion of scientific development as a series of long period of normal science, occasionally punctuated by short periods of revolution, now Kuhn maintains that **science is period of development within a coherent tradition divided occasionally by periods of 'speciation'** (like the biological evolution of species of Darwin's theory), into two distinct traditions with somewhat different areas of research; and finally, **d)**

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[82] Rupert Read, in his book review of *The Road Since Structure*, in http //www uea ac uk/~j339/ kuhnreviewbjps.htm)

[83] Kuhn, 2000f, in Kuhn 2000a, p 106.

[84] Kuhn, 2000c, in Kuhn 2000a, p 57

[85] The editors have done a good job in identifying the themes in the Introduction of *The Road Since Structure* See: Kuhn, 2000a, pp. 1-9.

distinguishing between commensurable languages (where translation is possible, between two languages, and therefore, what is said in one language can be said in another) and incommensurable languages (where only paraphrasing is possible between the languages!) he gives **a linguistic twist to the understanding of incommensurability**.[86]

### 1.2.1.2.1 Theory Choice – Without any Actual *Choice*

Kuhn attempts to develop a descriptive (explanatory) account of science, which, at the same time has certain normative or prescriptive characteristics. This renders the account rational. In choosing a theory, scientists do have different levels of liking for various desiderata. Therefore, Kuhn claims that theory choice cannot be settled on the basis of "logic and experiment alone"[87] and he insists that the final outcome of the theory choice is not bound uniquely by rational procedure but by many other factors. The scientific community is vested with the power to decide in the case of conflicting interests. The community shares the same standards and values which are acquired in the process of specialized professional training. He lists a few preferred features of scientific theories. These include *precision, wider scope, better formulation, accuracy, close agreement between theory and empirical data, simplicity, and novel predictions.*

But Kuhn himself is aware that they are vague if considered in isolation and they might contradict one another, if taken together. For instance, the existing theory may have highly

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[86] Kuhn at the second phase prefers to look at incommensurability **metaphorically** With the change of theories not all the terms change in their meaning While most of the meanings remain the same only some of the terms change in their meaning "The terms that preserve their meanings across a theory change", says Kuhn, "provide a sufficient basis for the discussion of differences and for comparisons relevant to theory choice". [Kuhn 2000a, p 36]. Now incommensurability is confined only to the linguistic domain He now distances himself from the non-linguistic aspects of incommensurability Therefore, "Incommensurability thus equals untranslatability" [Kuhn, 1990, p 299] Kuhn highlights two major difficulties in translation and interpretation **Translating interdefined terms** – for example, phlogiston – its full meaning is embedded with other terms used in the theory; therefore not possible to translate into terms of later chemical theory, and the notion of **Conceptual disparity among terms,** (i e terms are conceptually so pertinent and relevant to one particular linguistic system, culture etc ), while translating a term into another language one may not find the exact equivalent for a given term For example, the French word, *esprit*, can be replaced by 'spirit', 'aptitude', 'mind', 'intelligence', 'wit', 'attitude', 'judgment' etc according to the context Kuhn clarifies that "these are not cases of ambiguity, but of conceptual disparity between French and English" [Kuhn, 2000c, in Kuhn 2000a, p.48] and therefore every translation has to involve an element of author's intention and that in turn proves that "there can be no perfect translation" [86] [Kuhn 2000c, in Kuhn 2000a, p 49]. Therefore among scientists there is no side-by-side or point-to-point comparison, a scientist has to learn from scratch as a learner of a new language does

[87] Kuhn, 1970c, in Cohen, and R C Buck (eds ) 1971, p 144

positive value in any one of the criteria, while the new competitor may have a high score in another criterion. Now the dilemma arises as to which of the criteria to choose. Sometimes the community seems to accept a new theory even without considering any criterion. Kuhn gives the example of the theory of Copernicus. When it was proposed it was not more accurate than Ptolemy's. It gained more accuracy only with Kepler's sixty years' of slogging in radically modifying it. If, for the lack of accuracy, Copernicus' theory had been completely ignored, we would not have remembered him today. Each of the five criteria mentioned above can be understood or interpreted differently by different scientists. Therefore, though two scientists may use the same criteria and yet can reach different conclusions.

Kuhn prefers to call the shared criteria **as values, rather than rules**. Each creative discipline is characterized, among other things, by different sets of shared values. At times two men committed to the same values may choose different theories. Unfortunately these values may prove to be confusing in actual applications. He explains with an example from the traditional proverbs that are contradicting each other. "He who hesitates is lost" and "Look before you leap" or "Many hands make light work" and "Too many cooks spoil the broth". Though contradictory yet these are taught to the children in the school. Treating the shared criteria as values, not as norms, has some advantages. It explains rationally even those aspects of scientific enterprise, which the tradition normally labels as irrational or non-scientific.

As these desiderata assure rationality of science, Kuhn sees the descriptive account of science as normative also. Therefore, in spite of the ambiguity and vagueness in the desiderata Kuhn affirms that science is very rational. He is convinced of rationality in science and argues: "if history or any other empirical discipline leads us to believe that the development of science depends essentially on behaviour that we have previously thought to be irrational, then we should conclude not that science is irrational, but that our notion of rationality needs adjustment here and there'[88]. He emphasizes the same when he comments

[88] Kuhn, 1970c, in Cohen, and R. C Buck (eds.) 1971, p 144.

on the ideas of Lakatos: "Scientific behaviour, taken as a whole, is the best example we have of rationality"[89].

Along with these values there are many personal or subjective criteria shaping theory choice: one's previous experience as a scientist, the duration of his research, extra-scientific persuasions (like philosophical or religious convictions), one's personal preferences. for instance, one may prefer originality to coherence (and therefore ready for risks!), while another may prefer vice versa and end up not taking risks. So Kuhn concludes that the theory choice is a complex procedure, because "every individual choice between competing theories depends on a mixture of objective and subjective factors, or of shared and individual criteria"[90]. Yet he chooses these desiderata "because they are individually important and collectively sufficiently varied to indicate what is at stake"[91].

However, since theory choice is a collective decision of the community and all our observations are theory-dependent, no hypothesis can be purely objective. So there is no objective way of theory-evaluation. Given this view he faces a lot of criticism from different quarters. Lakatos is so strong in his criticism that he labels Kuhn's science as "a matter of mob psychology"[92]. Kuhn declares once again that all these are due to a total wrong reading of his ideas: "Reports of this sort manifest total misunderstanding, and I have occasionally said as much in papers directed primarily to other ends"[93].

A scientist cannot just base her theory choice on a matter of her personal taste. She needs to intelligibly explain her choice to the peers. Even with Einstein it so happened that towards the end of his life he had to remain isolated due to his view towards quantum physics, which he based only on his taste, whereas Bohr was ready to discuss the bases of his claims. The critics accuse Kuhn of subjectivism on the ground that he bases the theory choice on personal likes and dislikes. But Kuhn denies the charge as a misunderstanding. He claims that the theory choice is still objective (though with some limitations!), as it can be analyzed in terms of criteria like accuracy and consistency. Though theory choice is affected by

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[89] Ibid , p. 144.
[90] Kuhn, 2002, p 425.
[91] *Ibid*, p. 422
[92] Lakatos, 1970b, in Lakatos and A Musgrave (eds ), 1970a, pp 91-195
[93] Kuhn, 2002, p. 422.

"idiosyncratic factors dependent on individual biography and personality"[94], there are also shared (or objective) criteria. Thus for Kuhn, "Analysis of theory choice of an individual scientist thus results in two kinds of active values; cognitive values to which the whole community is committed, and individual values varying within the community".[95] The communal cognitive values may grant rational basis; but individually differing values may not give rational base. But not all of the individual values are irrational; professional experience will surely add to better functioning; this consideration may lead to different choice by different scientists; it does not indicate irrationality, "rather, it may be a sign of different information bases used in the decision".[96] Thus an adoption of the new theory cannot be regarded as conscious choice on the part of that person. So declares Kuhn, "*No process quite like choice has occurred,* but they are practicing the new theory nonetheless"[97] (emphasis mine).

### 1.2.1.2.2 Popper vs. Kuhn

Kuhn, in his paper, "Logic of Discovery or Psychology of Research", compares and contrasts his views with those of Popper. Kuhn enlists a number of claims or attitudes that are common to both of them, like the importance given to the dynamic nature of science, the rejection of cumulative growth of science and so on[98]. Nevertheless there are indeed **many areas where Kuhn and Popper differ**[99] Kuhn argues that a Popperian scientist seems to be

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[94] Kuhn, 2002, p 429
[95] Hoyningen-Huene, 1992, p. 493.
[96] *Ibid.*, 495
[97] Kuhn, 2002, p 436.
[98] It seems that both of them have developed similar ideas about scientific enterprise almost simultaneously. For as Kuhn himself claims he has not read Popper's work until the publication of *The Logic of Discovery* (1959), though he has heard that Popper's ideas are widely discussed For instance **a)** both focus on the dynamic nature of science, rather than the strict logical structure of science, **b)** both give equal importance to facts and the spirit of actual scientific life, for which both turn to the actual history of science and result in similar conclusions; **c)** both emphasize upon the revolutionary process of scientific growth, where the new theory replaces the old one and they focus on the failure of previous theory in facing challenges posed by logic, experiment and observation; **d)** both reject the cumulative growth of science, **e)** both are found in one company in rejecting most of the tenets of logical positivism, and insisting upon an intimate relation between scientific observation and theory; **f)** both of them seriously doubt the possibility of any neutral observation language, **g)** that the aim of scientists is to arrive at explanatory theories is agreed upon by both of them, and finally another significant similarity between Kuhn and Popper is that **h)** both of them give due importance to the concept of tradition in the enterprise of scientific knowledge [See Kuhn, 1977c, in Kuhn 1977b, pp 267-8] As early as 1948 Popper boldly declared, "I do not think that we could ever free ourselves entirely from the bonds of tradition. The so-called freeing is really only a change from one tradition to another" [Popper, 1963, p 122]
[99] Some more areas where **Popper and Kuhn disagree** Kuhn demands a deeper commitment to tradition on the part of a scientist, while Popper would appreciate if the scientist is always geared to refute the tradition!

always anxious to disprove his own theory, as if a dagger dangerously dangles upon his head. A significant disagreement between them is with regard to the idea of demarcation of science and non-science. The notion of 'normal science', which is central to Kuhn, seems to be missing in Popper's framework In the words of Kuhn, "it is normal science, in which Sir. Karl's sort of testing does not occur, rather than extraordinary science which most nearly distinguishes sciences from other enterprises. If a demarcation criterion exists it may lie just in that part of science which Sir Karl ignores"[100]. When one focuses too much on testing of theories one is sure to lose the major part of science, for most part of the actual science lies in the period of normal science. Kuhn laments, therefore, "To rely on testing as the mark of a science is to miss what scientists mostly do and, with it, the most characteristic feature of their enterprise".[101] Popper, therefore, seems to make the exception a rule! Kuhn suggests that "Sir Karl has characterized the entire scientific enterprise in terms that apply only to its occasional revolutionary parts"[102]. A beginner in science is primarily trained to work in normal science not to throw away the existing theories outright! Kuhn has problem with Carnap also, as Carnap and Popper agree on many important aspects of science. [103] Kuhn claims that scientific growth is not cumulative, with no sharp distinction between observation and theory, nor between context of discovery and context of justification There is no particular method used in science and there is not a strict deductive structure in science. Science is very much social and context-bound and therefore essentially historical.

Therefore, The fundamental difference between Popper and Kuhn is that while former views science to be always in constant revolutions as the basic principles are being always put to test, the latter demands a serious commitment to the existing theories (as revolutions or shifts occur only occasionally). Further, a Popperian scientist is always anxious to falsify

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Further, Kuhn is highly unhappy with Popper's demarcation criterion of science and non-science But Kuhn prefers to concentrate on the central region of agreement, in stead of focusing on the disagreements. Though the disagreement over the demarcation is one of high intensity, Kuhn still feels that the disagreements between them must not be blown out of proportion, as the disagreement is not really a disagreement, rather only a difference of viewpoint. Both seem to see the same lines and diagrams on a sheet of paper but interpret them differently. So Kuhn explains, "That is why I call what separates us a gestalt switch rather than a disagreement and also why I am at once perplexed and intrigued about how best to explore the separation" [Kuhn, 1977c, in Kuhn 1977b, p. 269].

[100] Kuhn, 1977c, in Kuhn 1977b, p 272.

[101] Kuhn, 1977c, in Kuhn 1977b, p. 277

[102] *Ibid.*, 272.

[103] For a precise and comprehensive presentation of the similarities and dissimilarities among the views of Carnap and Popper, see: Hacking, 1999, in Klee (ed ), 1999, pp 217-220

his/her own theory, whereas a Kuhnian scientist needs to exhibit a deeper commitment to uphold his/her theory.

### 1.2.2 Paul Feyerabend - Methodology – Not a *Corner Stone* for Science

No other critic of science has meted out such a vigorous attack against the received view of science as Feyerabend has done. He knocks down the whole concept of rationality from the realm of science. He argues that science has been given an undue high pedestal-status on two grounds: the methods of science and the results that it comes out with. For him *what makes science rational is its methodology* and *what makes a methodology special is its aim and results*. And because there is no such special method which is unique to science, to be followed in all the domains of science, he argues, ***there is no rationality in science;*** therefore he claims that science too need not be unique. He propagates this conviction, mainly in his celebrated works: *Against Method* (1975) and *Science in a Free Society* (1978). One can roughly divide, Feyerabend's works, as for instance John Preston does in his *Feyerabend – Philosophy, Science and Society*, into two major sections: ***from early 1950s till 1970*** and ***from 1970 onwards, till his death in 1994***. In the first part he was engrossed in developing an all-embracing model for acquisition of knowledge, while in the second part he lost interest in the above project and became highly critical of rationalism. In this short presentation, I concentrate more on the ideas of the second phase, regarding the rational (or non-rational!) aspects of science.

#### 1.2.2.1 No Method, No Rationality!

Feyerabend identifies *the demand for one single method* (i.e. *methodological monism*) as the core of rationalism. He agues that the rules, which the methodological monists propose are naïve and simplistic, fixed in advance, without any consideration for historical elements. The types of rules that he has in his mind are a) that one must not propose *ad hoc* hypotheses to explain away the noncompliant data; b) one must not yield to hypotheses which go against the hitherto well-accepted experimental outcome; c) one must not accept hypotheses with lesser empirical content compared to the prevalent theories; and d) one must stay away

from introducing hypotheses that are self-contradictory[104]. He claims that these rules can neither be descriptive nor prescriptive and goes on to systematically deny each of those claims.

But history shows that there is no *the* method, suitable for all the domains of science. He brings in the case-study of Galileo to show how the latter systematically went against each of the rules of the methodological monists. This is not to show that Galileo did not follow any method in his science at all, rather, Galileo emerges as a strong sign for the need for *methodological radicalism* and *theoretical pluralism*. Many facts are unearthed only with the availability of alternative theories. To refuse to consider the alternatives leads the scientists to the danger of abolishing the potentially refuting facts. These facts may be capable of showing the absolute inadequacy of the theory in question. [105] By ignoring them the scientists are at loss. They have to go on with the ignorance of holding on to a theory which is, in fact, deficient and incompetent Not even one single rule, however greatly valued and cherished it might have been, does come to stay permanently in science. It is violated at one point or the other. The scientists also ignored the demands of rationality to achieve greater heights in science. They sometimes not just violate the traditional rules they even choose just the opposite rules. Such violations are *factual*, *deliberate* and even *absolutely necessary* for further growth in science. The newly adopted rules could even be *backward looking*. Circumstances may even demand "to introduce, elaborate and defend *ad hoc* hypotheses, or hypotheses which contradict well-established and generally accepted experimental results, or hypotheses whose content is smaller than the content of the existing and empirically adequate alternative, or self-inconsistent hypotheses, and so on"[106]. It is not the case that a new theory has to clarify all the doubts raised by the previous theory and rationally prove its superiority and a far-advanced empirical content before it is used. Theories often obtain clarity only after a prolonged usage. To become empirically successful they need non-rational and non-sensical acceptance in the first place. Such unmethodical push-ups' are needed for the new theories

[104] Preston, 1997, p.172.
[105] Feyerabend, 1998a, in Curd and J A Cover (eds ), 1998, p 937
[106] Feyerabend, 1999, in Klee (ed.), 1999, p.231

Feyerabend employs several instances from History of Science to argue that strictly insisting upon any single prescriptive scientific method is not only impossible and not factual, but also it positively hinders the scientific enterprise. For instance, he elaborates the Copernican Revolution, which is usually taken to be the clear and undeniable instance of rational and systematic growth of science, and which supposedly follows a fixed methodology. But he showed "that all common prescriptive rules of science are violated in such circumstances"[107] and claimed that efforts to blindly follow those prescriptive rules would have even prevented scientific revolutions. Theoretical pluralism is preferable as it does not impose rigid rules on the scientific community and it is necessary for the growth of science, because, "Variety of opinion is necessary for objective knowledge"[108]. Therefore he advocates *methodological pluralism*, which is not only more humanitarian but also more favourable to the growth of science.

#### 1.2.2.1.1 Anarchism – Need not Lead to Chaos!

Anarchism, Feyerabend argues, is a requirement for any intellectual enterprise. It may be objectionable in politics but certainly not in epistemology. Feyerabend is for epistemological anarchism, to liberate science and society from wrong understanding that scientific rationality has a special and superior character. In fact this is the conviction, as he himself declares, that led him to write *Against Method*: "The following essay is written in the conviction that *anarchism*, while perhaps not the most attractive *political* philosophy, is certainly excellent medicine for *epistemology*, and for the *philosophy of science*"[109].

Feyerabend assures that because we don't adhere to fixed rules or methods in an anarchistic science we need not worry that it will land us in chaos. The less stress on strict law and order in science would not lead to anarchism in science, for he believes in the well-ordered nervous system that the humans have developed over the millennia[110]. Therefore he denies strict, unchanging and all-appealing methodological rules in science; he does not encourage a chaos-like situation, in both theoretical pluralism and methodological pluralism. **For what he has in mind is not the non-existence of such rules but their emergence and**

[107] See: http://paul-feyerabend biography ms/
[108] Feyerabend, 1975, p 46
[109] Feyerabend 1999, p.228
[110] *Ibid.*, p. 230.

**dependence only within the given research agenda.** As "there are standards, but they come from the research process itself, not from abstract views of rationality"[111], a scientific research need not be capricious and whimsical.

#### 1.2.2.1.2 A Tendency to Follow False Reasoning

True, it is not easy to go against the traditionally well-appreciated practices. For we are generally determined to faithfully follow the *tradition of reason* but actually we fail to realize that what we consider the "'voice of reason' is but a *causal after-effect* of the training"[112] we have received. Only the ignorance of the potentialities of humans and the complexities of the social surroundings make us cling to ".. intellectual security in the form of clarity, precision, 'objectivity', 'truth'..."[113]. Thus, when we dispassionately analyse the intellectual processes in history, there seems to be only one rule that is protected and acceptable under all situations and at all times of human development, and that principle is nothing but "anything goes"[114]. In fact, he says, a rationalist who has a closer study of the historical episodes cannot but throw up his arms in the air and sincerely exclaim that 'any thing goes'.

Feyerabend makes a scathing attack on *the stability thesis* (i.e. taking rationality to be more or less invariant over time). There are no absolute rules in science and, in fact, accepted rules are very often violated and even just the opposite ones are chosen. He does not see any 'rational' basis for choosing Newtonian science over Aristotelian science. **Science prevailed magic, or Newtonian science prevails Aristotelian science, not because of any rational superiority on the part of science**. Of course, science has a sort of rationality but it is not as robust as we think it is; it is one among many forms of rationality. A scientist or an artist is at the same footing in terms of rationality. They don't need, as Feyerabend puts it, "papa methodology or mama rationality to give them security and direction, he can take care of himself, for he is the inventor not only of laws, theories, pictures, plays, forms of music,

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[111] Feyerabend, 1978, p.90.
[112] Feyerabend, 1999, p. 232.
[113] *Ibid.*, p. 234.
[114] *Ibid.*

ways of dealing with his fellow men, institutions, but also of entire world views, he is the inventor of forms of life".[115]

#### 1.2.2.1.3 Falsificationism – Not a Solution!

Feyerabend is also critical of Popper's Falsificationism For, no important theory is ever in harmony with all the relevant facts. But naïve Falsificationism demands that a scientific theory must be rejected if it does not agree with the available, known facts. But theories are kept up and even encouraged for further development with *ad hoc* methods, which are essential to the progress in science. For example, Galileo could not give the necessary optical theories to support his observational claims with telescopes, he and his followers had to use *ad hoc* rules until the field of optics could justify their telescopic claims with an optical theory. He agrees that falsifiability provides a way to replace invalid inductive thinking with deductive, falsifiable reasoning. Nevertheless he argues that doing so is neither necessary for, nor conducive to scientific progress; in fact it hinders it. Thus he argues that science proceeds not by induction, but by *counter-induction.*

In short, **no special methods for science, therefore no special status for science either.** If at all one looks for a universal rule for science, that would be, 'anything goes'. The special status of science, if any, is obtained from the social and physical values of the results of science, rather than its methods. The supremacy of science is just given to it. Science has forcefully pushed itself up! Not by logical arguments, but because of its power it came to occupy the ruling position. As in the middle ages the religious leaders of Christendom imposed rule on their subjects, now scientists use science as power to push their ideologies upon people.

### 1.2.2.2 Feyerabend's Lenience towards Relativism

In Feyerabend one can trace out two possible routes to relativism, through *methodological pluralism* and *incommensurability*: Firstly, given no fixed method, science has no way of ratifying the choice of one method over another. There seems to be no way of calculating the

[115] As quoted by: McMullin, 1988b, in 1988a, p 10

merits of the different methods or paradigms. Secondly, since there is incommensurability in terms of truth-content relativism emerges very strongly[116].

In his "Rationalism, Relativism and Scientific Method" (1977) Feyerabend combats against rationalism, He differentiates between naïve and sophisticated versions of 'cosmological', 'institutional' and 'normative' rationalisms. He finally gives his doctrine of relativism that "there is no *one* rationality, there are *many* and it is up to us to choose the one we like most"[117]. In the same paper he presents a crucial problem what has is known as the 'dilemma of ultimate commitment' – i.e. both the rationalists and the irrationalists make a sort of 'leap in faith' in committing themselves to their respective ideology Their choice is beyond rational justification. For he explains: [118] Assume we want to judge action A by standard S. We apply S to A and render our judgment. But the application must also be rational, so there must be standards S` which judge the pair [A,S] and so on *ad infinitum*, unless we admit that at some place we simply act without being able to provide the standards which make this action rational.

With the insistence of anarchism, the privileged position given to reason is displaced. It becomes equally problematic and abstract as the other notions of Obligation, Duty, Morality, Truth and 'their more concrete predecessors, the Gods'. All these notions have been very badly threatening humanity and systematically hampering their freedom and joy in developments of every sort. He argues that for both rationalism and irrationalism there is no rational basis. As it is only a 'leap of faith', the proponents of both rationalism and irrationalism land in relativism.

### 1.2.2.3 Empiricism – Ineffective in Fulfilling its Promise!

According to Feyerabend, empiricism is not able to fulfill even its fundamental promise. However, empiricism has become so powerful that every intellectual enterprise is keen to take it as its official position. Many look up to empiricism as the only way to escape whimsical speculation and meaningless metaphysics is to rely upon a *thorough*

[116] Preston, 1997, p. 193
[117] *Ibid.*, p. 194
[118] As quoted by Preston, 1997, p 195.

*observational procedure*. But unfortunately modern empiricism seems to establish a sort of metaphysical dogmatism, which in fact it aims to oppose. It is ironical to note that empiricism constructs its own position on such an edifice which is not refutable by experimental procedures[119]. ***Empiricism, if it is less and less tolerant of theoretical pluralism then it becomes more and more dogmatic***. If any intellectual enterprise likes to be objective, it must make an essential room for pluralism. It is this pluralism of theories that enables a sharp criticism of the existing theories, however well-accepted they have been in the past. One must not make only the domain of 'observational facts' as the yardstick for evaluating theories, as we don't have any observation, independent of theoretical considerations. Science cannot afford to deny a theory, because it sounds too general or metaphysical. At every stage of science some sort of metaphysics or the other is unavoidable in order to stop science from becoming dogmatic: "A science that is free from *metaphysics* is on the best way to become a *dogmatic* metaphysical system"[120].

Empiricism insists upon two conditions – *Consistency Condition* and *Meaning Invariance*. Feyerabend explains them as follows: [121] "**a)** Only such theories are then admissible in a given domain which either contain the theories already used in the domain, or which are at least consistent with them inside the domain and **b)** Meanings will have to be invariant with respect to scientific progress; that is, all future theories will have to be phrased in such a manner that their use in explanations does not affect what is said by the theories, or factual reports to be explained".

He finds serious fault with both these criteria. Episodes from the history of science show that both these conditions have been violated, especially at those crucial points where great scientific revolutions took place. There are widely know violations of consistency conditions: • between Newton's theory *and* Galileo's law of the free fall and Kepler's laws, • between statistical thermodynamics *and* the second law of the phenomenological theory; and • between wave optics *and* geometrical optics. Similarly, the relativity theory is shown to be violating both the conditions of consistency and meaning invariance. The first criterion, the *consistency condition,* increases the tendency to retain the older theory as one

[119] Feyerabend, 1998b, in 1998, p 923
[120] *Ibid.*, p. 925
[121] *Ibid.*, p. 926-7.

can retain many cherished assumptions of the past. At times forces us to overlook even the observational evidence in the choice of theories. A theory is rejected, not so much for its counter-evidence at the face of new observational or experimental results, but just because it goes against a well-cherished theory at hand. Here, the age and familiarity become the basis for the theory elimination. So he even wonders: "Had the younger theory been there first, then the consistency condition would have worked in its favour".[122]

Against the condition of 'meaning invariance', Feyerabend maintains that 'contextual theory of meaning', by which, meaning of a term in a theory is determined by the context in which it occurs. A genuine alternative competitive theory must substantially differ from the first theory; must differ in the meanings of all the terms in it; if this difference is not substantial, this is not really the alternative theory but only a variant: The general principles of a theory affect the meaning of every term; when theory changes substantially those principles too change, and with that meaning also changes. However, large part of the theory of the world remains intact; that is why the transition from Newtonian mechanics to general theory of relativity has not altered culture, arts, ordinary language and perception.[123] Incommensurability leads to a strict subjectivity in the realm of theory choice. Since there is no logical way of comparing various theories, we are left only with the "aesthetic judgments, judgments of taste, metaphysical prejudices, religious desires, in short, what remains are *our subjective wishes*"[124]. Thus the notion of incommensurability shakes the claims of rationality in science.

Under this 'blissful ignorance' of the refuting facts, one tends to be mistakenly convinced of the speciality and uniqueness of the current theory and reject any single theory that does not go along with the present theory. From here one automatically moves on to the state of metaphysical dogmatism. Here its success is assumed and artificially created by us. The success is not because it corresponds to the truth and nature, nor because it has been scrutinized under many possible alternative theories. Given such a background, that particular scientific theory becomes a sort of a *myth*, which is kept up for many personal, social, political and religious reasons, like one's dread, unfounded inclinations,

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[122] Feyerabend, 1975, p 36.
[123] *Ibid*, p. 271.
[124] *Ibid.*, p. 285.

preconceived ideas, and religious convictions. Efforts are made to reinforce the *myth*, not necessarily by religious priests but by the custodians of science and Nobel laureates themselves. This *myth* permeates the whole life and it becomes almost impossible to criticize, because the possibility of considering any other "set of equally all-embracing principles... has been excluded from the very beginning"[125] **Therefore the insistence upon consistency and uniformity of theories weakens science by removing its critical power; it seems to lead even to opposite effects.** For, the great power of imaginative and innovative ideas is under a threat. It tells upon the realization of one's deep insights. If such a situation is allowed to prevail for a period of time it will slowly and steadily affect the quality and the vigour of education.

Having presented the seminal ideas of the proponents of the rational and non-rational models of rationality in science, I now move on to the critical evaluation of these ideas in **Chapter 2.**

[125] Feyerabend, 1998b, in Curd and J A Cover (eds ), 1998, p 938

# *CHAPTER 2*

# ASSESSMENT OF THE 20TH CENTURY THEORIES OF RATIONALITY IN SCIENCE

## 2.0 Introduction

In this Chapter I assess the views of the proponents of rational and non-rational models of rationality in science. In **Section 1**, I take up the ideas of Hempel and Popper. I attempt to argue that Hempel is in need of 'liberation from goal', as rationality cannot be comfortably confined only to goal-means relationship. After analysing Popper's strong proposal of Falsifiactionism I conclude that he emerges out to be a 'fallible fasificationist'. **Section 2** takes up the critical evaluation of Kuhn's and Feryerabend's views, the proponents of non-rational models of rationality in science. At the end of the analysis of their views, I argue that, due to the difficulties in the desiderata, Kuhn can be correctly taken as a 'rational relativist', while Feyerbabend, as my appraisal would reveal, would be a 'proponent of rationality in science with a human face'.

## 2.1 ASSESSMENT OF THE RATIONAL MODELS OF RATIONALITY IN SCIENCE

### 2.1.1 Assessment of Hempelian Account

I begin by summarizing the critiques of Hempel's analysis of rationality by two important thinkers, namely Kuhn and Philip Kitcher, whose critiques I deem to have direct relevance for our purposes here.[126] Then I give a few evaluative remarks of mine about Hempel's ideas.

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[126] Many critiques have a great admiration for Hempel's sincere and honest efforts in philosophizing. As Fetzer puts it, "He [Hempel] cared more about finding the right solutions than whether his solutions were right" [Fetzer (ed.), 2001, xiii.]. Further, Kuhn too expresses similar sentiments when he declares, "In him [Hempel] I learned to recognize the stance of a man who intends philosophical distinctions to advance truth rather than to win debates." [Kuhn 2000b, in Kuhn 2000a, p 208], and similarly W Salmon too admires Hempel's acumen in philosophy, especially in logical empiricism, by saying, "His [Hempel's] writings have uniformly exhibited the kind of clarity, depth, incisiveness, and fairness that ideally suit them to provide a solid basis for understanding the fundamental philosophical issues" [Salmon, 1983, p 555]

### 2.1.1.1. Hempel's Impossible Dream: Kuhn

Kuhn construes Hempel's attempt as an attempt to construct a purely logical account of scientific rationality. Both Hempel and Kuhn agree that theory choice has to presuppose a prior specification of the goals – say, to make the theory more efficient or better 'puzzle solving'. A theory is more efficient, if, say, there is a better fitness between theoretical predictions and the results of experiment and observation Suppose, given this goal, one chooses a theory which does not provide a better fitness then we can straightaway see that one is irrational. Hempel wants to develop an account of theory choice based upon logic and experiment, whereas Kuhn affirms that logic and experiment alone can't provide one with sufficient grounds for theory choice. Kuhn, as well as several historians and philosophers are of the opinion that this very attempt is basically untenable. However it is good to note, as Salmon clarifies, that "It is not that Kuhn wants to regard science as irrational; instead he would offer a more 'naturalistic' conception of rationality"[127]

Any comprehensive account of scientific rationality, Kuhn is convinced, cannot afford to ignore the actual practice of science. According to him, the traditional methods of verificationism or falsificationism are not compatible with the actual practice of science. Logical positivists derived their methodological rules for the notion of rationality from certain *a priori* models. But there are no *a priori* determinations or norms to which scientific activity is expected to conform. Theory of rationality must be formulated by looking at the actual practice of science. Kuhn also rejected the clear-cut distinction between descriptive and normative accounts. Normative account has to take note of the actual practice of science. As essential functions of science-practices lead science to improvement and progress, so they can be considered as normative. Scientific progress, like Darwinian evolution, "[is] a process driven from behind rather than pulled towards some fixed goal to which it grows ever closer".[128] For Kuhn, all these lines of thinking make one thing very clear, that is, Hempel's efforts to arrive at a logical account of rationality of science will remain always unsuccessful.

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[127] Salmon, 1983, p. 557.
[128] Kuhn, 2000f, in Kuhn 2000a, p 115.

### 2.1.1.2 Rationality does not always Demand Utility-Maximization - Philip Kitcher

No doubt, Hempel's notion of rationality has two distinct components, namely *normative* (evaluation) and *explanatory* (description) components. Hempel defines, as we have already seen, rationality in terms of the goals of the action and the beliefs available for the agent to accomplish that action. Kitcher calls this as ***'utility- maximization notion of rationality'***. But the problem with this notion of rationality, Kitcher observes, 'success' can be a matter of luck too. One may attain the maximized utility by a mere matter of luck. So a modification in Hempel's account of goal-means relationship is needed to take care of the aspect that the agent does the actions in the most reliable way, not by luck, to maximize the perceived utility.

Kitcher tries to show that utility-maximization of action need not always be counted in a materialistic and numerical way. He gives the example that Charles Darwin, before proposing to his cousin, jotted down all the advantages and disadvantages of proposing to her and marrying her. Weighing the relative strengths of the both the aspects he finally decided to marry. We cannot totally call this approach a rational one. For, this kind of *decision-theoretic approach* to such a phenomenon of choosing one's spouse does not seem to be appropriate. Marriages involve companionship and commitments at deeper levels. One who is aware of this "would question his own ability to make the numerical judgments and would be profoundly skeptical of attempts to compute the 'utility-maximization action"[129].

More studies in psycho-neuro related fields reveal many striking elements with regard to the process of decision making in our ordinary day-to-day lives. Very often we don't make any elaborate cost-and-effect analysis of our actions before we perform them; we need to act almost impulsively having no time for strict rationalization – for example, jumping into the river to save a drowning child, or jumping quickly away at the sound of leaves' rumbling fearing a snake, and later finding out that it is just a noise made by some dry leaves. Decisions can very well result from our emotional responses, like moved by pity and sympathy helping someone, even by going out of one's way even though we don't seem to

[129] Kitcher, 2000, p 252.

like him/her. Kitcher prefers the phrase ***being reasonable*** to ***being rational*** The one who is reasonable gives considerable importance to reason and emotion. Such a person goes far beyond mere decision-theoretic calculation. Such a person goes beyond being rational.

### 2.1.1.3 Problems in Confining Rationality to Sheer Goal-Means Relationship

It is true that the 'means/end conception of rationality' is very close to common sense. Critics of rationalists cannot deny this means/end conception of rationality. Even those who deny the elements of logicality, objectivity, deliberation, detachment etc can't easily deny this concept of rationality; for to do so will make that person highly irrational or insane; for even the action of denying the concept of rationality in terms of means/end relation has an *end* to be achieved. However, when we investigate into the nature of goals and the multifaceted nature of human actions we understand that it is not all that simple to understand rationality in terms of goal-means relationship.

#### 2.1.1.3.1 The Complex Nature of Goals

Due to the complexity involved in *the nature and formation of the goal itself* it seems to be inadequate to see rationality only in terms of goal-means relationship. According to Hempel, an action can be shown to be rational if it has the highest probability of bringing about the desired end. This view involves knowledge about the desires of the agent. If that is the case, then ***some problems***, subtle though, arise in such a claim: ***First***, there is no unbiased and certain method to learn about or to judge the aims of the agent **a)** A given action may have many goals and one goal may involve many actions; **b)** The person himself/herself is not aware of all that goes on in the mind; **c)** An action may have expressed and unexpressed goals. He/She may be dishonest or may not like to reveal the hidden agenda of her actions. (e.g. It is like doing some charitable activity with the explicit goal of helping the needy, but with the implicit goal of basking in some self glory), and **d)** Emotional factors, religious ideologies, value systems, personal and social commitments play a very big role fixing up one's goals. Without desires, passions there can't be any aim at all in life. Very often the society lacks strict parameters and universal standards to measure them, especially in the grey areas.

***Second***, since all our goals in life are often inter-dependent it is not easy to fix upon the validity and the quality of a goal in isolation, and this reflects in determining the rationality of the action itself. The end must be coherent with one's other goals in life. A rational action is the one which enhances the prospects of satisfying our central goals in life, rather than interfering with it. So an action can't be taken in isolation to study its means/end relationship. I can think of an example: a youngster wants to have the experience of taking some narcotic drugs. But although that action may fulfil the goal of having such experience the very action does not seem to be alright given the welfare of the whole of life, especially in case she gets addicted to the habit. And ***Third***, if reason requires acting for the best, many other questions arise – What is the best? What things are of value? And not only that, one may further ask Whose best? The agent's? Of the agent's beloved? The society's? All humans? All sentient beings? and so on. All these are not a simple matter to be settled easily. ***And finall,*** as Nathanson[130] points out, limiting rationality to the success of realizing the intended goal would do a big harm to a whole lot of human activities. For, there can be cases where an action can succeed in realizing an agent's goals and ***still be irrational.*** [e.g. Someone wants to check the force of gravity by jumping from the 10$^{th}$ floor without adequate precautions. S(he) may fulfil the goal of the action, but life is seriously endangered]. [131]

### 2.1.1.3.2 Multi-dimensional Nature of Human Actions

Humans are so multifaceted that their actions can't be limited only to goal-means type of actions. Goal-oriented actions seem to be just one type of actions that humans undertake in their actual life situations. All of human actions, that are multi-dimensional, cannot be squeezed into one category of goal-means relation.[132] For some actions we are not aware of the goals at all. For instance, although one may not know the purpose of some religious

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[130] Nathanson, 1994, pp 105-109

[131] I'll return to Nathanson's ideas once again in discussing the notion of 'Reasonableness' in Chapter 5

[132] Max Weber argues that it is unfortunate that in modern society, in the realms of politics, economics, the law, surprisingly even in interpersonal relations, the means-to-end action seems to be given more predominance He lists four types of human actions ***goal-oriented action*** (where goal and means are rationally chosen); ***value-oriented action*** (where the goal may not be rational itself, but pursued with rational means, e g. like attaining salvation), ***emotional or affective action*** (which is rooted in emotional state of the actor, rather than in the rational evaluation of means and ends, e g like religious or fundamental sects), and ***traditional action*** (which is rooted in customary of thought, e g actions of Orthodox Jewish congregation) [Coser, 1996, pp. 217-218].

rituals yet one will be still performing them It is not rare to find children asking for the purpose of some rituals and the elders telling them to keep quiet and perform them; this is because often the elders themselves don't know the clear purpose (or goals) behind those rituals. The ancestors, of course, might have had some goals for those rituals, but the present elders are not aware of them, yet we consider those actions quite rational.

Some religious goals don't seem to be attained throughout one's life time There is no proof that it has been achieved in other's life as well For instance, having salvation as one's goal! It is, in fact, achieved after one's death.[133] If one confines rationality of an action only to the actual realization, or possible realization, in the case of salvation one does not even know that it is possible to achieve, as no human being has come back from death to tell us about it. So the rationality of the actions that are striving for salvation seems to hang in the air, unsettled this way or that way!

It is true that any action of a human being in normal circumstances will have some goals and that makes her/him rational. Be that as it may, all that I want to show that the account of rationality based on goal-means is not that simple and straight forward. One final example, I think, might capture the difficulty, which I am struggling to explicate here. An elderly gentle man, who receives pension from the State, is expected every year to produce a certificate to declare that he is alive. One particular year he fails to do so. The following year he goes with a said certificate. But to his dismay, there the authorities were demanding another certificate from the pensioner to show that he was alive the previous year. For the present certificate shows that the pensioner is alive now, but that is not the proof for his being alive last year. Now the action of **those officials may sound rational** as they try to fulfil their duty and to achieve their goal of keeping a proof that the man was alive the previous year. However intuitively we seem to know that **it is not reasonable to demand** the second certificate from the man because had he been dead the previous year he would not have been alive this year. Thus, my point is that life involves variety of actions, where goal-means

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[133] In the Indian Traditions the state of liberation (or freedom from all sorts of suffering) has been seen variously, as *mukti*, *apavarga*, *kaivalya* etc It is basically a realization that the self is different from the physical body. They speak of the possibility of attaining liberation (Mukti) while still alive or after death While living in body, the self (soul) attains *jivanmukti*, after the death of its body the liberated self attains what is called *videhamukti*. For instance, the *Sankhya* Philosophy of the Indian Tradition [See Chatterjee and Dhirendramohan Datta, 1984, p 284] I don't intend to go into all those intricacies here, except to note that even there the *videhamukti* seems to be more desirable

view may make an action rational but not reasonable, and what we need in life is, as Philip Kitcher[134] would argue, to be reasonable people rather than rational people

**2.1.1.3.3 Goal Vis-à-vis Science**

Speaking about goal-means relation in the scientific inquiries, one realizes that goal of science, unlike that of an individual, is to be understood in a much more complex manner, not as an attempt to attain fixed goal. Goal in science is not like the goals of the activities of day-to-day life. Scientific activity can't be seen as something motivated to achieving one particular clearly-articulated goal. It may not be always directed to a specific goal, but that does not mean that it is not rational. History of science shows us that i) Science is not purely a goal-governed activity; usually when the repeated attempts fail to achieve a goal, that action is renounced, but in science on the contrary, they try more hard or try in different methods to attain that goal; ii) Scientific activity is somewhat different from moving towards one fixed goal; the activity itself generates new dimensions and aims for its development. (Galileo, Newton and others replaced the then held practice of explaining reality in terms of occult qualities and adopted a mechanical view of reality But Newton himself, in order to explain gravity had to introduce a sort of occult elements; that is, he relied on some divine powers to explain the action-at-a-distance; thus though he had not renounced the general goal of providing mechanical view of nature, yet he had to shift / change his goal for a specific purpose). The context itself imposes certain requirements or conditions, like the need to abide by the religious principles in vogue that time This shows that the goal of science is constantly modified by the circumstances, in which it has its being and moving.

Even if there is one grand pre-fixed goal for science, at no point of time one can claim the goal of science has been achieved; suppose that goal is achieved one day the activities of other scientists, say of the following generations, seem to be redundant. Down the centuries science shows that it is an on-going activity; it is never able to reach the already one fixed final goal due at least to two reasons: i) one fixed goal is not given to the scientific community; dimensions of goal keep changing in relation to the realms of actual practice; and ii) Goals of scientific inquiry are such that they can't be attained by one or two groups

[134] Kitcher, 2000.

in a specified time-frame. It requires a very long process and it needs the collaboration of diverse groups, from diverse regions for a long period of time. For instance, the Human Genome Project to unravel the mysteries of the genetic make up of humans or the Space Mission to trace out the presence of life in the extra-terrestrial or extra-solar domains, has been going on for several years, with the collaboration of hundreds of experts from the various parts of the globe.[135]

#### 2.1.1.3.4 Goal of the Institution, not of an Individual Activity

Science is not just one single homogenous inquiry, rather it is an institution Since science is an institution (structure) the whole institution as such represents the goal. Max Weber points out that the choice of problems, in both social and natural sciences, is always 'value relevant'. For him, "There is no absolutely 'objective' scientific analysis of culture or... of 'social phenomena' independent of special and 'one-sided' viewpoints according to which – expressly or tacitly, consciously or unconsciously – they are selected, analyzed and organized for expository purposes" [136] He goes on to argue that the difference between the social and natural sciences is not in any of their special methods of investigation inherent to them, but they differ only in the aims and the interests of the scientists. There are lots of similarities between these sciences, like, total explanation is not possible in both sciences, and both involve abstraction from the multidimensional aspects of reality.[137]

To decide upon the rationality of an action mere analysis of goal is not enough, but the conditions/requirements of the institution within which science functions. In a complex activity the failure (or difficulties) to achieve a goal does not imply the activity is irrational. (For instance, a good government, a harmonious society, removal of poverty and various discriminations in the society may not be satisfactorily achieved in a society, but this does not mean that actions with that aim are irrational). Further, some goals are not achievable, not only in practice, but even in principle For instance, justice or equality - which is not possible (not only practically speaking) to attain in its fullness in a political realm; it is

[135] When we include these non-rational features of psycho, socio and political dimensions of the goal of a scientific endeavor, an action may not be rational according to the strict requirements of the Received View, but still it *need not be irrational*, for that action can be *certainly reasonable*, in a Comprehensive Account of Rationality in Science, as I will argue in the Chapter 5.

[136] Shils, and Henry Finch (eds.), 1940, p 72

[137] Coser, 1996, pp. 219-20.

impossible also in principle, because the yardsticks or requirements of justice may change from time to time within political systems and across various political systems Often each activity is seen as rational not with the realization of its goal but whether it sets the step for further practice towards the realization of that goal. Therefore goal-action may not be the right way to address the issue, rather the issue of rationality must focus on the aspects of goal-institution relationships.

### 2.1.1.4 Hempel – A Bridge between Logical Positivism and Kuhn

Hempel, on the one hand, reformulates logical positivism's account of rationality in order to include socio-cultural elements in the account of rationality, and on the other he tries to correct Kuhn by showing that the considerations of a goal (and the means to achieve it) of the scientific activity lay down restrictions upon the desiderata so as to make them necessary and sufficient norms for scientific rationality. Hempel rightly shows that the accounts of logical positivism and Popper are incompatible with actual practices of sciences. Therefore the normative account has to take note of the actual practice of science. At the same time, he argues that a major lacuna in the Kuhnian position is a result of not making a distinction between the explanation of behaviour of the scientists and the issue of justification. It is true that desiderata are insufficient in theory choice; and these don't provide any algorithmic procedure for science practices. However there are conditions of goal; the goal lays down restrictions upon the scientific procedures and acts as motivating reason or direction. Therefore, for Hempel, science is not an inquiry where 'anything goes'. We need context to reconstruct the rational account of science He comes out with a new account of rationality, which he names as **'objectivist but relaxed rational reconstruction'**, which can be seen as a bridge between logical positivism and Kuhn.

### 2.1.1.5 'Relaxed but an Objectivist Construal of Rationality' – More Relaxed than Objective?

As Hempel is aware that due to the problem with the nature of desiderata proposed by Kuhn a totally objective account of scientific rationality is not possible, he accepts, 'a relaxed but an objectivist construal of rationality'. For, *till late 1970s,* Hempel maintained a strict list of requirements for scientific rationality For instance, in "Scientific Rationality: Normative vs.

Descriptive Construals,"[138] he demands that scientific procedures are precise to make a theory choice which is unambiguous at all times, and these procedures follow strict and explicit norms and these rules are followed for advancing scientific knowledge. He also believed in the continuous growth of science· "(the new) theory does not simply refute the earlier empirical generalizations in its field; rather, it shows that within a certain limited range defined by qualifying conditions, the generalizations hold true in fairly close approximation"[139]. He views the growth of science a sort of cumulative growth as he believes that the new theory is not only more comprehensive but also the old theory is a derivative of the new one, so much so that the new one is a kind of special manifestation of the old one. However *by the middle of 1980s,* we see a sort of liberalization in his demands, as he maintains that the methodological principles which don't refer to psychological or sociological aspects are not desirable[140] and he adopts a *relaxed objectivist construal* Thus, according to Hempel an ideal rational account of scientific inquiry must involve both the ***descriptive*** (explaining) and ***prescriptive*** (justifying) accounts of scientific enterprise. An account may justify ***why an agent followed certain rules*** to attain a particular goal, but this need not explain ***why the agent chose to act in that way*** So we need an explanation to that effect For him, therefore, "An account which does possess this double aspect of explanation and justification might be called an *ideal rational account*",[141] and he calls it 'explanatory-normative methodology' (E-N methodology). Richard Kitchener also has the same the view, as he argues that "one will not simply *describe* what it (critical philosophy of science) is, what its epistemology, ontology and ethics are .. But neither will one *prescribe*... what it ought to be".[142]

This approach seems to be reasonable. However, according to Fetzer, though Hempel finds some commonalities between the normative and pragmatic methodologies yet he seems to be inclining more towards a normative methodology. So he evaluates Hempel as follows "The most important lessons of Hempel's enduring legacy must be that scientific standards cannot be derived from descriptions of its practice alone".[143] However, I personally seem to think that Hempel's account is more relaxed than normative. Due to the inconclusive nature

[138] Hempel, 2001a, in Fetzer (ed ), 2001
[139] Hempel, 1966, p. 79.
[140] Hempel, 2001b, in Fetzer (ed.), 2001
[141] Hempel, 1998, p 454.
[142] Kitchener, 1992, p. 19
[143] Fetzer, 2001, p. xxxii.

of the desiderata (as pointed out by Kuhn), Hempel argues that the desiderata provide only a relaxed notion of rationality and he claims that the conditions of goal are able to provide an objectivist construal of rationality. But I feel his latter claim is debatable. With all the problems with the goal-means notion of rationality, as we discussed earlier, one can see that the goal-means thesis of Hempel does not seem to do the job what he attributes to it. Therefore I tend to look at his relaxed objectivist construal as something 'more relaxed than objective'.

Having seen some critical remarks on Hempel's ideas we now move on to have a close look at the those of Popper.

### 2.1.2 Karl Popper: A Fallible Falsificationist!

Popper, due to his well-developed theory of Falsificationism, emerges as a staunch proponent of rational model of science. That theory, for Popper, achieves many things with one shot: it solves the perennial problem of induction; it demarcates between science and non-science; and it gives a strong rational footing to science. But with a bit deeper analysis we find Popper's claims for scientific rationality run into many difficulties.

In this Section I look into some of the limitations of the theory of Falsificaitonism and to assess the viability of Popper's claim to have dissolved the problem of induction.

#### 2.1.2.1 The Limitations of Falsificationism

The theory of Falsificationism might seem to be acceptable at the first sight as it claims to guarantee conclusiveness (in falsifying), unlike verificationism which can give us only probability. However on a closer analysis, one becomes aware that there is an ocean of criticisms from all possible sections. As one commentator puts it, "there are many problems with his (Popper's) account of progress through Falsificationism, (for) ... some kinds of scientific evidence, including probabilistic evidence, are unfalsifiable and... in the lab, scientists often ignore falsification".[144] Newton-Smith sounds rather blunt in branding

[144] Taylor, "Why Science Matters", 2006. See: http://www.sirc org/articles/why_science_matters.shtml

Popper as 'the irrational rationalist'[145]. It is because i) Popper's method of *Conjecture and Refutation* is not able to produce theories with greater *verisimilitude*, in fact, falsification is not only helpless it even "involves a grave distortion of actual scientific practice"[146] and ii) the relationship between the goal of science and the method of science, which is essential to claim rationality in science, can't be established. Let me now consider some of them here:

**a)** A scientific theory or a statement is a very complex one in reality. So it is not that easy to falsify it. As Duhem-Quine show that a single falsifying instance can't falsify the whole theory, as any theory is a collection of many hypotheses. Not all the theories are as simple as 'All elephants are black', for, theories are interconnected and no theory would be established or disproved in isolation and hence the conclusive falsification is made very difficult. So given a falsifying observation statement it may be the case that one of the auxiliaries or initial conditions is false. The falsity cannot be automatically attributed to the hypothesis in question. So the hypothesis can be retained in spite of a falsifying test by modifying the auxiliaries or the initial conditions. This, in fact, can keep on going and at no point one can strictly falsify a hypothesis. [147]

**b)** We have many examples in the history of science to show that even after falsification a particular theory is not just discarded They just temporarily shelf it aside and hope for a better explanation in future. After a while it may be revived and gets accepted, tentatively though, by the scientific community. Meanwhile they make *ad hoc* modifications to keep the theory going. Therefore it is not proper to demand an immediate rejection of a theory when it is falsified. As Lakatos quotes the example, Mercury's anomalous perihelion was not taken as a falsifying instance of Newton's theory of our planetary system. As a result Newton's theory was not rejected, rather they kept aside the anomalous instance to be considered later and *ad hoc* solutions were given to save the theory[148].

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[145] Newton-Smith, 1996, 1981, p 44
[146] *Ibid.*, p. 45.
[147] Chalmers, 1992, p. 64.
[148] Lakatos, 1974, p 247.

**c)** In history, there are many episodes, which can be adequately accounted for, neither by the Inductivists nor by the Falsificationists. For instance, the Copernican Revolution took about 150 long years to be established. In 1543 Copernicus published his helio-centrism theory and it was confirmed by Galileo's telescope only in 1609. Hence the acceptance of the Copernican theory did not take place at one instant of falsification as Popper would have us believe

**d)** Further, the scope of falsificationism is limited in the sense it cannot be employed in the case of probability statements and analytic statements. For the technical falsifiability seems to be unhelpful in such cases. Popper[149] makes the distinction between *logical Falsificationism* (referring to the logical possibility of falsification in principle) and *technical Falsificationism* (referring to a practical proof of falsity). Probability statements are neither falsifiable nor verifiable in the logical sense. They are not verifiable, for the usual reasons as any other universal generalizations and not falsifiable either, because in a throw of a coin the probability for 'head' is ½, that is, both head and tail have equal frequency. Though we have a series of throw and in all of them we get head; yet the probability of getting tail is not ruled out. So with a finite number of throws of a coin we can't falsify the probabilistic statement. Only infinite sequence of events can contradict a probable estimate and it is not meaningful to speak of infinite number of sequences. However science (Physics) has grown successful in the predictions derived from the hypothetical estimates of probabilities by a method called 'practical falsifiability. That is, though the hypothetical probabilities can't be fully falsified, practical falsification is achievable by a methodological decision to rule out highly improbable events.

**e)** Problem with having falsifiability as the criterion of demarcation of science and non-science: any statement which is falsifiable need not automatically be scientific. As Putnam[150] gives the example, "if anyone puts a flour sack on their head and raps the table 99 times then a demon will appear' – this statement clearly has epistemological character, logical property and falsifiability too. But it is hardly scientific!

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[149] See: Popper, 1992, p. xxii
[150] Putnam, 1981, p. 197.

f) Falsification does not seem to be very different from verification. Popper shuns verification as it is impossible to conclusively verify a universal theory. The same difficulty seems to arise in the case of falsificationism too. Any theory depends on auxiliary hypotheses and initial conditions. Therefore it is always possible to have alternative assumptions about the initial conditions to 'save' the theory. Only the combination of theory, auxiliary hypotheses and initial conditions can be falsified, but unfortunately, as we saw above (in b), this falsificationism cannot automatically be transferred to the theory at hand! Rom Harre and Michael Krausz clearly bring out the problem of asymmetery between the process of confirmation and falsification, when they analyse Popper's ideas:[151]

> Furthermore it (Popper's ideas) suffers from the general problem of methodological fallibilism that the supposed asymmetry between confirming a hypothesis as true and disconfirming it as false is difficult to defend. While the former seems to depend on the inductive assumptions that the future will be like the past in relevant respects, itself in need of inductive support, the latter seems to depend on a related assumption that the future will not be like the past in relevant respects, an assumption equally in need of inductive support.

Therefore, an in-depth analysis of Falsificationism clearly brings out some of the insoluble problems that plague the Popperian account

### 2.1.2.2 Problems with Popper's Denial of Induction

Popper ignores inductive reasoning as unnecessary: "There is neither a psychological nor a logical induction. *Only the falsity of the theory can be inferred from empirical evidence, and this inference is a purely deductive one*"[152]. For him science is rational primarily because it is a goal-oriented enterprise and it strictly follows a method to achieve that goal. Nothing but *truth* is the aim of science. But sadly enough the final truth is always beyond its grasp. Any new theory, if it is genuinely a scientific theory, can take us only nearer to truth, called *verisimilitude*. In this process inductive reasoning will not be of any help as it would not lead us to any conclusive truth. The very notion of verisimilitude, which is very dear to

[151] Harre and Michael Krausz, 1996, p 71
[152] Popper, 1963, p. 55.

Popper to affirm that science is rational, progressive and worth the while, itself is in danger without some sort of inductive metaphysics[153]. Lakatos takes pains to elaborate on the disturbing implications of Popper's verisimilitude for the problem of induction. The actual dividing line between classical scepticism and Popper's fallibilism is rather thin So Lakatos observes: "The difference between total scepticism and humble fallibilism is so small that one frequently feels that one is engaged in a mere verbal quibble..."[154]. So it would do well for Popper to realize that some form of inductive process is crucial in the scientific process.

Science needs something more than mere observation and experiments. If it confines itself to the domains of empiricism it cannot justify its very existence. For the very principle of induction, which is supposed to be the backbone of the scientific enterprise, cannot be derived from experience and Hume has to be given the credit, as Bertrand Russell stresses, of bringing this fact to light: "(The principle of induction) must therefore be, or be deduced from, an independent principle not based upon experience. To this extent, Hume has proved that pure empiricism is not a sufficient basis for science"[155].

It is true, inductive reasoning is not without problems either. But going to the extent of effacing inductive reasoning (if at all possible!) from the very enterprise of science will land us in scepticism. Of course scepticism has its own strings of difficulties. Nevertheless without induction it is well nigh impossible to show that there is a growth in science and that science is a rational enterprise. It is highly likely that science would be empty, if inductive reasoning is completely ruled out. It would be even suicidal for science to reject inductive process. As Salmon puts it, ".. that science is inevitably inductive in matters of intellectual curiosity as well as practical prediction. It *may* be possible to excise all inductive ingredients from science, but if the operation were successful, the patient (science), deprived of all predictive import, would die"[156].

Finally, for Popper rationality is critical debate. The core of Popper's philosophical breakthrough is, as Stefano Gattei has it, "rationality requires not foundation, only critical

[153] By inductive metaphysics I mean a framework of metaphysics where one is allowed to have the inductive reasoning as a valid form of reasoning
[154] Lakatos, 1974, p. 260.
[155] Russell, 1974, p.699.
[156] Salmon, 1998, p. 443.

dialogue: it is the end of foundation philosophy".[157] In the 20th century, the debate over foundationalism plays an important role, people either deny it (and hence scientific knowledge is unjustified and therefore irrational) or hold that scientific knowledge is a justified belief, while weakening the idea of truth as correspondence with reality, or the idea that justification shows that a statement is true. Gattei falls on Socrates, who said that we are living in the twilight zone between knowledge and ignorance, to claim that "the failure of foundationalism does not drag epistemology with it. The twilight zone between knowledge and ignorance is an ideal well worth holding on to"[158]

With Popper's denial of induction and dependence on the scientific community for rational decision, scientific methodology seems to be rendered to be void of rationality altogether. Anderson raises an important query: "Since Popper allegedly has rejected induction and relies on the scientific community to reject and accept basic statements, the scientific methodology inevitably loses its rational component."[159] Nevertheless, though Popper claims to have solved the problem of Induction, in the theory of corroboration it makes a slow and subtle reappearance. There is no obvious difference between the view that a theory depends for justification on the occurrence of confirming instances ***and*** the view that it depends on the failure of the falsifying ones to occur. Hence Popper does not seem to be proper in denying or successful in solving the problem of induction. In fact, science needs inductive reasoning and, of course, it never makes science less rational.[160]

Having seen the critical remarks of the proponents of rational model of science, now in the next section I'll elaborate the critical evaluation of the proponents of non-rational model, namely, Kuhn and Feyerabend.

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[157] Gattei, 2004, p. 464.
[158] *Ibid.*
[159] Soren Bo Anderson, "Relativism". Source. www.phys.port.ac.uk/what/example.htm
[160] In Chapter 5, I take up the issue of inductive reasoning again to argue that it is a happy legacy from the traditional account of rationality in science

## 2.2 ASSESSMENT OF THE NON-RATIONAL MODELS OF RATIONALITY IN SCIENCE

I evaluate the views of the proponents of the non-rational model of rationality in science, Kuhn and Feyerabend. I focus on those aspects that are relevant to our purpose here.

### 2.2.1 Thomas Kuhn – A Rational Relativist!

Kuhn's serious and systematic study of History of Science has drastically changed the hitherto held picture of science. Science is now basically seen as a social enterprise. Here I assess his ideas that are directly relevant to our purpose, namely the new picture of science, the notion of paradigm and the issue of theory choice.

#### 2.2.1.1 Science – As a Social Enterprise: Kuhn's New Picture of Science

Issues of rationality and those of reality, though not unrelated, are the main pre-occupation of the contemporary philosophy of science According to Hacking, Kuhn's book, *The Structure of Scientific Revolutions,* "produced a decisive transformation and unintentionally inspired a crisis of rationality".[161] Before Kuhn, the prevalent idea of science was that each new theory in the successive periods was better than the older one, adding more to the knowledge content. As the latter theories were more comprehensive the scientific growth was a continuous one. The goal of science was to arrive at the whole truth, whatever it might have meant: "Each successive theory's explanation was closer to the truth than the theory before. It was the truth, and the prediction and control that came with it that was the goal of logical-empirical science".[162] But for Kuhn it is not so. Arriving at Truth, whether full or partial, is not the goal of science. Truth does not pull science forward but only the puzzles push it ahead. Puzzle- solving is the goal of science, as noted earlier.

For Kuhn the subject of science is the community of the scientists, committed to values, whereas for logical positivism and critical rationalism, the subject of science is the

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[161] Hacking, 1999, p.217.

[162] David J Voelker, "Thomas Kuhn Revolution against Scientific Realism" In: http://history.hanover.edu/hhr/94/hhr94_4.html

individuals following rules (algorithms). For the latter theory choice is done with well-defined rules; so anyone pursuing it rationally will eventually come to the same decision; it is a rational decision. For Kuhn the theory choice is not strictly rule-governed, rather "the decisions are influenced by the cognitive values to which the respective community is committed. The important point here is that a decision which is *influenced* by values is not necessarily *determined* by them This implies that different individuals influenced by the *same* values may come to *different* decisions" [163] He was probably the first one to being out the interconnectedness and the interdependence of Philosophy, History and Sociology of Science in a very emphatic manner. They need one another for mutual enrichment. The processes within a scientific community, which finally results in an authoritative consensus is termed as 'negotiation' and "Negotiations in science, like those in politics, diplomacy, business, and many other aspects of societal life, were widely said – especially by sociologists and political scientists – to be governed by interest, their outcome determined by considerations of authority and power".[164]

### 2.2.1.2 Kuhn – In the Eyes of His Critics

Alexander Bird[165] presents a much precise and balanced evaluation of Kuhn's ideas. The very cyclic understanding of science, as normal science – crisis - revolution – normal science, is disproved by history. If normal science and revolutionary science are taken as the two extremes, most of science is in between, neither normal nor revolutionary. Most of the revolutionary sciences did not involve any bloody-fight; for instance, perhaps we can cite Crick's unraveling of the DNA structure as a bloodless coup Many of Kuhn's critics, like Hoyningen-Huene[166], find fault with Kuhn that he does not give any explicit theory of meaning in his *Structure*. Others[167] have tried to present Kuhn's philosophy in broader philosophical angles and evaluate his positions with respect to a large range of philosophical concerns. Moreover, Suppe[168] opines that Kuhn loses his influence in contemporary philosophy of science due to many reasons: such as, Kuhn's modifications and clarifications of his positions seem to exhibit his inclinations towards a sort of neo-positivistic view; the

[163]Hoyningen-Huene, 1992), p. 492
[164] Kuhn, 2000f, in Kuhn 2000a, p 8
[165] Bird, 2000
[166] Hoyningen-Huene, 1993
[167] For example, Horwich, 1993
[168] Suppe, 1977a, p 647-8.

limited role for rationality in his understanding of science, his distinction between normal science and revolutionary science seems to be increasingly becoming more and more untenable; and above all his epistemological and ontological outlook sadly reduces scientific knowledge to nothing more than just a collective beliefs of a given scientific community.

### 2.2.1.3 Paradigm - Still Problematic

After about 15 years of the publication of *SSR*, Kuhn seems to have realized that the concept of paradigm grew out of his control. He agrees, paradigms were supposed to be held just as exemplary problem solutions, "but they expanded their empire to include, first, the classic books in which these accepted examples initially appeared and, finally, the entire global set of commitments shared by the members of a particular scientific community."[169] All such expansions in the limits of the notion of paradigm led to lots of confusion. To avoid many such misunderstanding of the notion of paradigm, Kuhn proposed the idea of *disciplinary matrix*. But unfortunately, the analysis of such new proposals shows that, though some of the earlier misgivings were solved, many of the puzzles regarding paradigms were left untouched[170]. For instance, Carl Matheson opines that many interpretations of Kuhn's ideas, very divergent at that, are possible, perhaps "because the internal consistency of Kuhn's positions still stands in some doubt"[171]. Kuhn's distinction of normal science and revolutionary science is not so problematic as the description of the transition from one paradigm to another. The way he deciphers the transition projects him to be non-rational, if not irrational! The transition is not something which is rationally deliberately chosen, rather a sort of conversion experience. As Carl Matheson puts it, "the transition between paradigms is best explained sociologically, in terms of institutional might, polemics and perhaps generational replacement" [172].

Kuhn claims that a paradigm is not rejected unless another paradigm is simultaneously accepted by the scientific community. He argues that when a paradigm is rejected it is in fact

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[169] Kuhn, 1977d, in Kuhn 1977b, p xix

[170] For instance, Shapere comes out with a sharp criticism against Kuhn's attempts to solve the problems of 'paradigm'. See: Shapere, 1972, pp 706-709

[171] Matheson , "Historicist Theories of Rationality" In http //plato stanford edu/entreis/rationality-historicist/

[172] *Ibid.*

a decision to accept another.[173] However Mark A. Stone[174] points out that this is not the case; Stone differentiates three types of discoveries: spontaneous, implicit and directed and argues to show that Kuhn's claim may be true for the first two types of discoveries, but not for the directed ones. He shows Kuhn's own example of Copernican Revolution does not subscribe to this claim, because, by Kuhn's own admission, Copernicus has rejected the existing paradigm even without any successor at hand.

Thus the notion of paradigm, the transition between paradigms and the extent of its influence on the respective scientific community are not clear even with the later Kuhn.

### 2.2.1.4 Theory Choice – Not a Cake-Walk!

Kuhn's insistence upon theory-ladenness of observation and meaning variance thesis had naturally led him to view knowledge as a matter of shared judgment of a given community. In his own words, "I regard scientific knowledge as intrinsically a product of a congeries of specialists' communities"[175]. Because of this many authors[176] accused him of making science a totally irrational enterprise. In the enlarged edition of *Structure*,[177] he tries to soften his doctrine of theory-ladenness of meanings, whereby he maintains that disciplinary matrix is that which determines the meanings of terms in such a way some shared interpretation of some of the terms found in both theories is made possible.

The desiderata of Kuhn, namely, *accuracy, consistency, scope, simplicity, fruitfulness of the theory, etc*,[178], as he himself, as noted earlier, was aware of their limitations and ambiguities, don't also seem to make the theory choice completely smooth and rational. Kuhn's proposal to take the desiderata as shared values did not solve their inadequacies. For, as Paul Hoyningen-Huene puts it:[179]

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[173] Kuhn, 1970a, p. 77 and p. 79
[174] Stone, 1991, pp. 177-85.
[175] Kuhn, 1970b, in Lakatos and Musgrave (ed ), 1970a, p 253
[176] For instance, Schefler, 1982; Shapere, 1964a, 1964b and 1972).
[177] Kuhn, 1970a.
[178] Kuhn, 2002, p. 422.
[179] Hoyningen-Huene, 1992, p 493

> Each of these values can be interpreted somewhat differently by different members of the same scientific community. For example, what simplicity means exactly and which aspects of a theory are primarily meant is not uniquely fixed by the commitment of a community to this value... two cognitive values, can, in their application, contradict each other which makes relative weighing necessary. But their relative weight is, again, not determined by the commitment of the community to the list of values.

Hempel too finds the desiderata to be problematic in many ways; for instance, the taste and priorities of scientists vary with regard to the items in the desiderata. So "commitment to those norms does not ensure a uniform decision as to which of two theories outranks the other, by way of satisfying the entire set of desiderata"[180].

Due to this subjective element playing a big role, Kuhn, unfortunately, is accused of making theory choice (scientific enterprise) an irrational enterprise. Therefore, for Kuhn, science is largely shaped by powerful propaganda, personal conversions and the demise of opposing voices. One is not able to see any objective and precise evaluation of the achievements or claims of scientific theories.[181] But Kuhn argues that this is not a weakness for science and one need not remove this; any theory- choice will always be a risk; when the full implications, both positive and negative, are not fully known, it is vital for scientists to give a try; different scientists must try different theories, so this disagreement among them is very significant for the growth of science. The individuals may disagree but **the consensus is based on the collective system of cognitive values**, but finally the 'the community of specialists' ensures the choice of a theory over another. [182] Therefore, for Kuhn, the **question of rationality of theory choice** must be raised in the context of the community, and not in the context of individual scientist. Thus the role of the community is very important in arriving at consensus, especially in modern scientific research.[183]

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[180] Hempel, 1998, p.457
[181] Hoyningen-Huene, 1992, p. 494
[182] Kuhn, 1970a, p 200
[183] In Chapter 5, while discussing my notion of Comprehensive Understanding of Rationality of Science, I take up this consensus of the scientific community, as one of the features of Reasonableness in science I have an elaborate presentation on this showing, for instance, how the community plays a role in deciding what an observation is in modern science.

### 2.2.1.5 Kuhn – A Rational Relativist!

Kuhn[184] lists and discusses in some detail desirable values for theories, like accuracy, consistency, scope, simplicity, and fruitfulness. The five criteria are at work both at normal and revolutionary periods. These criteria, which are used to evaluate scientific theories and structured lexicons, are constitutive of science and scientific rationality. These criteria enable one to differentiate two paradigms to see which is better. Therefore the **threat of relativism** is removed: "For me, therefore, scientific development is, like biological evolution, unidirectional and irreversible. One scientific theory is not as good as another for doing what scientists normally do. *In that sense I am not a relativist*".[185] He is aware that those criteria may not guarantee full agreement; yet they help for a better judgment of a theory[186].

However, though he claims that he is not a relativist but due to the problems in theory choice relativism is not fully ruled out; at the same breath we need to add that the desiderata and the consensus in the scientific community prevent him to be totally irrational either. Therefore, it is more fitting to see him as ***a rational relativist!***

### 2.2.2 Feyerabend: An Advocate of Rationality in Science with a Human Face!

Feyerabend is one of the most influential critics of science who made ripples in both the scientific and humanist circles. In this section I devote some time to see how he is kept at the extremes, by his critics, of high appreciation or depreciation. Then I asses his challenging claim that there is no methodology in science.

### 2.2.2.1 Mixed Reactions over Feyerabend's Contributions

Feyerabend anticipated strong reactions for his thought-provoking work, *Against Method* (*AM*), from different quarters. He, in fact, was criticized as cheating people, misapprehending Galileo, making false assurances and even making himself stupid in the

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[184] Kuhn, 1970a, p. 158, 199, 262, Kuhn 1977e, in Kuhn 1977b, 321-2
[185] Kuhn, 1970a, p. 264. Stress mine
[186] Kuhn, 2000f, in Kuhn 2000a, p. 105

eyes of the intellectuals. He himself was aware of some inadequacies of that book. In his own words, "*Against Method* is not a book, it is a collage. It contains descriptions, analyses, arguments that I have published, in almost the same words, ten, fifteen, even twenty years earlier"[187]. As he expected there were strong, but mixed, reactions over his ideas.

Gonzalo Mune'var gladly declares that Feyerabend is the most important thinker of the 20th century, especially as humanity seems to look back to evaluate all that has gone in that century. In introducing the volume on *Beyond Reason*, Mune'var says that for some Feyerabend is a clown and for the others a great philosopher; but he is "decidedly of the second opinion that is becoming general around the world as this century comes to an end and history begins to cast its appraising eye upon the intellectual harvest of our era".[188] Science can no more be treated as a body of rational disembodied knowledge. That is why, a decade back, Elzinga and others strongly realized that "in the future, graduate programmes as well as undergraduate curricula will have to devote more time to ethical topics, and also to enlighten the students on the ways that political interest intervenes into science"[189]. The gender issues in science, the concerns of the environment, the apprehensions involved in biogenetic technologies and many other such domains highlight the moral responsibilities of scientists as social agents, who are supposed to be accountable, not only for the present but also the future generations! All these elements were clearly and powerfully brought out by Feyerabend even in 1970s.[190]

Some, on the other hand, are very tough in attacking Feyerabend to call him a childish thinker, who is not serious about his own claims. For instance Herbert Schnädelbach thinks Feyerabend is a playful man; he quotes Feyerabend to have diluted the claim about 'Anything goes', as it was never meant to be a principle, but only "a somewhat joking portrayal of the situation of the rationalist who wishes to have universal principles but who

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[187] Feyerabend 1995, p 139 He, in fact, regretted greatly for having written that book He even thought that he had been sick when he wrote the book His personal life was in a very bad shape That book made him totally defenceless (p.147)

[188] Mune'var (ed.), 1991, p. ix In fact it is a very good collection of 25 essays on Feyerabend's contributions, it ranges from glorifying him as a rarest of the rare thinkers of the 20th century and accusing him to be the most dangerous man of humanity For example, Vine Deloria, in "Perceptions and Maturity: Reflections on Feyerabend's Point of View", acclaims that Feyerabend reveres all the peoples of the globe with dignity Whereas on the other hand Jospeh Agassi, in "As You Like It", goes even to make a scathing personal attack on him accusing him of supporting the Nazi ideology

[189] Elzinga, et al., (eds ), 1990, p 9 As quoted in S Richard Jennings, 1992

[190] Feyerabend, 1978

has to increasingly empty them of all contents when faced by the material I offer. 'Anything goes' is all that remains".[191] Feyerabend is projected to be a staunch proponent of irrationality in science, or at least he is made to declare that science is not guided by any rational element but power, propaganda, prejudice.

### 2.2.2.2 Feyerabend in a New Light!

Now there are efforts among the scholars to remove the erroneous understanding about Feyerabend, by reconstructing his arguments to show that Feyerabend (at least the later one!) is not against rationality in science. He argues for rationality in science based on certain values. Robert Farrell is one among such sympathizers of Feyerabend, who try to show that Feyerabend's rationality is to have a fine balance among the competing (even incompatible!) methodological demands. He projects Feyerabend to have a 'tightrope-walking rationality'. For, **though Feyerabend denied any universal 'rules' of rationality yet he recognized temporal values that are universal, like comprehensiveness, empirical accuracy, fruitfulness and testability**. Therefore, Farrell argues: "The ultimate practical necessity of rationality is to attempt to balance the irreconcilable demands of the values of rationality, hence the title: *Tightrope-Walking Rationality*"[192]. Further, Rationality involves something more than mere adherence to rules; rationality is often identified by a rationalist with always acting in compatibility with certain strict rules and regulations. But Herbert Schnädelbach wonders that if 'adhering to strict rules' is what makes one rational, then computers, trained bats, and even washing machines cannot be excluded from being rational[193].

Feyerabend is against only the strict traditional understanding of rationality; in a strict rationalist point of view, science must fulfil at least one of these three theses[194]: the logical thesis, the factual-foundational thesis and the methodological thesis. These theses would not

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[191] Feyerabend, *Erkenntnis fur freie Menschen* (Suhrkamp: Frankfurt, 1979), p. 87. As quoted by Herbert Schnädelbach, 1991, p. 434.
[192] Farrell, 2003, p. 3.
[193] Schnädelbach, 1991, p. 435
[194] Logical thesis claims that all our thinking must conform to logic in providing the structure of our knowledge; the factual-foundational thesis demands that there are indubitable sources of our knowledge and they exist; and the methodological thesis maintains that a scientific research must be performed according to the rules of an unchanging scientific method.

allow any room for subjective or rhetorical elements (like judgement, emotions, intuitions, reasonableness etc.) in scientific progress, as these would be considered 'irrational'. But Feyerabend's notion of scientific progress does have room for all these elements. Nevertheless science can still (and still) be rational. He was always trying to show that rationalism would have to be rejected by its own standards

### 2.2.2.3 Science Needs a Sort of Metaphysics

It is encouraging to see Feyerabend not ruling out metaphysics outright as meaningless. His understanding of empiricism, which attacks the traditional inconsistency condition and meaning invariance condition, does make room for metaphysics and ideologies. He makes it clear not only that our observational claims involve non-observational background elements but also no part of observations is free from it. As Newton-smith has it, " .. it is not that our observational judgments may have an ideological component, our observational judgments have no components that are not ideological"[195]. Therefore, Feyerabend is very well aware that without some metaphysical elements science would not be what it is today. In his framework of empiricism, we have a different understanding of metaphysics. Metaphysical systems can be looked as scientific theories in the making. Metaphysics, as an alternative, is desirable for a better criticism. If a metaphysical claim goes against a well-established scientific claim, the former can be taken as a new criticism of the given scientific claim. Alternative claims are very important for the purpose of criticism[196] Therefore, if whole of metaphysics is mercilessly ruled out it is very likely that the scientific theories themselves may transform into dogmas. It is not enough that an empiricist checks the knowledge claims only on the basis of observational evidence, rather she has to create many alternative theories, including metaphysical ones, to evaluate the original theory. So in short, "*a good empiricist must be a critical metaphysician*"[197].

[195] Newton-Smith, 1996, p. 139
[196] Feyerabend, 1998b, in Curd and J A Cover (eds ), 1998, p 942
[197] *Ibid*, p.944; emphasis mine.

### 2.2.2.4 Does / Can *Anything* Really Go?

Feyerabend seems to be doing the mistake of throwing the baby with the bath water! Yes, no fool-proof certainty is available with science and no universally accepted ahistorical single methodology is to be applied, but that does not certainly imply *anything goes*! One might even see a sort of rashness in jumping to a conclusion that anything goes! The failure of the inductive methodology and that of even of Popper's deductive methodology seem to have made him largely disheartened. He is in search of a method or a set of rules without any exception, but because he is not able to come across one, he turns out to be highly sceptical to declare 'any thing goes!' He is angry with the society which gives undue importance to science and makes science 'everything' for the society. So as a reaction to such a society he goes to the extent of denying any rationality to science at all.

No moderate rationalist would deny that some methodological rules have failed at some time or the other. We are not omniscient. We don't have any direct access to truths of reality other than the tools that are available with us. We need to somehow judge the achievements of science by the comparison of rules and methods available at hand. A historical analysis may find fault with one particular methodological rule but that does not justify denouncing all the rules. A historical investigation of science may "take up a single plank of the ship of methodology while the rest remain, for the moment at least firmly in place. An attack on a particular aspect of method presupposes method"[198].

### 2.2.2.5 No Methodology, No Rationality?

It is quite common among philosophers to think that scientific methodologies are theories of scientific rationality; for example, we can cite Lakatos, Musgrave, Worrall and so on[199]. Methodology is identified with rationality. Therefore one tends to impose one's understanding of methodology to evaluate the rationality of the past. But Curtis cautions that a historian must not use one's own modern methodology to evaluate the rationality of the

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[198] Newton-Smith, 1996, p. 134

[199] For instance, Kulka thinks that for Lakatos, methodology provides a rationality theory (See. Kulka, 1977, 325-43); Musgrave argues that various methodologies provide cannons of rationality (See Musgrave, 1976, pp. 181-208); and in Worrall's understanding a methodology has a direct relevance upon rationality or irrationality (See: Worrall, 1976, 107-79)

research programmes of the scientists of the past.. One needs to consider the scientists of the yester years in their own intellectual milieu. The methodology that the present historian arrives at now is the product of the intellectual contribution of the long generations of the bygone era. He makes an elaborate study on Darwin's understanding of methodology and rationality and concludes that we can consider the overthrow of creationism by Darwin and his "overthrow of the requirement for proven causes itself" as rational, "only if we decline to use our own methodologies by which we appraise the rationality and correctness of the revolution as a whole. We can see this only if we take into account the rationally changing methodologies of the participants themselves".[200]

Those who argue against any universal methodology in science, as Polanyi, Quine, Hesse, Kuhn, Wittgenstein and so on, put forward two sorts of arguments; *either* the principles of (non-universal) methodologies thoroughly underdetermine theory choice, and thus making the principle impotent; or they are so indistinct and confusing that they permit anything and every thing.[201] Similarly, Feyerabend also claims that very important scientists have produced very important theories by violating the well-cherished rules of their times. True, no one claims that all scientists are rational at all the times in all the matters. But only a few that too the trend-setters of modern science fit Feyerabend's description; as Laudan says, "It is not scientific charlatans he is describing; rather... the figures he is writing about have always been considered as the folk heroes of our scientific culture" [202], like Kepler, Copernicus, Galileo and Einstein who come across as persistent 'cheaters' in the game of science, as they always seem to go counter-inductively, just not bothering about even the glaring falsifying evidence. It is true, they all went against, or even modern progress would not have been possible had not they done so, but to make this exception a rule, that science always progresses, or has to progress this way, is a bit too much.

Further, some authors strongly feel that the historical case studies that Feyerabend undertakes are not historically accurate[203]. Even if one assumes that they all be true, still Laudan is convinced that Feyerabendian conclusions can't be justified. A serious study into his conclusions will easily reveal his confusions over the nature of methodological rules.

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[200] Curtis, 1986, p. 158.
[201] Laudan, 1989, p. 299.
[202] *Ibid*, p. 302.
[203] For example, see: Machamer, 1973), and McEvoy, 1975

Laudan proceeds further to analyse the situation: A legitimate methodological rule is that which optimizes the opportunities of achieving some cognitive aims. Therefore it can be criticized on two grounds; either **a)** a rule chronically fails to promote a certain goal, or **b)** it is less efficient than other rules. All that Feyerabend case studies show is that certain scientists at certain times promote the goals of science though they violated the given rules[204]. Further, a methodological rule is proposed to obtain a particular end.

Sometimes it may happen that the end is achieved by violating the rule. Laudan clarifies that when scientists support a given rule they are in no way claiming that all sciences must follow only that rule in all their endeavours, rather they are convinced that that rule ensures the achievement of goals than the violation of it[205]. In such violations we can only say that said rule is not the best for the desired end; or that rule may never work out to get the intended end. Only from a few successful rule-breaking events by a few scientists no universal conclusion can be drawn against methodology itself. Laudan wonders that Feyerabend's position is like that of some one decrying any treatment for cancer, just because a few cases of cancer spontaneously got cured without any medications. He raises a very strong objection to Feyerabend: "To move from the alleged failure of two of three methodological rules to the presumption that all methodologies are hopeless is *to engage in just that sort of naïve inductivism about which he is otherwise so abusive*" [206]

Feyerabend not only claims that great scientists have broken the well-accepted rules and methods to develop science and behaved in a way what modern philosophers would call irrational, but also that the rules ***had to be broken*** to attain scientific progress. Powerful scientists make up their own rules and standards as they proceed; it is because there is no over-arching rules about how to compare and evaluate scientific theories; so much so that scientists progress well "because they did not permit themselves to be bound by 'laws of reason', 'standards of rationality', or 'immutable laws of nature'".[207] Granted, the prevalent methods may be faulty; they may not be efficient; and one method may not be answering the questions of different disciplines. But science is always in need of new methods and not abolition of all methods. For as Herbert Schnädelbach explains science does need a method

[204] Laudan, 1989, p. 303
[205] *Ibid.*, p. 304.
[206] *Ibid.*, p. 305 & 306. Emphasis mine.
[207] Feyerabend, 1975, 190-191.

to subject it to the members of the free society; just because a few philosophers have the illusion that methodologies can be demolished one can't decry the methods permanently.[208]

### 2.2.2.6 Science – Not a Custodian of Rationality

In the normal parlance *science* is seen as the epitome of rationality, because science uses a special and unique methodology: therefore, to be scientific or to be an expert is to be rational. If any one comes out with a theory or a kind of new invention or a discovery, it is expected to look for its scientific basis. That is why, nowadays every discipline likes to claim its statements or principles are scientific in order to make it more acceptable to the people. The scientific character of the traditional natural sciences, like Physics and Chemistry, is appropriated not only by the Study of Politics and Society, but also by the Study of Historical Materialism, Administration and Library and the like; that is why today we also have, as C. Trusedell lists out, "Library Science, Administrative Science, Speech Science, Forest Science, Dairy Science, Meat and Animal Science, and even Mortuary Science"[209].

But such a received view of science and its methodology are being questioned in the recent decades. Still many top level scientists are convinced that they, as scientists, are the custodians of rationality. Daniel P. Moloney points out, "Stephen Jay Gould, Richard Dawkins, E. O. Wilson, Stephen Pinker, Daniel Dennett - all these have, in recent years, tried to leverage their credentials as scientists into positions as guardians of public rationality"[210] and since science is close to answering all questions, if any one is anti-science, she will be branded outright as 'irrational'.

Feyerabend's caution against absolutizing rationality is appreciable and meaningful. It is true and correct that scientists are not that rational and objective as the popular picture of

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[208] Schnädelbach, 1991, p. 438
[209] As quoted by Chalmers, 1992, p xvi
85. Moloney, "Questioning Everything?", in http://www leaderu com/ftissus/ft9811/opinion/moloney.html
86 *Ibid.*
87. *Ibid.*
88. Feyerabend, 1975, p. 295.

science makes us believe. We need to realize that the 'questioning-everything' attitude is not always at work in the scientific enterprise. It is not true to say that science arrives at every theory or inference through a process of scepticism. So, if one thinks that a scientific theory must be without any Cartesian scepticism and there must not be any logically possible alternative, "then there might not be a single meaningful scientific conclusion that we can call rational"[211]. Scientists do act upon many assumptions and suppositions, which cannot be put into a scrutiny of Cartesian methodological scepticism. Nevertheless this in no way makes science and scientists irrational, rather it only teaches us that logical certainty is not possible in scientific enterprise. Scientists also make as many assumptions, if not more, as any one else. Their assumptions often do go wrong, "especially when, like Feynman, they assume they know more than they do".[212]

Feyerabend maintains that the scientific activities are so varied that no common rules can be abstracted. The theories are so incommensurable that the preference of one theory over another is only a question of subjective ideologies and personal orientation. As long as the *accepting and rejecting of ideologies should be left to the individual*[213] it totally depends on one's ideology and not on any rational basis. He seems to accept that inconsistency can be one of the criteria to objectively decide that a theory is deficient. Therefore at least there is one factor which is not bound by one's ideology. However he does not have any problem with inconsistency, as inconsistent theories have brought progress in many cases. But Newton-Smith objects that "the fact that inconsistent theories have brought progress is not reason to revise logic by dropping the law of non-contradiction. Inconsistent theories have brought progress through their development into consistent theories"[214]

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[214] Newton-Smith, 1996, p. 128

### 2.2.2.7 Need for a 'Method' to attack Methods!

One cannot afford to deny the role of reason or method completely, neither in practical life, nor in science. Feyerabend is right in opposing scientism; but he goes to the extent of denying any dint of rationality in science. He says, "...those who admire science and are also slaves of reason. They have now to make a choice. They can keep science; they can keep reason; they cannot keep both".[215] Thus, unfortunately he places science as something opposed to reason. A reasonable rationalist would allow a certain degree of incommensurability between two theories, belonging to two different paradigms. True, comparison between two rival theories may sometimes be logically impossible. Further, to a certain extent a scientist is influenced in theory choice by the elements, which Feyerabend has mentioned, and some other external factors like desire for name and fame, the financial aids for the given research. But, as Chalmers points out, one need not think that this would make science opposed to rational arguments. For, by checking in terms of serious inconsistencies or by showing some consequences that the individual scientist may detest we can have a rational backing for the particular theory choice[216]

Again, methodological pluralism does not imply the absence of rules and norms in science. Rather, it implies that there are different sets of rules for different sciences. The methodological monists seem to have been misled by the examples taken only from physics of the last few centuries. Actually it is not even conceivable that the physicists, neurophysiologists, geologists and astronomers use the same method(s) in their respective investigations. But radical rationalists are reluctant to agree with this fact, for methodological monism is the bedrock for them. For them, perhaps as they give undue importance to the view of methodological monism, if there is no fixed methodology there is no guarantee for a rational process in science: "If no principles of evaluation are fixed, there is no 'objective view-point' from which we can show that progress has occurred and we can say only that progress has occurred *relative to the standards that we happen to accept now*"[217]. Reasonable rationalists will surely make room for the fact that the methodological rules need not be absolutely immune to changes.

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[215] Feyerabend, 1978, p 16.
[216] Chalmers, 1992, p. 138
[217] Worral, 1988, p.274



### 2.2.2.8 Rationality in Science – but with a Human Face

One cannot afford to ignore science or reason; we need traditions as a spring board for diving deeper, or soaring higher into the explorations of reality. Newton seems to have said, 'Only when I stand on the shoulders on the giants of the past, I am able to see farther'. As Herbert Schnädelbach explains that it is reasonable to follow the traditions and we constantly ask ourselves in each and every case whether it is rational to follow them. At no stage humanity can afford to ignore reason, nor science, and much less reason in science. However limited and problematic the rational approach may be in facing our life-problems, humanity does not have any other better way of proceeding.[218] Nevertheless, this rational or scientific approach needs to be enriched by human and social factors of life.

Due to an undue admiration for science the society mistakenly concentrates only upon the scientific developments investing lots of time and energy, money and human power. We need to concentrate on the totality of human welfare. The State has to focus first on the making safe drinking water, sanitation, employment and other basic facilities available for all its citizens. This demands at least as equal, if not more, attention as science gets. Any one who is genuinely interested in the total welfare of humanity will certainly demand that the State puts all humans *right* on the earth first, before it plans to put a man *right* there in the moon. Clarity in priority is required. At the global scenario thousands of times more money is spent for weaponry than for peaceful and holistic development projects. Realizing all these Feyerabend demanded for liberation of the society from science.

Feyerabend, till his end, voiced out throughout his life his deep concerns for humanity and liberty, in all the realms like politics, science and intellectual pursuits. That is why, in spite of all his great contributions in the intellectual world, finally he wanted the world to remember him basically as a simple and ordinary human being, who values love the most. A couple of weeks before he breathed his last on 11 February, 1994, he wrote in his touching autobiography: "My concern is that after my departure something remains of me, *not* papers, *not* final philosophical declarations, but love... That is what I would like to happen, not

[218] Schnädelbach, 1991, p. 446

intellectual survival but the survival of love"[219]. Considering the whole analysis and the last words of his life, one can, in my opinion, get the picture of Feyerabend as someone who is certainly for rationality in science, but not at the cost of humanity.[220]

Now I move on to consider the salient features of Dudley Shapere in **Chapter 3.**

[219] Feyerabend, 1995, p 181

[220] In Chapter 5, when I evolve my account of rationality in science, I argue for the need for some of the human elements, like judgment, role of the agent, common sense etc., which would make science reasonable, if not rational.

# *CHAPTER 3*

# SHAPERE – A CONTINGENT INTERACTIONAL EMPIRICIST

## 3.0 Introduction

Among the contemporary philosophers of science, I choose the ideas of Dudley Shapere to be dealt with in detail. It is because I think his ideas of science and philosophy of science sound very enlightening and well founded. In my opinion, Shapere succeeds to a very large extent in demonstrating that science is neither divine, implying that it is not beyond corrections and changes, nor too shallow, to allow anything to go, in an irrational way, being led by the forces of mob-psychology. His position frees the human thought process from the unconscious compulsion of having *a priori* absolutes. At the same time, it would not lead to relativism or skepticism. His treatment of the notion of background information in science and the detailed study of neutrino experiments have helped me in understanding the issue at hand.

Therefore, after providing a brief look at the most important theories of rationality in science of the 20$^{th}$ century, I now devote this chapter to delve into Shapere's contributions. This chapter has two sections: ***Section A*** deals with Shapere's critiques of the major trends of the 20$^{th}$ century; namely Logical Positivism and Karl Popper, in what he calls 'the Classical Era', and Kuhn and Feyerabend in 'the Post-Classical Era' In ***Section B***, I look into some major aspects (that are relevant to our purpose) of his contribution to philosophy of science.

Shapere's contribution is quite vast. His important ideas like methodology, observation, meaning and incommensurability in science, the notions of domain, goal, success and the absence of specific doubt in science, the role of 'given' in experiments, his idea of reality, truth and knowledge etc. – all seem to be a well-connected web, as though they are different nodes in fishing net. I intend to focus only on the ideas that are directly relevant to my purpose: his understanding of background information, the notion of observation as a concept schema and the idea of reason in science. At the end, I shall show how he projects

himself to be ***a contingent interactional empiricist*** and in the next Chapter I shall assess his views.

## 3.1 SHAPERE'S CRITIQUE OF 20TH CENTURY'S THEORIES OF RATIONALITY IN SCIENCE

### 3.1.1 Critique of Scientific Theories of the 20th Century – Classical Era

Shapere considers the first half of the 20th century as the Classical Era of the 20th century. Now I spell out his critiques of Logical Positivism and Karl Popper.

#### 3.1.1.1 Against Logical Positivism's Observation-Theory (O-T) Distinction

Shapere does recognize the constructive contributions of Logical Positivism. For instance, it has raised, he acknowledges, many problems regarding the interpretation of science; the answers to those problems may not be perfect, but gave considerable insight and illumination to the problem. However he criticizes the logical positivists from various angles.[221] Here I take up one of the important criticisms, namely the criticism against the Positivists' famous *Observation-Theory (O-T) distinction.*

Logical Positivism attempted to show science to be the most objective enterprise, as it is based on pure, unadulterated observation and verifying (or falsifying) experiments. However, by 1950s, this view had to be rejected and it was realized that there was no brute, undeniable 'given' at the bottom of observational facts. It was also realized that observations, contrary to the popular expectations, were theory-infected. Shapere argues that in science even observation terms are not theory-free. In science things are not always as simple as the claim 'cat-is-on-the-mat'; it is also not simply a presentation of sense data or

[221] Shapere's another major criticism against Logical Positivism is about their *logical orientation in understanding science* They misconceived the scientific enterprise in a very fundamental way. They saw philosophy of science as logic of science and therefore philosophy of science was supposed to be concerned only with the logical form and not with the contents of science They were blind to the central 'nature' of science. They actually diverted from the original aim of the Vienna Circle, that is, to examine closely the then radically new scientific developments in areas like relativity and quantum theories [For more details on this, see: "Logic and the Philosophical Interpretation of Science," in Weingartner (ed ), 2004, 41-54, "Post-Positivistic Interpretation of Science, I, 102-119; and "Post-Positivistic Interpretation of Science, II, 352-382", in *Reason and the Search for Knowledge,* 1984a)

phenomenalisitic analysis of observation; and it is not just an investigation of pointer-readings or graphs. Science involves a great deal of interpretation even in the so-called simple observations. Theory-ladeness affects the relevance of observation, what counts as observation and the very interpretation and meaning of observation terms Therefore, "All 'observation terms' in science are, in this view, at least to some extent 'theory dependent' or 'theory laden' ... Data are not 'raw'; there are no 'brute facts'"[222]. Shapere explicates this notion of theory-ladenness further in the context of neutrino experiment, as we shall see in the next section.

Given the complex nature of modern science, Shapere proposes yet another sort of distinction to meaningfully speak about the existence and the interpretation of theoretical concepts, which reflects the actual practice of modern physics clearly. In scientific reasoning often situations demand that scientists make a distinction, what Shapere calls, between two types of concepts: existence concepts (or terms) and idealization concepts (or terms). This distinction is necessitated to deal with certain types of problems at hand. Of course it is not that all concepts in physics come under these two categories. Some entities are thought to 'exist' though there are no compelling reasons to think so. Shapere elaborates the 'idealization concepts' with some examples[223]; I would like to focus on one such example, the 'notion of electron'.

Lorentz theory of electron claims that electron cannot be a geometrical point with no radius. It must have some radius. For treating it as 'a point particle' with no radius creates some serious problems. For, the electrostatic energy of a charged sphere of radius 'r' and charge 'e', is $e^2/r$. If $r = 0$, energy will be infinite; and if we apply it to $E=MC^2$, then the rest mass will be infinite. But the electron does not have any of these infinities. However, for certain purposes and problems it is more convenient and simpler to treat electron as a point particle. The theory of relativity requires that electrons have a zero radius, while Lorentz's theory denied that idea. Lorentz's concept of non-zero radius for electrons had also a problem – how is that the electron is kept at equilibrium without constituent parts of this negative

[222] Shapere, 1984b, in 1984a, p. 106.
[223] Shapere, 1984c, in 1984a, pp 352-365 Another example he discusses here is the notion of 'rigid body', both in the classical and post-classical periods of science.

charge repelling one another? For this Poincare[224] proposed a mysterious power; he introduced cohesive forces (which are not electromagnetic in nature) that counterbalance the coloumb negative repulsive forces of the electron on itself and maintain the equilibrium. Such inconsistency between the theory of relativity and the classical electrodynamics is not merely due to idealization or characteristic of 'formal structure' of the system; but it shows the inadequacy of any theory as an account of nature. The distinction made between idealization and the way the things really are, is made on scientific grounds, and it has a definite use in physics. Whether science treats electron as dimensionless point or as a particle, it is all for some genuine scientific reasons. Thus though an electron in reality cannot be a dimensionless point, yet it is convenient to treat it, for genuine scientific reasons, as if it had no dimension. As Panofsky and Phillips note, "The idealizations of real charges as points, lines, and surfaces not only permit great mathematical simplicity, they also give rise to convenient physical concepts for the description and representing of actual fields"[225].

Shapere further analyses what it means for an entity to exist in physics. A distinction is made in science between the way in which an entity can/not exist and the way in which it is convenient to 'idealize' that entity. For instance, the notion of Electron as a point-particle is physically impossible, but in certain cases it is assumed to be so. Certain entities can be said to be existing or non-existing or probably existing. What is important here is not the 'terms' used, but their 'uses'. The context of uses will tell us that the terms used here refer to idealization, and not directly to electron itself; some purported entities (at some time claimed to have existed), but do not exist now (like ether, phlogiston); some entities whose existence is claimed by good theorists, but not yet established (quarks); there are even borderline cases. All these point out "the fact that it is not terminology of 'entities', 'idealizations' etc., which is important; what is important is the logic of the scientific usage of the terms so classified" and the entity terms need to be understood in terms of convenience of employment, "in order to call attention to certain features of the cases discussed".[226]

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[224] Poincaré, "Sur la dynamique de l'électron," *Rend Palermo*, 21 (1906) 129 As quoted by Pauli, 1958, pp. 184-6.
[225] As quoted by Shapere, 1984c, in 1984a, p. 358
[226] Shapere, 1984c, in 1984a, p. 367.

The relations between 'entities' and 'idealizations' are very important. The entities involved may be held not to exist, not because their existence would conflict with some theoretical concepts, but it may be because that such entities are not found (e.g. Vulcan, fifth force of nature), or their existence is abandoned (e.g. ether). However some entities, which were once abandoned, may still have some utility value (e.g. particle theory of light was abandoned in 19th century, but even today it is used in ray optics under certain circumstances). Over the years, it is possible for entities to have a shift in their status, from 'entity terms' to 'idealization terms'. Such shifts are normal precisely because the treatment of these entities as 'entity terms' or 'idealization terms' depends on actual physical grounds, rather than logical, or metaphysical, or linguistic ones.[227] All these considerations so far about the existence / properties are not in a metaphysical sense; rather it is very much within scientific realms. Thus Shapere has shown the serious difficulties with the O-T distinction of Logical Positivism in the context of modern science.

### 3.1.1.2 Popper's Notion of Background Knowledge – Too Temporary and Alarmingly Broad!

Shapere argues that Popper did not give a clear and systematic presentation of background knowledge and its functions, though he gave a few examples of such functions. Here the intuition is that such background knowledge is already well-accepted and it is therefore easy to choose or reject a proposition on the basis of such background knowledge. Popper always attributes only a temporary character to the background knowledge; he says, it is "for the time being," "for the discussion of this particular problem" [228] and so on. He goes on to make it clear that a fallibilist "does not accept this background knowledge; neither as established nor as fairly certain, nor yet as probable. He knows that even its tentative acceptance is risky, and stresses that every bit of it is open to criticism, even though only in a piecemeal way."[229] It sounds too temporary to be taken as knowledge. Besides, he

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[227] Shapere further elaborates on the implications in Physics when we assert that 'A exists' It implies that other existing particles can interact with A, and A can affect and be affected by them, It implies that it has some properties that have not been discovered yet, that what we consider as fundamental properties may not be really so fundamental or vice versa, or (though rare) we may be wrong in thinking that the entity has the property at all; and It implies that it has some properties that have not been discovered yet, that what we consider as fundamental properties may not be really so fundamental or vice versa, or (though rare) we may be wrong in thinking that the entity has the property at all [See Shapere, 1984c, in 1984a, p 370-372]

[228] Popper, 1962, p 239.

[229] *Ibid*, p. 238.

conceives background knowledge to be consisting of also 'myths'[230] and 'common sense'[231]. This implies that it is alarmingly wide so that anything can be used as background knowledge, and there is no reason to consider any particular belief better than other beliefs in the background knowledge.

Shapere further points out that Popper never seemed to have recognized that "many of our scientific beliefs about the universe have come to be accepted more securely than that, at least until we have found specific reason to doubt and reject them"[232]. He further argues that if what Popper says is correct, then how is that a piece of background knowledge is used again and again? The position of the background knowledge is not as temporal and tentative as Popper thinks; it is more lasting and secure than he conceives it of. If so tentative, why does he call it knowledge at all? It cannot be used in the pursuit of further knowledge, nor as guiding reasons for carrying further the work of science, and for more practical purpose. If that is the status of the background knowledge, Shapere wonders, why to take such background knowledge very seriously and why it is accepted in a more lasting and reliable sense and not just tentatively. Popper seems to have no answer for this.

### 3.1.2 Post-Classical Philosophers of Science of the 20th Century

In the post-classical era, starting roughly from late 1960's, the trends in philosophy of science did recognize the need for background knowledge in science. They took the role of background information in science very seriously; they all held that some kind of presupposition or background information to be playing a big role in understanding the problem at hand, to interpret facts, even to determine what 'facts' are at all in science. Without all these background support, they claim, scientific theories are hardly meaningful.

Shapere[233] recognizes three common theses among all of the post-classical philosophers: a) ***A presupposition theory of meaning*** – meaning of all scientific terms are determined by theory / paradigm / ideal natural order in which we find them. Therefore, they are against the distinctions drawn, according to Received View between Observation-Theory and meaningfulness and meaninglessness; b) ***A presupposition theory of problems***, which helps

[230] Popper, 1972, p. 181.
[231] *Ibid.*, p 33.
[232] Shapere, 1999.
[233] Shapere, 1984d, in 1984a, p. 66-67

define the domain of scientific inquiry, and decide what can be a scientific explanation in answer to the problem; and c) ***A presupposition theory of the relevance of facts to theory, of the degree of relevance and generally of the relative acceptability of different scientific conclusions.*** Let us consider his critiques of the two major philosophers of science in this era: i) Thomas Kuhn and ii) Paul Feyerabend

### 3.1.2.1 Thomas S. Kuhn

I focus on two important critiques of Shapere against Kuhn, namely, i) the Paradigm and Background Information and ii) Denial of O-T distinction leading to Incommensurability.

#### 3.1.2.1.1 The Revised Notion of Paradigms – Still Problematic

Shapere was one of the early critiques[234] of Kuhn when the *Structure* was published. Shapere did not accept the idea of an 'absolutistic and monolithic view of paradigms'. For, an absolutised view of paradigm naturally leads into strong relativism, "in which not only substantive theories, but also what count as reasons, legitimate theories, explanations, and even the meaning of words, could differ in an 'incommensurable' way from what counts so in another paradigm-tradition"[235]. Further, it becomes impossible to speak about the progress of science in the context of totally compartmentalized paradigms; and since there are no 'paradigm transcendent' elements, how to judge two paradigms and how to rationally choose one over the other – and therefore how to understand even the very notion 'progress'? It becomes impossible to see whether a theory has any advance of the over the theory of the past. [236].

Correcting some misunderstanding and removing ambiguities over the notion of paradigm, Kuhn attempted at a modified picture of paradigm in the second edition of *Structures*[237]. In its *postscript* he tried to answer these objections by proposing an analysis of 'disciplinary matrix', with four components, namely, 'symbolic generalizations', metaphysical paradigms', 'values', and 'exemplars'. Earlier he had focused on the unity of the community

[234] Shapere, 1964b.
[235] Shapere, 2004, p 46.
[236] Shapere, 2001a, in Hoyningen-Huene and H Sankey (eds ), 2001, p 193
[237] Kuhn, 1970.

or paradigm; but now on the diversities of a paradigm. Yet he insists upon 'unity', a sociological one (not monolithic internal or intellectual, as treated in the previous one), whose members might disagree on what are appropriate 'symbolic generalizations' and so on. In fact, thus he encounters an 'essential tension' between the fundamental unity - a thread of intellectual unity - among scientific traditions / communities *and* healthy diversities among the members. Modern science teaches us that background information consists, not only of various types of theories, narrow or broad, playing different kinds of roles, but also specific facts and practical knowledge.[238] But Shapere points out that there are many exemplars to be followed; science has to rely on a combination of diverse background theories; there might emerge some types of classification of background information and their functions, even some thread of unity... but tracing out that kind of unity need not be the aim of philosophy of science. Further, the search for such unity, which does not exist, is not only unnecessary but also a distraction from the efforts of understanding what real science is and how to build on what we already know.

Further, Kuhn's explanation of disciplinary matrix (the four components mentioned above) does not clearly capture the actual variety of components of actual science. It is not enough to fit in or squeeze in various aspects of background information into the above mentioned four components. For example, in the neutrino experiment – how to clean the tank-fluid that captures neutrinos? Why to bury the experiment to avoid contamination by cosmic muon decays? – Where to classify all these information under those four components? Thus, "Background information is too diverse, applied too many ways, for too many purposes, for a simplistic classification into four fundamental types to be truly illuminating"[239].

#### 3.1.2.1.2 Denial of O-T Distinction Leading to Incommensurability

The notion of incommensurability is common to both Kuhn[240] and Feyerabend[241] as both are staunch proponents of the view of theory-ladenness. There cannot be clear-cut distinction between observation terms and theoretical terms. The meanings of the observation terms are fully contextual. The terms in a theory don't have meaning in isolation. While logical

[238] Shapere, 2001a, in Hoyningen-Huene and H Sankey (eds.), 2001, p.196.
[239] Shapere, 2001a, in Hoyningen-Huene and H Sankey (eds ), 2001, p 195
[240] Khun, 1970
[241] See: Feyerabend, 1965.

positivism has been advocating that only observation sentences are meaningful and all theories are meaningful only in as much as they rely on observational sentences for their interpretation, Kuhn and Feyerabend claim just the contrary – observational statements have to depend on theories to be meaningful, and therefore it is the observation sentences that are in need of interpretation and not the theory.

However, with the denial of the O-T distinction even the fundamental theories were rendered to be incommensurable. Because of no observational vocabulary independent of theory and no common element among theories, and above all due to the theory-ladenness of observation, the issue of comparability becomes very crucial. Problem of relativism thus emerges very powerfully. This makes the whole of scientific enterprise to be non-objective, non-progressive and relative to background information and therefore, immune to rational criticism. While the logical positivists insist upon the independence of observational terms from any theoretical influence, these relativists argue that the meaning of observational term is permeated by the theoretical context and is relevant to the theory in question. Thus both stand at the extremes.

### 3.1.2.2 Paul Feyerabend

Among other criticisms of Shapere against Feyerabend, I highlight only two important ones: Problems with Feyerabend's denial of two basic theories of contemporary philosophical empiricism and the problems with his notion of incommensurability and theory choice.

#### 3.1.2.2.1 Problems with the Denial of Consistency and Meaning Invariance Conditions

Feyerabend[242] focuses on two important conditions, which are said to be the corner stones of contemporary philosophical empiricism, ***the consistency condition and the condition of meaning invariance***. He denies both of them and argues for inconsistency of scientific theories with one another and contextual dependence of meaning of scientific theories, including the so-called observational terms. In fact the meaning of observation terms depends on the theoretical terms and not the other way about. Shapere challenges that if both

[242] *Ibid.*

these conditions are denied one would be led to relativism; a certain amount of consistency and meaning invariance (in a qualified sense) are necessary to see science as a rational enterprise. For, how is it possible to reject both these conditions? For if two theories are to contradict each other one must be the denial of the other; this contradiction demands that theories must have some common ground of comparison. Even the theories that are seemingly very different have some common elements; for instance, geological theories and physical theories of waves and their transmission – how earthquake waves are transmitted through different kinds of material is a common element for both the theories. One may argue that this comes as a part of the background information, and then the same old problem arises, 'what is a part of theory?' It is still persisting.

Further, Feyerabend claims that even a slightest change in the theoretical context will change the meaning of every term. Does every change result in a change of meaning? Does every change constitute a change of theory? Do mere extensions / applications of a theory make a difference to the theoretical context? Do the different ways of axiomatizing the same theory give us different theoretical contexts? When a theory is changed, do the logical terms, like 'and', 'if-then' change their meanings too? Similarly, his statements about relationship between change of meaning and change of theory are not clear. Similarly, can all these, namely, an addition of an epicycle in a theory; a change in the value of a constant; a shift from circular to elliptical orbit; ascribing a new property to some entity – be treated as a change of a theory? He may say that these are changes ***in*** a theory, ***not of*** a theory; that is, when these changes become strong enough they affect the meanings of the terms; or he would say that the mere difference constitutes a change of meaning, which, as Shapere fears would may end up in a tautology: "the mere difference itself constitutes a change of meaning of all terms in the theory – so that the doctrine that 'meanings change with change of context' becomes a tautology"[243].

Thus Feyerabend fails to give a detailed and adequate account of: **a)** what counts as a part of 'meaning' of a term; **b)** what counts as a 'change of meaning'; and thus in turn, **c)** what counts as a part of a 'theory' and **d)** what counts as a 'change of theory'. His idea of a theory seems to include everything; it is not clear as what to include in it – they include ordinary

[243] Shapere, 1984a, p 71.

beliefs of day-to-day lives, religious myths, strong commitments to methodologies and even quasi-metaphysical principles[244]. It is not sure whether Feyerabend and Kuhn would be happy to include Kepler's mysticism as an integral part of the theories proposed, and Newton's idea of absolute space is part of his theory.

### 3.1.2.2.2 Problems with Incommensurability and Theory Choice

In order to overcome the objection that incommensurability leads to a serious problem of theory choice in science, Feyerabend proposes *three requirements*, which help in judging between two competing theories:[245] **a)** Invention of a new metatheory, which is more general in describing a common background that defines test statements acceptable to both the theories. But, Shapere points out a problem: any term in the metatheory will have a context will be radically different from the context in which a corresponding term occurred in one of the two original theories Thus, the problem of comparing the terms in the original theories, in stead of being solved, has been just pushed to the level of comparing the terms in the metatheories[246]; **b)** Feyerabend invites us to do an internal examination of theories. One theory may establish more direct connection to observation and may have a more direct interpretation of observational results. But the problem here would be, if a theory defines its own facts / experience, then what could be more direct than this?; and **c)** Feyerabend introduces the notion of 'the pragmatic theory of observation' to help in theory-choice. Here the criterion to decide upon an observational statement is not in terms of meaning but by the circumstances of its production. However, this introduction of 'pragmatic theory of observation' too did not succeed much. For, if all the meanings are dependent on some theories, and theories can be formulated as one wills and further if any observational evidence can be given to support any given theory, then "it follows that the role of experience and experiment in science becomes a farce"[247]. This analysis seems to agree that there is something which is theory-independent and with which we can determine the choice: that is 'human experience as an actually existing process' – which makes the observer utter some sequence of noises – only when we consider their meaning theoretical

[244] Feyerabend, Colodny (ed.), p. 219
[245] *Ibid.*, pp. 216-217.
[246] Shapere, in 1984d, in 1984a, p. 74.
[247] *Ibid.*, p. 81.

considerations come in. Hence, not the reference to their meaning is important but the domain of 'features of experiences' which they are concerned to imitate.

Shapere spells out the ***problematic similarities between Feyerabend and Kuhn***: **a)** Feyerabend's notion of 'high-level theory'[248] and Kuhn's notion of 'Paradigm'[249] – both are too general and one is at a loss about what to include or not under that notion!; **b)** Both of them don't give what counts as a part of meaning of term and what counts as a change of meaning, though both these issues are central to their philosophies; **c)** Both of them lead to relativism, as they demand for complete replacements of theories / paradigms, which in turn bring in utter incompatibilities. For Kuhn, the standards to decide problems, facts, concepts, explanations – all depend upon paradigm; and for Feyerabend, all these depend upon theories; and d) Both of them fail in providing extra-theoretical basis to compare / judge theories; and therefore the choice depends on the basis of arbitrary decision.

All these problems[250] are, Shapere is convinced, due to the wrong turn in understanding the 'meaning'; these are the logical consequences of their narrow understanding of what 'meaning' is. Now can we provide a middle ground by altering their rigid notion of meaning? He gives a way out by suggesting that we can have meanings similar, and yet different in some respects. By this view he hopes to avoid extremes of positivism and relativism, and yet includes the Positivists' meaning invariance and the relativists' incommensurability. He suggests that 'reference to meaning' need not be the fundamental tool for dealing with the problem of theory choice. He claims to *(dis)*solve the problem

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[248] Feyerabend, 1965.

[249] Kuhn, 1962, p. 40 ff.

[250] Shapere further argues that both the classical and post-classical philosophies of science of 20th century fail in a particular aspect. The actual motivation of the Vienna Circle (VC), at the beginning of 20th century, was to understand the then revolutionary changes in physics of the 20th century. Due to their exaggeration of the need and the role of logic in science, the content of science was thought to be irrelevant and dangerously misleading Logical empiricism, the offspring of the VC imbibed the Platonic-Aristotelian quest for essences. if one wants to understand science must know the essence of science, which all sciences have in common (not any individual theory) and so the original motto of studying the relativity and quantum theories was lost, it is the fundamental failure to ignore the specifics of particular scientific theories In a similar vein, the post-classical trends too seem to have gone off the track they began criticizing logical empiricism and presented a new program to correct the deficiencies inherent in that movement; but the post classical philosophers of science, Kuhn and the cohort, like Toulmin, Hanson, Feyerabend, who were rooted in history of science paid too much attention to historical content, even to the extent of not finding any trans-historical elements to judge the progress of science. Therefore for the postclassical philosophers of science, "major scientific change, scientific revolution, was left as mysterious, even unanalysable, now, in the absence of anything that could count as a paradigm-transcendent reason, as it had been for their logical empiricist predecessors, who had denied that reasoning (a 'logic of discovery') was involved in arriving at new scientific ideas" [Shapere, 2004, p. 47].

ofincommensurability and theory choice with the concept of 'chain-of-reasoning connections' between the usage of terms at successive stages in history.

Having discussed Shapere's criticisms of the Classical and Post-Classical trends of 20th century, I concentrate, in the next section, upon his own contribution to philosophy of science.

## 3.2 SHAPERE'S MAJOR CONTRIBUTIONS TO PHILOSOPHY OF SCIENCE

This section focuses on the salient features of Shapere's philosophy of science, relevant to our discussion: namely, the Notion of Background Information, Observation as a Concept Schema, Reason in Science, and Rational Descendent of Empiricism.

### 3.2.1 Background Information and Science

#### 3.2.1.1 The Notion of background Information

Content of science at a given period serves as background information of science for that period. In science there is always a set of beliefs, and never a vacuum. There are varieties of sets of background information, where different items play a different role in different problem-situations. Background information has not only factual and theoretical beliefs, but also "vocabulary by which we describe and delineate the subject-matters of our inquiry, the methods we employ in the search for knowledge, the normative standards by which we conduct our inquiry and set its goals"[251]. Logical empiricists, insisting upon experience as the starting point of the scientific enterprise, did not appreciate any role for background information. But the contemporary historians of science, like Kuhn and Alexandre Koyrè, have made the philosophers aware of the need of history of science for philosophy of science. Feyerabend[252], N.R. Hanson[253], Robert Palter[254], Stephen Toulmin[255] and many others realized that science would not take place in a 'vacuum' and it would certainly need

[251] Shapere, 2001a, in Hoyningen-Huene and H Sankey (eds ), 2001, p 200
[252] For instance, Feyerabend, 1962 and 1981a
[253] Hanson, 1958.
[254] Palter, 1956.
[255] Toulmin, 1953.

prior beliefs and theories. There is no paradigmatic unity or single background theory, as Kuhn would like us to believe. Specifiable background beliefs are used with specific roles in conception, performance and interpretation of the research. [256]

### 3.2.1.2 Criteria to be a Component in Background Information

The background comes from the past of science; it has proved powerful, successful in its own way. Therefore *previous success* (in accounting for a body of information, for which they are held responsible) and *present coherence* (under certain conditions) with other beliefs with which they are expected to cohere are *major criteria* to be a member of the background information. Based on these two, a sort of demarcation line is gradually drawn. This demarcation line between background information and non-background information is only *incomplete unfinished, and contingent* as it is based on the considerations internal and external to science[257]. We need to be critical of what we take to be background information; and this pool of background information is not discovered by logic; it is based on earlier knowledge, and thus can reach back to the deepest levels of evolutionary history. It is not to belittle the role of logic in science; logical inference plays an important role in science; but it is not all that that is there for scientific reasoning and it is not even the central part of science; logic is concerned with all possible worlds, but it cannot tell much about why we have come to believe certain things about our particular world.[258] One day science may become totally autonomous and then we may have to introduce a new logic. But we cannot predict the outcome of science in advance, and the inquiry has to be guided by the content of what we have learned. But as of now, we must admit that we can only be guided by prior knowledge, which may be inadequate for the tasks to which it is applied.

### 3.2.1.3 Evolutionary Aspect of Background Information

One more important feature of that background information is the fact that it has evolved over the years, just as how we have evolved; that is, over the past centuries we have departed from those primitive middle-sized views and we have transcended those

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[256] Shapere, 1989a, p.433
[257] *Ibid.*
[258] Shapere, 2004, p. 52.

experiences in modern science. The limits of everyday world have gone beyond the middle-sized domains, to the smallest and the largest ones. In spite of the gaps and uncertainties we could draw a large picture of the universe, from the beginnings of evolution in the past, into the far distant future; and this is being tried in evolving 'the theory of everything'. It has altered our concepts of explanation, the idea of the universe and even the very idea of reason. All these "have been radically transformed, in ways that could not have been anticipated by any *a priori* considerations"[259].

An individual element is accepted into or rejected from background information for excellent and compelling reasons. However these reasons are not known *a priori* or transhistorical absolutes, rather its legitimacy is proved or disproved by the actual functioning of science in course of time. For instance, in the case of neutrino experiment, "Nuclear physics, weak interaction theory, the theory of stellar structure – those qualify" to be background information, while "witchcraft, Aristotelian mechanics, and religious creation myths do not"[260]. **The significant role that the background information plays in the scientific enterprise, the mode of accepting something as legitimate member in the pool of background information, and how it enlarges in course of time – all these become clear with the example of 'neutrino experiment' in the following pages.**

### 3.2.2 Concept Schema

To understand the recent sophisticated science it is better that one treats the important concepts employed in it as a 'concept schema', instead of individual concepts. For, the meanings of these concepts are not given once and for all as one individual concept; rather they develop over the years, with all related aspects. He prefers to discuss the notions of observation, meaning, reality, truth, knowledge, and so on as 'concept schema'.[261] Philosophers have failed to arrive at the exact meaning of many concepts and that can be evidence that there is no such exact meaning. Their meanings can be made up only by a chain of ideas, linked by reasons: "that is what we consider to be a 'concept or meaning specified by a set of necessary conditions is really a concept schema. I argue that many other

[259] Shapere, 1989a, p. 436
[260] Shapere, 1988b, p. 308
[261] Shapere reiterates his preference to address them as concept schema, rather than concepts, in his forthcoming book, *The Rational Dynamics of Scientific Inquiry*

'concepts', including 'explanation' cannot be given precise meaning except in terms of the CONTENT of background information."[262] Thus a concept schema means[263]: **a)** A concept schema is formulated in terms of a 'framework' that remains reasonably stable over a significant period of time, or over contemporaneous areas of inquiry; **b)** The usage of the *content terms*[264] depends on accepted scientific beliefs, which are the elements of the background information; **c)** The accepted background information can and does often change from one epoch to the next, and therefore the usage of the content terms of the concept schema (e.g. what is to be observational) also changes. Thus the usage or application of the content terms can vary over the period during which the framework is otherwise stable. (Later we see, the framework itself can be changed); **d)** The usage of the content terms is changed in the light of new scientific beliefs, which count as reasons for making changes. Thus there is a *chain-of-reasoning connection*[265] between the successive usages of the concept schema; **e)** A concept schema is treated as part of 'an approach to inquiry' and the interpretation of its results. There can be many rival approaches to an inquiry; one is accepted and the others are rejected. The selection of a given approach is based on legitimate reasons. The approach involving concept schemata is also contingent;

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[262] Shapere, over e-mail communication, 30 Sept, 2003.

[263] Shapere, *The Rational Dynamics of Scientific Inquiry*, Chapter II, p 8-9, (Forthcoming).

[264] By content terms Shapere means those terms which refer to the content of the accepted scientific beliefs These terms are contrasted with meaning-terms and reference-terms

[265] Though the usage of a term differs, and the background context differs at successive stages, the usages can be compared due to, what Shapere calls, 'the chain-of-reasoning connection' between those usages At successive stages some properties or the other of the terms are dropped or added for specific reasons. Let $U_i$ and $U_k$ are two usages that determined by theoretical contexts, $T_i$ and $T_k$ There is a chain of reasoning which helps us to understand why certain properties ascribed in usage $U_i$ and its successors up to and including $U_k$ were deserted, modified, or replaced; the same chain-of-reasoning explains the possibility of comparing the two usages and their theoretical contexts even though the last stage $U_k$ involves very few or even no features in common with the first usage $U_i$ [Shapere, 2001, p. 199]. Shapere explains with an example of usage of electron over centuries: After a rethink upon Faraday's electrolysis experiment Stoney concluded that electron was an indivisible unit of charge (and not matter), later Thomson added the property of mass to electrons and electrons became classical particles, with mass, position and velocity, and negative charge But the recent quantum mechanics abandoned simultaneous attribution of position and momentum, and added another property of spin to electron. In the further evolution of quantum field theory, electrons are seen as a variety of leptons Like all particles, electrons are also seen excitations of a quantum field, possessing a range of quantum numbers. All these developments were even unimaginable to Stoney and Thomson in those days However, we know all these properties are about electrons, not because we ascribed essential properties to electron, or some sort of necessary and sufficient conditions of applications of the term We understand the term refers to electrons also not because of an irreducible assertion that we 'refer to electron' The continuity and comparability of the usage is not due to some common descriptions or common reference, rather, "the rationale for saying that we have referred to the same thing all along is given by the linkage of reasons which gives continuity to the history" [Shapere, 1989a, p 429] **The historical usages of electrons are extremely different, if not radically incommensurable, yet they are not incomparable due to chain-of-reasoning connection. Therefore, to understand the nature of science and its development, we must look in the process of reasoning employed in science and not in philosophy of language.**

and **f)** A particular schema is used to a sequence of specific usages, not just to a single set of specifications. The members of the sequence are linked by a chain-of-reasoning connection. I now elaborate one of the most important, and relevant to my purpose, concept schema, observation[266].

### 3.2.2.1 Observation as a Concept Schema

Shapere prefers to see, for the reasons explained above, observation as a schema, rather than a concept. In the process of discussing salient features of observation Shapere undertakes the following four *important tasks*: a) What is it to be a scientific observation, in the light of the recent particle physics and cosmology?; b) What is the distinction between the legitimate and wild speculation in science (this he thinks that the traditional empiricism failed to do)?; c) How to justify the appeal to the unobservable in science as something legitimate? and d) How to show that science is still empirical, though going beyond unobservability? He points out a major misconception of equating observation with sense perception. He argues that the empiricists' doctrines of observations are in need of correction.

Both the major methodologies of science, the Inductive Method and the Hypothetico-Deductive Method, suffer from the same deficiency: both the methods don't tell us what an observation is. Classical Empiricism insists that all our ideas are based on observation. 20th century Logical Empiricists give logical basis for construction of ideas, not psychological basis. Since they are interested in science, they speak of 'observation', and not 'impression'. Due to their linguistic interests, they speak of 'observation-terms', intensifying its distinction from 'theoretical-term'. Except a few, like C. G. Hempel, (for whom observation includes not only direct observation by sense, but also sensation and introspection), for almost all empiricists, **observation means sense perception.** By sense perception they mean only the direct sense-observation, while scientists have a wider notion of it; the scientists rather include in the realm of sense perception what we get by means of instruments, designed to get information about what we don't and can't perceive directly through our senses.

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[266] I choose to elaborate on the concept schema of observation because in the last chapter I take up the notion of observation (in the context of Gravitational Wave Experiments) to show how the consensus in the scientific community assumes great importance in modern science. This notion of consensus, I hope to show, is very significant feature of the holistic understanding of rationality (reasonableness!) in science

May be, it was alright during the period from the 16th to 18th centuries to interpret scientific concepts as being exhaustively interpretable in terms of sense perception. But as science developed many features and elements were encountered which were not directly perceivable (e.g. force, inertia, space, electromagnetic radiation etc.). By the 19th and 20th centuries, what is selected to be observed, how to be observed, how it is to be described, how it is to be interpreted – all such exercises departed from the strict adherence of sensory perceptibility.

Even if all our knowledge were shown to be ultimately based on sense perception still we would not know or understand knowledge fully We need something more than that to understand knowledge. For our sense perception covers only a limited section in the whole range of Electro Magnetic (EM) spectrum and ***more importantly***, classical empiricism is not only insufficient to understand science and its problems, but also it is largely irrelevant and even positively obstructing the process. For now we learn that the EM spectrum consists of a wide range of rays and with vastly differing wavelengths. It ranges from short wavelength gamma rays through X-rays, Ultra Violet (UV) rays, visible light, Infra Red (IR) rays to long wavelength Radio waves. The normal light, which is visible to our human eyes, is just one portion of the vast spectrum. Gamma rays (with extremely high frequency and wavelength as short as a billionth of wavelength of the visible light) are at the one end and at the other end are the radio waves, with trillion times higher wavelength of the visible light. "The eye" therefore, "comes to be regarded as a particular sort of electromagnetic receptor, capable of 'detecting' electromagnetic waves of the 'blue' to 'red' wavelengths, there being other sorts of receptors capable of detecting other ranges of that spectrum. This *generalized notion of a receptor or detector* thus includes the eye as one type"[267].

Shapere highlights three fundamental doctrines of empiricism (regarding observation) and shows why all the three need to be rejected given the present developments in philosophy and science: **a)** In order to decide what is to be considered as a sense-perception, a clear distinction is to be made between purely 'given' in sense perception, which is therefore free of any interpretation; and all 'other ideas' that are based on the interpretation of the 'given'. All these beliefs and concepts go beyond the 'given'; **b)** All our knowledge-claims are either

[267] Shapere, 1982c, p. 505.

directly or indirectly traced to observation. When science uses unobservable or theoretical terms they get their meaningfulness only by tracing its origin or relevance to some observational aspects; and **c)** Observation has two aspects: evidential and perceptual. Both are identical and therefore what is evidential is perceptual. So what counts as evidence is what is given in sense-perception. It is perceptual, because it is free of any interpretation, having no need of any background information.

From the recent advancements in the knowledge of history of science and the actual practice of scientists, it can be shown that all the three doctrines mentioned above are extremely problematic: **a)*** No clear-cut distinction can be made between the 'given' and the 'interpretations' of them. There is no pristine or brute 'given' that is ever found. Observation is based on selection. Interpretation of the 'given' is a construction with many presuppositions. The actual situation is: $T_x = f\,[g(O_x)]$.[268] Logical empiricism claims that a theoretical term ($T_x$) can be shown to be meaningful as a function of an observational term ($O_x$). But they don't seem to realize that ($O_x$) itself is not the 'pure given' but coloured with the presuppositions (g). So pure observation is not possible; **b)*** The second is a natural effect of the denial of the first. Because the 'basis' itself is not purely objective, then all other beliefs might be infected with presuppositions and interpretations. Even if something is taken to be the basis (e.g. unanalysable sense-data), it is not clear how other non-basic terms are based on the 'given'. and **c)*** Modern science has separated these two, evidential and perceptual, and "the focus of modern science is on observation as evidence, not on observation as perception"[269]. It is primarily because sense perception is often unreliable (seeing the half-immersed stick as bent!) and incapable (in the areas of too small or too big in size or with the objects too near or too far!). Since perceptions are often erroneous we bring in instruments to record exactly; evidence is collected by the detectors without any perceptual bias involved. Now these results are to be interpreted.

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[268] For Logical Positivists it would be $T_x = f(O_x)$ They stop with this and don't seem to realize that observation is not a 'pure' observation but a function of some presupposition (s)

[269] Shapere, 2000.

### 3.2.2.2 Conditions for Observation

There are certain elements which can never be observed. For instance, as science develops one may observe Jupiter from a close range, but one can never perceive directly the particles in the cloud chamber; one can only observe only the track of the particle. Further, even if we assume that pure observation is possible, which requires no interpretation, and even if we grant that all scientific concepts are presuppositions ultimately based on sense- perception, we need to realize that the central body of reasoning by which scientific ideas are arrived at in modern science would have been ignored. Observation is not mere sense perception, it needs a specific receptor and it needs interpretation. Therefore, the conditions for something to be observed (observable) are· "**a)** information is received by appropriate receptor; **b)** that information is transmitted directly, without any interference, to the receptor from the entity".[270] Further, whatever is grasped by the receptor needs to be transformed into humanly accessible form for interpreting the results. Therefore, Shapere proposes the third condition: "**c)** The information is transformed by appropriate devices into humanly-accessible information which is (eventually) perceived (and used appropriately as information) by a human being"[271]. These conditions will be explicated with the help of the Neutrino Experiment discussed below.

### 3.2.2.3 An Elaboration of the Neutrino Experiment

Here I briefly explain the neutrino experiment, raising the question at the end, whether, according to the scientists, neutrino is observed or inferred. I also outline the need and the components of the background information with regard to this experiment. I show how, as Shapere claims, the understanding of the background information in this experiment differs from that of presuppositionists.

Shapere undertakes this case-study of neutrino experiment[272] to undercut the traditional claims about observation in science, by showing logical empiricism's basic tenet of 'pure and interpretationless' observations is a farce. Nuclear Physics arrived on the scene of modern science in the 1930's. Bethe-von Weizssacker proposed that nuclear reactions are

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[270] Shapere, 1988b, p. 308.
[271] Shapere, 1982c, p. 509.
[272] See: Shapere, 1982c.

the source of the energy produced by the sun. But there was a problem in testing these nuclear reactions. The sunlight (energy) that we receive from the sun is produced due to the nuclear reactions, at the central core of the sun, at very high temperature and pressure. Four hydrogen atoms join together to produce one Helium atom and lot of energy (photons or EM particles) and neutrinos are also released: $4\ {}^{1}H \rightarrow {}^{4}He + 2\ e^{+} + 2\nu_e$ (superscript is the atomic number; along with Helium two positrons and two electro neutrinos are released). When the photons reach the surface of the sun, after a long journey of 400,000 miles from its core, taking $10^5$ to $10^6$ years to reach the surface of the sun, they lose much of their energy, due to interaction with other particles. From the earlier knowledge about the photon-interactions and the theories about the states inside the sun, we learn that the information carried by the photons from the core of the sun is greatly distorted in the long journey through the passage of energy from its production-point. So actually speaking, the photons that are released at the sun's surface are not the same photons that had been produced at the center of the sun. Hence it was considered to be an *indirect* observation of the core of the sun.

However, neutrinos, which are weak in interactions, reach the surface from the core of the sun without any interaction with any kind of particles. Further, when they reach the earth too they are intact without any modification, while other EM particles undergo lots of changes, already before reaching the surface of the sun, and also later while reaching the surface of earth. The neutrinos reach the earth exactly as they were created at the core. Hence in order to learn about the core of the sun more *directly*, the study of neutrinos is essential. They carry the 'pure' information of the solar core, as they are not tampered or interfered with on their long journey.

Later in the 20$^{th}$ century 'direct test was proposed', by studying those weakly-interacting particles, neutrinos. The world of Physics was already aware of the four fundamental forces in nature: The *Strong Force* (which holds the nucleus together), the *Gravitational Force* (the weakest of the four), the *Electromagnetic Force* (manifested in the EM spectrum) and the *Weak Force* (responsible for radioactivity and more importantly for the conversion of one chemical element into another). Based on this knowledge and the knowledge of the 'Theory of the Source of Stellar Energy,' (of 1930s), the 'Theory of Stellar Structure', and, and the

'Theory of Nuclear Reactions', Neutrino experiment was conceived to 'observe' the core of the sun and to find out how they produce the heat energy (light). To make a study on these neutrinos, we need first to capture them in an appropriate container, making sure that that process doesn't alter the nature of the neutrinos. They are received in a chlorine filled tanker to produce radioactive argon, with a half-life of roughly 35 days. Neutrino detector is a tank with 400,000 liters (610 tons) of cleaning fluid (Perchloroethylene, C2Cl4), which is kept at a deep mine of about one mile underground. When the neutrinos reach this tank radioactive argon is produced and this has to be removed before it is decayed. $^{37}Cl + \nu_e \rightarrow {}^{37}Ar + e^-$. This is done by sending helium into the tank. Then a proportional counter is set up to register the number of neutrinos captured and that is compared with the theoretical predictions.

Can one claim that the core of the sun has been observed? One might argue that the core of the sun is not observed, for what is actually observed here is only absorptions of neutrinos produced at the center of the sun and not the sun itself; one may even say only the decay of radioactive argon, or just the sense-data, like the clicks, in the consciousness of the perceiver; all the remaining details are the result of inference[273]. Nevertheless scientists claim that this experiment gives us direct information about the core of the sun and that those neutrinos enable us to 'see' the interior of the sun. They don't just say it in a metaphorical language. Their usage is somehow related to some aspects of ordinary and philosophical uses. It is not totally eccentric, rather, "it is an extension of such uses, in part a generalization thereof, in part a departure there from, made on the basis of reasons, and designed to make the most of the epistemic role of observation" [274]

Even some philosophers may not be ready to consider this as observation, arguing that this is a far-fetched notion of observation, or the misuse of that term. For them observation must be 'without inference' and since the experiment here involves inference profusely, it cannot be an observation for them. But Shapere argues that philosophers, being mesmerized by the strict logical rules of inference treat neutrino experiment as a result of inference. He makes ***the distinction between inference and non-inference in terms of 'specific reasons to doubt'***. And he distinguishes between inferential and non-inferential conclusions – the

[273] Shapere, 1982c, p. 487.
[274] *Ibid.*, p. 522.

former would be those having specific reasons to doubt ("but which we are nevertheless still able to use to a certain extent and for some epistemic purposes") and the latter would be those having no such specific reasons to doubt, "and upon which we can build confidently"[275]. One can find an answer with Einstein too:[276]

> It is the theory which decides what we can observe. You must appreciate that observation is a very complicated process. The phenomenon under observation produces certain events in our measuring apparatus, which eventually and by complicated paths produce sense impressions and help us to fix the effects in our consciousness. Along this whole path – from the phenomenon to its fixation in our consciousness – we must be able to tell how nature functions, must know the natural laws at least in practical terms, before we can claim to have observed anything at all... When we claim that we can observe something new, we ought really to be saying that, although we are about to formulate new natural laws that do not agree with the old ones, we nevertheless assume that the existing laws – covering the whole path from the phenomenon to our consciousness - function in such a way that we can rely upon them and hence speak of "observations".

From the above words of Einstein, two points are clear: **a)** besides the single applicable theory, other knowledge may be brought to bear in deciding what we can observe; and **b)** by 'theory' he does not mean something doubtful but something on which we can 'rely'. Further such doubting philosophers need to realize that there is no epistemically relevant case where one can have an observational component "which is in some absolute way free of any inference in the logical sense, that is, which does not require any antecedent belief in order to be useful in the quest for knowledge?" [277]. For instance, as simple as noticing a glittering speck in the night sky and recognizing it as a star, involves lots of theories in the process or seeing the clock-dial to say what time is.

The whole experiment is quite complicated. We need to study all the relevant previous theories. One needs to learn about the appropriate target substance and the interpretation of the results. A lot of background information is needed for the *conception*, *execution* and *interpretation* of the experiment. So without the background beliefs the experiment wouldn't have been executable, and without further background information the results would not

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[275] *Ibid.*, p 517.
[276] As quoted by, Shapere, 1978, p. 993-4
[277] Shapere, 1982c, p. 518.

have been interpreted. In formulating theories of transmission and of receptor, a lot more background theories and knowledge are at work: they have to utilize theories of nuclear reactions, experimental determination of reaction rates, cosmic ray physics, the chemistry of noble gases, the properties of cleaning fluid, information about the radioactive content of the rock walls of the cave which holds the receptor, technological information as to how, and why, to air-proof the apparatus, technological information about the capabilities of radioactive-decay counters and many other similar information are needed.[278] Thus Shapere argues that "science builds on what it already knows, even where its observational capabilities are concerned. It *learns how to observe* nature, and its ability to observe increases with increasing knowledge (or decreases when it learns that it was mistaken in some piece of background information it employed)"[279].

In addition, the background information needs the following major components as well:[280] **a)** various theoretical and experimental results regarding specific nuclear reactions; **b)** information about the opacity about the sun to photons and neutrinos and the factors that affect it; **c)** the appropriate substance to use as a material to capture or detect the relevant neutrinos; **d)** the knowledge about the proper place where to deposit the material (in a deep mine in order to protect it from cosmic contamination); **e)** the information how to clean up the receptor tanks of neutrinos and so on; **f)** What counts as an 'appropriate receptor'; **g)** What counts as 'information'; **h)** What kinds of information there are available so far; **i)** What counts as an appropriate 'source' of the information; **j)** The ways in which information of the various types is transmitted and received, and **k)** The character and types of interference and the circumstances under which and the frequency with which any interference occurs.

Though the background information includes variety of beliefs and theories, and this information may be modified or magnified during the process of the experiment, yet it is not that anything can be included in the body of background information. There are **reasons to**

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[278] Shapere, 1982c, p. 506.
[279] *Ibid.*, p. 514. italics his.
[280] Shapere, *The Rational Dynamics of Scientific Inquiry*, Chapter II, p 4, (Forthcoming)

**choose** some as relevant and reject others as irrelevant beliefs There are reasons to check, like *success* and *coherence*. [281]

The neutrino experiment and its interpretation may sound analogous to the position of 'presuppositionists'[282], in scientific problem-situations. They have identified the need for background beliefs by the phrase 'theory-ladenness' of perception, but it has distorted many real issues: **a)** The term 'loading' implies the loss of objectivity and thereby the presence of epistemological relativism; **b)** Unlike Kuhn, Shapere claims that there is no *one* basic paradigm available for all the experiments; rather different pieces of information in the background information are used for different experiments; so background information is not to be considered as one single unit; **c)** Against Feyerabend, Shapere rejects the theory of 'anything goes' – because, the items employed in a given research / experiment must be specifically relevant to that situation at hand; **d)** Unlike Hanson, Shapere affirms that background information-ladenness does not remove the objectivity; because, only beliefs which have been established are eligible to serve as background information; and **e)** Shapere[283] differs from the presuppositionists also in criticizing the traditional empiricism.

### 3.2.2.4 The Role and the Scientific Status of Unobservable in Modern Science

With such a renewed understanding of observation we can now look at the role and the scientific status of Unobservables in the Contemporary Science afresh. We need to revise their nature and the ontological status too. Now it is believed that the universe is infinite. But our horizons of possible investigation are limited. The part of the universe, as cosmology and physics teach us, will not be observable by us unless it enters our horizon, and "if the universe is infinite, that, at any given time, there will always be regions which are unobservable"[284]. Many ideas in Particle Physics and modern cosmology deal with

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[281] Shapere, 2001a, in Hoyningen-Huene and H. Sankey (eds.), 2001, p 185-6

[282] According to presuppositionists' theory, "there is something, of the sort that can serve as standard or set of standards or criteria for scientific rationality and progress, which is immune to the vicissitudes below, and which serves as the ultimate arbiter of those lower-level scientific disputes," says Shapere (1982d, p 451.)

[283] For instance, Shapere holds that * The theory-ladenness of observation does not make it arbitrary, for it is not that just anything can be in the background beliefs but needs to be qualified like the fact of their success in the past, * From the background information, only those elements which are directly relevant to the situation are used in the interpretation, and there are no vague and imaginative appeals, even implicit, to anything like 'social context'; and * The 'given' in the experiment plays a better and more significant role here. The critics of the traditional empiricism tend to either deny any such 'given' or make it powerless to confirm or deny, to choose or reject, any from the rival knowledge-claims [See· Shapere, 2000, p 157-8]

[284] Shapere, 2000, p. 159.

unobservables, unobservable not only in practice, but even in principle. In this context new questions emerge: What is it for something to be observable in science? Is unobservable admissible in science? Going a step further, we need to ask whether empiricism itself can be an account of the scientific enterprise.

Recent Particle Physics and cosmology encounter problems and theories for which observational or experimental tests appear impossible. Those theories are not testable even in principle. Shapere mentions a couple of phenomena with such difficulties, like Theory of Superstrings, Inflationary Theories and Theories about Black Holes[285]. As one may rightly expect classical empiricism would deny / ignore all such entities and theories about such unobservables as unscientific because they turn out to be untestable and they seem to be entering the region of metaphysics, exceeding the bounds of good scientific reasoning. Classical empiricism holds that over the period scientific content changes, but not the scientific methods by which the contents are determined. But now it is clear that we know method also changes along with content. What is observable / unobservable is determined by a number of factors, like: the instrumentation used; the theoretical knowledge which tells us the nature of interactions; the theoretical possibilities of detection of particular interactions, and how the particular interactions give information about its sources. With the growth in the scientific content the notion of (un)observable also departs form the philosophical and common sense. e.g. - the discovery of UV, IR radiations marked the departure from the notion of identifying observation with sense experience.

[285] ***Theory of Superstrings*** – aims at unified picture of the universe, to unify the gravitational forces and the standard model of elementary particles and forces). They deal with energies on a scale of $10^{19}$ GeV There is no imaginable technology to test such a high voltage Science is said to have reached a stage where only the universe itself can be the testing laboratory ***Inflationary Theories*** – claim that our presently observable universe is only one domain of the whole universe In the different regions of the universe constants of nature will differ. Some theories speak about the other unobservable regions, even other universes Science considers such entities as legitimate objects of scientific study, though they are unobservable in principle, and ***Theories about black holes*** – though now scientists like Stephen Hawkins opine that black holes are not that black after all, because light can emit from them, we can still say that the centre core of the black holes is largely unobservable. These theories are not just speculative. In the present cosmology, new regions which were previously unobservable are now entering our horizon Similarly, the present unobservable domains may one day enter our horizon, may be $10^{100}$ years From this one can't argue that this is observable in principle, which would be a mockery of it. In any case, according to our present understanding the universe is infinite, and therefore, as long as it is infinite, there will always be regions unobservable. [See: Shapere, 2000, pp 158-160].

Therefore, whether something is observable or not, is a contingent matter of fact, resting on what we have best reason to think we have learned; it depends on the scientific beliefs currently accepted, the instruments used, and the theoretical knowledge about the nature and the detection of a given interaction, and how these interactions give information regarding their sources[286].

### 3.2.2.5 A Demarcation between Legitimate and Wild Speculations

One need not think that any bizarre and strange items can be accepted as legitimate entities in the domain of modern science. To avoid any such misgiving Shapere proposes some elementary *guidelines to distinguish between legitimate and wild / loose speculation in accepting something unobservable in science*: [287] **a)** If that entity is logically and mathematically implied by something that is already observable or has observable consequences; **b)** If it is needed for consistency considerations, even though it is not implied by the observable parts of the theory; and **c)** If it provides answers to problems concerning the observable parts of the theory with which no other solution deals successfully. These guidelines of course are to be taken in spirit, not in letters. The very fact that we don't know everything, i.e. our background information is vague, incomplete, even subject to contradictions – implies there will be border-line cases. And because the background itself can be revised, we need to liberalize the restrictions. However, despite the liberality, it is by no means the case that 'anything goes'.

### 3.2.2.6 Limitedness of Human Observ'*ability*'

In relating with nature, humans experience many dimensions that are inaccessible to logical proofs or sense perception. We need to rely on our ***intuition*** and trust our common sense and human nature. Some are *unobservable due to the limitations in human sensory capacity*; for instance, our eyes cannot see something too small or too big; our sense of touch cannot differentiate minute changes in temperature or pressure. Whereas many animals are equipped to do all these: for instance, a dog can differentiate forty types of smell; sharks can

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[286] Shapere, 2000, p. 158
[287] Shapere, 2000, p. 159.

observe the electric fields around the body of their prey, but we cannot observe. Similarly some are *unobservable by law of nature*; for instance, what lies outside our light cone, as the speed of light is finite, no signal can reach us from there; the core of the sun, quarks etc. As Bas van Fraassen succinctly puts it, "The human organism is, from the point of view of physics, a certain kind of measuring apparatus. As such it has certain inherent limitations... It is these limitations to which the 'able' in 'observable' refers – our limitations, *qua* human beings"[288]. Perhaps that is why, now it has become normal and essential for science too, to speak about the existences of entities, states and events, which are not accessible to human senses (eyes).

In sum, there is no doubt that "All our knowledge of the world rests on observation", but one must hasten to add that "observation is not equatable with sense perception. It is interaction with the world, in the light of background information we have gleaned about what sort of interactions there are in nature"[289]. In science 'observation' is not limited to 'perception with naked eye or by any other senses'. Still the sophisticated science speaks of making 'observations' though what is 'observed' is beyond naked or telescopically-aided eyes. Neutrino experiment teaches us that "what counts as observed or observable is a function of the current state of physical knowledge, and can change with changes in the knowledge"[290]. Thus the concept of observation is not a single notion to be captured by a logical or *a priroi* analysis. It is a concept schema evolving over the years, intertwined with the methodology and background knowledge.

### 3.2.3 Reason (Rationality) in Science

#### 3.2.3.1 The Emergence of What Counts as 'Reason'

Shapere, in his earlier papers, gives three factors as the constituents of 'reason' in science. When a belief fulfils all the three together its rationality is obtained. In his words, "a 'reason' in science consists of a belief (a) which has proved successful, (b) concerning which there is no specific reason for doubt, and (c) which has been shown to be relevant to

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[288] van Fraassen, 1999, p. 43
[289] Shapere, 1988b, p.309.
[290] Shapere, 1978, p. 992

the specific domain in which it is being applied as a 'reason'".[291] However he concedes that it is enough, practically speaking, to accept beliefs as rational which are shown to be unambiguously successful or free from doubt. Later in order to correct the over-enthusiasm of the historically-oriented philosophers, who seem to overstress on the fact of context-determination of scientific beliefs, Shapere highlighted the element of 'given' (which is unaffected by the theoretical presuppositions) in the scientific inquiry. However, he cautions that "This is not the 'given' of traditional empiricism, a 'given' of pure perception"[292] and goes on to give his understanding of 'given'.

Shapere, going along with the post-classical thinkers, holds that not only what is internal and external to science, and what is scientific and non-scientific but also what counts as reason are not given once and for all, rather emerges along with science. However, he shows that this position does not lead to relativism or subjectivism, as there are sufficient mechanisms to safeguard the objectivity of rationality in science. The guiding principles and the standards for further research, which guarantee the rationality in science, are **The Principle of Domain Success, the Principle of Explanatory Coherence** and these two put together lead to **the Principle of Goal Success.** The fourth requirement is **the absence of a specific doubt.** These principles are learnt, and not given as *a priori.*

### 3.2.3.2 Domain success

Domain success refers to the ability to fulfill the promise of arriving at explanation of individual domain. The notion of success changes, as the 'goal' changes. For instance, during the Chemical Revolution in 18th century, there was a shift in goal of matter study, i.e. it was from 'to bring matter to perfection' to 'understand matter in terms of its essentials'. There are ***no transcending, unchanging criteria for success***. The criteria for success change

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[291] Shapere, 1982d, p. 458.

[292] Shapere, 1989a, p. 435 The sense of 'the given' is not in the traditional empiricists' sense as 'pure perception' nor is it a result of single effort or a look, nor that once recognized it will automatically give us the character of the world by which it is given; but in a different sense, ***'the given'*** is also permeated and influenced by the background ideas and it ***is to be understood in the following three aspects:*** a selective aspect, having been marked out as significant by our best available background ideas, a descriptive aspect, having been appropriately described in terms of those background ideas, and an access-enabling aspect, having been made accessible by application of background ideas, the scientific character or value we find it to have is independent of – not determined by - those background ideas. [Shapere, *The Rational Dynamics of Scientific Inquiry*, Chapter II, p. 7, (Forthcoming)]. In this book he also elaborates on success, coherence, and doubt, which serve to justify the rationality of scientific belief

as science advances. The *piecemeal approach*[293] to the study of reality is more successful than its rival methods, like holism, mysticism, myth, rationalism etc. It is because:[294] **a)** The piecemeal approach could achieve what it promised to do, i.e. it could achieve domain descriptions and explanations; **b)** Through the piecemeal approach one could obtain results, whose relevance, possibility or conceivability was denied by the rival approaches. For instance, *holistic approach* could not see a piece of knowledge as a separate piece for the sake of study, rather always as a part of inseparable whole. *Rationalistic approaches* rejected any possibility that detailed empirical study of particular domain could lead to significant understanding of those domains; and *mystical approaches* often maintained that only revelation was relevant to their goals, whereas knowledge of specific domains was irrelevant. Results, proved to be impossible by its rivals, could be obtained with the piecemeal approach; and **c)** Through the piecemeal approach and its critical standards, it was shown * that it was possible to modify beliefs in such ways that an increasing number of specific beliefs were found satisfying those standards, * that it was possible to build further inquiry on those beliefs, and * that it was possible gradually to supplement the piecemeal approach itself, in an increasing unification of accounts of different domains, with al the consequences of that transformation.

### 3.2.3.3 Explanatory Coherence

A theory can be judged not only in terms of its success in accounting for its domains, but also in terms of ***compatibility or coherence*** with theories of other domains. A theory must have not only the domain success but also it needs to cohere with other domains. A theory is, of course, tested only within limited experimental situations, yet this cannot be a reason to doubt it. The ability to cohere with other domains is taken as one of the elements of rationality in science and coherence is elevated to be the 'aim' of science and counted as a

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[293] The piecemeal approach, as opposed to holistic or mythical approaches and so on, *demarcates different domains* of specific areas of research It approaches reality in a piecemeal manner, it tries to comprehend it in compartmentalized areas of experience, as moving bodies, gases, salts [Shapere, 1995b, in Leplin (ed ), 1995]. Light, electricity, magnetism, heat are some more examples for domains of science Domain expands, and it is constructed increasingly as science develops, on the basis of available background information. Further, the description of domains and their constituent items, the formulation of problems, lines of research, and possible solutions regarding them, all these get reshaped and reformed as science develops There can be broad domains such as electromagnetism, genetics, organic chemistry etc. or even narrow domains like the interests of specialized individual research workers.

[294] Shapere, *The Rational Dynamics of Scientific Inquiry*, Ch. VI, p.39-40, forthcoming

reason for accepting (or lack of it, for rejecting) a new idea. Coherence paves the way for unification of domains, which in turn is the clear indication of the growth and development of science. Coherence in terms of unification of the explanatory accounts given by separate domains was given importance in due course. Some examples for unifications are: terrestrial and celestial physics (Newton), electricity and magnetism (Faraday) the incorporation of light into the resulting electromagnetic theory of light (Maxwell), the unified treatment of matter (Chemistry) and light in quantum mechanics, and the unification of Big-Bang cosmology and the particle physics of he Standard Model and beyond.

### 3.2.3.4 Goal Success

One may raise a question with regard to these two principles, the Principle of Domain Success and the Principle of Explanatory Coherence: whether they need any justification and if so, what is the character of that justification? The fact that domain success is achieved in many instances encourages achieving it in other domains as well. The goal of science becomes the effort to obtain domain success and coherence with other domains. In other words, **the Principle of Goal Success consists of the Principle of Domain Success and the Principle of Explanatory Coherence**. This Principle of Goal Success can be looked at two levels: *at the top level* it consists of * the achievement of what the inquiry promised; * the inability of the rival approaches to fulfill those achievements and * the accomplishment of successive extensions to other domains. At *the bottom level*, the principle of goal success consists of * the Principle of Explanatory Coherence and * the Principle of Domain Success (succeeding in explaining domains). The range of success is not a matter of working from 'top to bottom' – but from 'bottom to top'; judging successes first in explaining domains, then moving on to showing their coherence with explanations of other domains and finally checking whether the specific things what the inquiry had promised are achieved or not. Therefore it is a 'bottom-up' rationality rather than the top-down' rationality as it is usually thought of.

### 3.2.3.5 Absence of a Specific Doubt

The absence of a specific doubt is the fourth important element in the notion of rationality in science. For, as we have pointed out, the elements in background information, which is the

locus of the emergence of what counts as reason, can always be doubted because it is only contingent that we count that information as 'information' or 'reasons' Shapere contrasts, 'specific reason for doubt' with 'universal or philosophical reasons for doubt'. The latter, like 'A demon may be deceiving me', or 'I may be dreaming', can be applied indiscriminately to any claim whatever. Shapere claims that "such philosophical doubts play no role in the scientific or knowledge-seeking enterprise"[295]. He proceeds further to show that the fear about doubt is applicable to the negation too: "In principle possibility that doubt may always arise with regard to any of our beliefs – a possibility of doubt that applies *equally* to *every* belief, including its negation – is not itself a reason for doubt."[296] The element of doubt seems to be always present in every realm of science. For instance, in spite of all great advancements in cosmology today, the physicists, chemists and biologists don't accept the views of the universe as something dogmatic, but open for correction. But to doubt a theory, just because there is the possibility of doubting (Cartesian doubting!), is useless and meaningless[297]. We need to distinguish between specific (actual, genuine) doubts vs. Cartesian (universal) doubts.

Therefore, there is no harm in treating an item as a piece of genuine knowledge as long as there is no specific doubt against it.[298] In sum, Shapere's fundamental claim is that "what counts as a reason in science is not determined by the logical form of the reasoning, but by the content of science at a particular epoch "[299] What is counted or rejected as a reason is done on the basis of background knowledge. Components of the background information are included in for specific reasons. Thus there is no arbitrariness in selecting the constituents of the background information (as against the view of deconstructionists, postmodernists, proponents of mythic approaches and so on).

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[295] Shapere, 1982d, p 458
[296] Shapere, 2001a, in Hoyningen-Huene and H Sankey (eds ), 2001, p. 201
[297] Shapere, 1986a, p. 6, italics in original
[298] Shapere, 1995b, in Leplin (ed.), 1995, p 19
[299] Shapere, *Rational Dynamics of Scientific Inquiry*, Ch VI, p 37, forthcoming

### 3.2.4 Rational Descendent of Classical Empiricism: Transcending Traditional Rationalism and Empiricism

According to Shapere, the question regarding the contributions of the investigator in the process of acquiring knowledge is a persistent issue in epistemology. For him, following are the burning questions in the knowledge-seeking enterprise: What does one actually investigate? - Is it one's own sense-experience or nature or the universe at large? Is knowledge obtained by direct observation or does the investigator bring his or her own aspects into it? If so, what is the nature of such contribution and is it necessary for the process of obtaining knowledge? Or is it not at all necessary, as one can deduce all knowledge from observation? Or is there any middle way possible, i.e. some knowledge can be deduced without any investigation and some knowledge can be obtained only through the investigation of nature?[300] Traditionally two major epistemological groups, ***Empiricism*** and ***Rationalism***, have tried to answer these questions in their own way. Both the groups have some deep insights, while they go wrong in some other aspects.

#### 3.2.4.1 Two Rival Doctrines: Empiricism and Rationalism

While empiricism maintains that all the pieces of knowledge (concepts & beliefs), even if they don't have the character of knowledge, are rooted in experience, for their source and justification, rationalism argues that at least some knowledge is attainable by reason, independently of experience, without any interaction with the reality outside. But **two major criticisms against empiricism** are that it failed to clearly clarify what is meant by pure observation, which does not need any interpretation, and to show how all the other nonobservational beliefs are rooted in observation. Empiricism failed to realize that sense experience (which is the only possible way of having direct contact with the universe) always involves inference, as there is no pure 'given' available. If the importance of the 'given' in experience is stretched too far, one would land in 'solipsism', as one cannot justify believing in anything beyond one's own experiences; one can't speak of past or future, which are basically inferential in nature, going beyond the 'given' of here and now.

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[300] Shapere, 2006b, p. 732.

Hence Shapere is sure, that "empiricism, in its classical version, slid down the slippery slope to the skepticism that lay at the pit of the epistemological enterprise."[301]

Kant attempted to have a balanced view of empiricism and rationalism, by proposing that 'reason' gives us the ***form*** of inquiry (namely, the twelve categories including space, time, principle of causality etc.), and the sense-experiences give us the ***content*** of the inquiry; thereby he claimed to show that some aspects of knowledge had basis in both rationalism and empiricism as well. Unfortunately lots of problems arose with this proposal. Shapere highlights two major lacunae with Kant's idea: **a)** ***The idea of the absolute space and time as basic categories*** - The data coming from senses are not just passive reception; sensation takes place due to a positive decision to pay attention. Recent developments in mathematics, like non-Eucledian geometry, Reinmanian geometry, have disproved Kant's idea of absolute space. The successive mathematical concepts of 'space' undercut the allegations that there was anything 'essential' to space, in terms of which we must inescapably think. In contemporary physics space-time itself has to be explained in more fundamental terms. Quantum fluctuations seem to be of more fundamental importance than the ideas of space. Quantum field theory has come to show that space-time itself is a product of the breaking of the original symmetry of all four fundamental forces and therefore space and time themselves have been derived from other more fundamental elements. So space and time are not necessary forms of intuition Shapere argues that "even if this idea should not turn out to be viable, the very possibility of its conception betrays the Kantian philosophy"[302]; and **b)** ***The categorical status of the principle of causality***[303] – The principle of causality claims that every event, object, and properties of objects must be predictable from some previously existing conditions through scientific laws. But the quantum theories have strongly questioned this claim. Not all properties of an object can be determined at every moment of its existence. For the *Bell inequalities*, the *Aspect experiments*, *non-locality of quantum theories* – all reject the spatial localization of objects. The discontinuities, which are pervasive in quantum theories, reject that an object implies spatiotemporal continuity of the

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[301] Shapere, 1988b, p 301

[302] *Ibid.*, p. 303.

[303] Here it seems that Shapere treats causality and determination as one and the same But one can show that certain events / processes that cannot be determined, can still be shown / conceived to have been caused, and the causes may be unknown.

object and its behaviour. Thus the so called rational truths have been radically questioned and rejected.

### 3.2.4.2 An Objection against Empiricism - Never Clarified!

Shapere points out an objection against empiricism, which he thinks that other critiques of empiricism ignore. Classical empiricism never answered the following objection about its central claim: 'all our knowledge is based on sense experience' – is this declaration itself analytic (a matter of definition)? Or empirical (a matter of fact)? In both cases it would be highly problematic: "if analytic, it can, on its own principles, tell us nothing about the matters of fact with which it seems to be concerned; but if it is empirical, it cannot be established with absolute certainty."[304] Therefore empiricism itself (like its conclusion) is an empirical doctrine, and so it can bring itself to a stage at which it outgrows itself. Further, if the character of empiricism as a methodology is thus contingent, why it has been *de facto* key to so much knowledge? In retrospect, we can now see that empiricism has been a powerful methodology, not because it is a logically necessary methodology, but because of the way we and our particular universe happen to be (i.e. all our knowledge has to start with some interactions with the world).

### 3.2.4.3 Moving towards *Interactional Empiricism*

Shapere comes out with a renewed understanding of empiricism. Neither science nor philosophy can tell us on *a priori* grounds what method must be used in studying nature, how to learn about it, and much less about how nature must operate or reveal itself to us! Empiricism is useful at the beginning stage of our knowledge-seeking inquiry, but should we hang on to it at the later stages too? That is yet to be answered. Classical empiricism would deny or ignore many of the contemporary cosmological theories of Superstring, Inflationary theories[305] and so on as unscientific, as they are untestable in the traditional

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[304] Shapere, 2000, p 161.

[305] Shapere argues that for this Interactional empiricism mathematics is very essential Until 19th century mathematics was seen just a tool in science. But now Modern cosmology and quantum theory show that Mathematics plays a constitutive role in science **We need Mathematics to think in weird terms and to go beyond the medium sized-world to extremely small or big world.** All these conceptual thinking was (is) possible because of the power of mathematics of the 19th and 20th centuries We thus go beyond our earlier

manner. As they enter the region of metaphysics they are said to be exceeding the limits of good scientific reasoning. Empiricists will have to classify such theories and concepts of the modern simply as ''theoretical' (i.e. all nonobservational entities). For, the tools of logical positivism (verification theory of meaning and justification), logical empiricism (theory-independent observation-language) and Popperianism (falsifiability) don't seem to be sufficient and capable to test the theories of the modern science.[306]

Shapere argues that even if classical empiricism has fulfilled its explicit aims, and even if those aims were not wrong in principle, it would ***not*** have given an account of how science proceeds, because concrete scientific reasoning (as in the solar neutrino experiment) consists of far more than what is exhausted by saying that 'all our knowledge (or beliefs) rest on sense perception'. For, empiricism made a fundamentally wrong turn: "The assumption of classical empiricism was that reflection on what could be constructed on the basis of sense-perception was both necessary and sufficient for understanding what happens in scientific investigation. It is neither."[307] For, sense perception is ***not sufficient*** because in whatever way one may interpret sense perception, its analysis would not be enough to understand the knowledge-seeking process completely, the nature of knowledge, the implications of the existence of knowledge etc. Sense perception plays only a minor role in this process of getting information. Moreover, in many cases sense perception has been shown to be untrustworthy. Similarly, sense perception is ***not necessary*** because it has been pushed to the periphery in the modern science. Instruments have replaced the need of direct sense perception and it is needed only at the last stage when the data is transformed into humanly-accessible form.[308] So from perceptual empiricism (classical/logical/constructive), we move on **towards Interactional Empiricism**; from the notion of necessary reliance on observation we move on to **focus on observation as relevant only in a certain domain or stage of the investigation;** and from the equation of sense perception = observation, we move on **to show that both are separate and distinct**.

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modes of thought, to transcend the preoccupation with the practical and the local to think of something which is hitherto unthought-of. [See. Shapere 1998b, in Pin (ed ), 1998]

[306] Shapere, 2000, p. 154.

[307] Shapere, 2006a, p. 527 (15).

[308] Shapere, 1982c, p. 508.

### 3.2.4.4 Knowledge-Seeking Process as Rational Descendent of Classical Empiricism

Shapere views the knowledge-seeking process[309] (science) as ***Rational Descendant of Classical Empiricism***[310]: it is empiricism, because we have to interact with the world to learn about it; and it is rational descendant as well, because we have to learn what it is to interact; with the help of the background information we have to learn to how to learn. All our knowledge (or beliefs) rest on interactions with the world. But what counts as an interaction, at least at sophisticated levels of inquiry, is determined by what we already have good reason to consider as background information. It is a ***generalization of classical empiricism*** (for sense perception is relevant only with one minor region of electromagnetic spectrum, a manifestation of one of four fundamental forces with nature); and at the same time it is a ***departure from classical empiricism*** (for we have to learn to go beyond the dictates of sense perception).[311]

Shapere's viewpoint, thus, "***is neither an aprioristic rationalism not a sensory empiricism***", though it takes certain important aspects from both of them into consideration: namely, we bring some background information to interpret the data available, however that background information is changeable for specific reasons; "***it is neither relativist nor foundationalist,***" due to the fact that the observation–situation is infused with background information and there is 'the given' in the whole of inquiry; "***it is both historical... and rational***", because even what counts as 'reason' too emerges over the periods of history, and finally "***it is far more concerned with content than with logical form*** (though the later is not excluded)"[312] as after all the actual science is more interested in the contents rather than the formal frameworks and thus this view is faithful to the actual practice of science.[313]

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[309] This knowledge-seeking process, for Shapere, practically means Science, as science is the best available process.

[310] Shapere criticizes not only empiricism but also rationalism. Rationalism, he argues, could not establish any substantive truths about reality, totally independent of any connection with the senses. He attacks even the compromise proposed by Kant to synthesize both empiricism and rationalism. Kant's *a priori* intuitive forms of Space-time category and the Principle of Causality have been seriously questioned by the contemporary physics. [See: Shapere, 1988b].

[311] Shapere, "Observation," 2006a

[312] Shapere, 1995b, in Leplin (ed.), 1995, pp. 25-26

[313] One may be reminded of the idea of 'constructive empiricism'. But this idea does not commit itself to realistic understanding of theoretical entities. Since this view considers 'perceptual' as relevant to scientific realism, it is not making any commitment to realistic claims. Its proponents distinguish between perceptible and nonperceptible. For instance, Fraassen differentiates observing Jupiter (if not now, later!) from inferring the particles in a cloud chamber, where the latter is only an inference, as we do with a jet trail in the sky [van

**In sum**, Shapere's view of science as knowledge-seeking process, which ***transcends both empiricism and rationalism***, consists of the following elements: **a)** In the inquiry of knowledge (in dealing with experience) we must employ some prior set of ideas, which is a half truth of rationalism; **b)** there is no unique set of such prior ideas (concepts or propositions), which we have to bring to our inquiries (as against the classical rationalism's claim that there is such a unique set of ideas) and **c)** There are many (even infinite number of) alternative concepts or propositions that will serve equally well in dealing with experience or the universe. Here one might perceive the danger of relativism and to avoid that, **d)** There are at least better and worse concepts that can be brought to bear in dealing with experience, and whose betterness or worseness can be decided upon specific reasons and to select those items which we bring to the investigation; and it may in at least some circumstances be the case that there is only one best set of such concepts or propositions. Thus "all our knowledge does indeed depend on observation... but we bring to our inquiries prior beliefs for the selection, description, and access of what to observe; and that is... the legitimate residue of the rationalist tradition in the theory of knowledge."[314]

Having given a fair presentation of Shapere's major contributions, I turn to some of his major critiques and Shapere's response to them in the next Chapter. I end that Chapter with my own assessment of some of Shapere's ideas.

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Fraassen, 1980, p. 16-17]. However Shapere argues that it is the evidential, not the perceptual, which is relevant to realism in the world of science. Scientists meaningfully talk about 'observing' the unobservables (e.g the neutrino experiment). "Thus, if the question of observation is relevant to the question of realism, the latter must be resolved not by considering what is perceptible to the senses but by examining the evidential aspects of observation." [Shapere, 2006a, (p. 21)] Scientists are justified in speaking about the unobservables in a realistic manner because of the practical success they get in employing those ideas

[314] Shapere, 1998b, p 311.

# *CHAPTER 4*

# ASSESSMENT OF SHAPERE'S VIEWS

## 4.0 Introduction

Shapere by and large evokes a lot of reactions from philosophers and philosophers of science, probably because he attempts at a balanced view between the positivists and the historicists. In this Chapter I assess Shapere's ideas. There are three sections in this Chapter. ***Section 1*** deals with some of the major critics of Shapere, while his response to them is given in ***Section 2.*** I come up with my evaluative remarks of his ideas in ***Section 3*** Recapitulating in a nutshell his notion of rationality in science, I spell out some of the implications of such a notion.

## 4.1 MAJOR CRITIQUES OF SHAPERE

### 4.1.1 Jarret Leplin: Circular and Dogmatic Nature of Shapere's Views

Leplin[315] has critiqued Shapere's notions of scientific aims, goals, rationale of scientific change, the relations between science and philosophy of science and the methods of philosophy of science. He criticizes that Shapere has no regard for the sceptical inductive argument[316] (i.e. the scientific theories have failed in the past, so will it be in the future!). I just mention two of the major critical discrepancies that he points out in the views of Shapere, namely, that Shapere's views on rationality involve a sort of circularity and that Shapere views theory change in science as a dogma.

Leplin argues that Shapere's view of rationality of science is plagued with vicious circularity. This is because Leplin construes Shapere's views in the following way: "The rationality of science in the long run is self-certifying because it is legitimate to criticize something in science only on the basis of something else in science. The rationality and epistemic warrant of science are determined by concepts themselves constituted by science

[315] Leplin, 1984b in Leplin (ed.), 1984a, 1987, 1988a and 1988b
[316] Leplin, 1984b, in Leplin (ed.), 1984a, p. 199

(compare Shapere 1985)".[317] Leplin sees no rational connection, as against the demands of Shapere, among scientific developments. He gives an example to show that Shapere's view does not work: Pre-Daltonian and contemporary tokens of 'atom' or the 19th century and contemporary tokens of 'electron'[318] – there is no connection or resemblance between the usages of these two terms at these two epochs.

Shapere, according to Leplin, seems to hold that theory change in science as dogma, with no proper distinction made between rational and non-rational: "It is nothing short of a dogma in Shapere ... that virtually *all* scientific change is rational".[319] Leplin also views Shapere treating both the notion of background information and the chain-of-reasoning as dogma. These connections make the link practically with everything that is taking place in science with everything outside science.

### 4.1.2 John Losee: Problems with Shapere's Non-presuppositionist Philosophy of Science

Shapere has proposed a non-presuppositionist Philosophy of Science, which is normative and yet avoids inviolable principles. His non-presuppositionist account, in Losee's understanding,[320] demands that:

**a)** There is no supra-historical evaluative standpoint and what counts as 'rational' is also subject to change, over the history of science. The criteria of acceptability, rules of procedure, epistemological and metaphysical assumptions – all change over history. One does not have any supra-historical evaluative standpoint and therefore there is no 'inviolability thesis'.

**b)** It is possible to obtain knowledge in science, and philosophy of science has to show how it is done. A theory replacement in the course of the developments of science is a clear indication of a gain in knowledge. For Shapere, "x knows that T, if and only if, x believes that T and T has been applied successfully over

[317] Leplin, 1988a, p. 509.
[318] *Ibid.*, p 508
[319] *Ibid.*, p. 509
[320] Losse, 1986.

a period of time and no one has a specific doubt about T"[321]. For him the general doubt that any time a piece of knowledge may be discarded is irrelevant to the issues about knowledge.

**c)** An account of Philosophy of Science must preserve the objectivity and rationality of science. As science is not a subjective and irrational enterprise and philosophy of science must exhibit objectivity and rationality very clearly.

But John Losee[322] lists out the requirements of a normative account of philosophy of science:

**a)** A normative account of philosophy of science must contain at least one evaluative standard, 'S', which is applicable to evaluative problems of confirmation-status of hypothesis, comparative acceptability of theories or the adequacy of explanation etc.

**b)** At a given time, at least one application of 'S' to a present evaluative situation in science determines the correctness of a particular judgment in that situation; and

**c)** Apply 'S' to evaluate that situation.

These evaluative standards too are subjected to justification. Aristotle, Whewell, Mill, Hempel, Nagel – all acknowledged the need for justification of evaluative standards, and advanced justificatory arguments to justify the evaluative standards they use. Therefore, a last requirement,

**d)** The question about the adequacy of evaluative standards and particular application of these standards are to be held relevant. Among those evaluative standards, there is at least one S, which has a justificatory argument.

Thus, Losee argues, against Shapere, that a normative account of philosophy of science is not possible without at least one inviolable principle. Shapere claims that all standards of evaluation are also subject to change. But if there is no justificatory argument is available

[321] Shapere, 1980b, in Nickles 1980, pp 83-4.
[322] Losse, 1986.

then the transition from one stage to another is arbitrary. Such an account of philosophy of science is merely a succession of unrelated evaluative standards and, in fact, there can't be any overarching philosophy of science. If we have evaluative justification $S_k$ at one stage $t_1$, and another justification $S_j$ at $t_2$, how to talk about the transition stage? Given that there is no inviolable principle, we need to have a meta-level principle (which stipulates that comparative justification of evaluative standards is to be determined by appeal to present day standards of rationality). If the criterion of rationality also changes at a given time, one displacing another, on what basis can one choose one over the other? One can't be discarded just like that without any proper justificatory argument.

Methodologists want to know whether a standard S can be applied in a given situation, whereas a nonpresuppositionist would say, "yes certainly, if it *works*"; but that can be known only after it has worked out well. So, if the correctness of the evaluative practice can be decided only after the 'fact', then the normative judgments are actually historical judgments. If so, Losee points out, Shapere has two options: either "to pursue the nonpresuppositionist program under weak strictures on prescriptive status, and accept the consequent incorporation of philosophy of science into the history of science; or to stipulate within PS (Philosophy of Science) at least one principle held to be inviolable".[323]

### 4.1.3 Gerald Doppelt: Shapere's Views in Need of Clarification

Here I focus on Doppelt's criticisms against Shapere's notions of theory change, success, and epistemic gain/loss. He argues that Shapere needs some universal standards, though Shapere denies them, in order to make Shapere's notion of science viable. Finally I highlight how he charges Shapere of (moderate) relativism.

#### 4.1.3.1 Problems with Shapere and Other Post-Kuhnians

Doppelt argues that post-Kuhnian trends, which include diverse thinkers like, Feyerabend, Hanson, Toulmin, Lakatos, Hesse, Laudan, Shapere and so on, pay more attention to history of science, at the cost of due attention to the content of science. The historicist standards

[323] Losee, 1987, p. 70-71.

make a clear division between post-Kuhnian programme of science and, its rival, logical empiricism. But among all these historicists there is a lack of consensus in the notion of rationality. All these historicists ignore the philosophical requirements that ought to be satisfied by any completely adequate conception of scientific rationality. **The problem with them in general is that they want, on the one hand, to give importance to history of science and on the other try to develop a non-relativistic conception of scientific rationality.** However they lack 'philosophical clarity' in their efforts to achieve these two goals. They seem to fail to give the properties which an epistemological conception of science must have.

### 4.1.3.2 Shapere's Notion of Success – Unsuccessful

The notion of success is very important in Shapere's framework. When a scientific belief fulfils the requirements of success, coherence and the lack of any specific doubt it is accepted as rational.[324] The rationality of theory choice also depends on the empirical success of the theory. But he does not seem to give a clear account of the notions of *success* or *specific doubts*. If these standards are specific to domains, Doppelt argues, how can the scientists of the other domains will judge the given theory? This presupposes or necessitates some common notion of success across various domains.[325] Shapere denies that there is any such universally valid standard to measure empirical success or the shifts in such standards. He asks, therefore, "... what better 'standards' or 'criteria' could we employ... than those beliefs, methods, and so forth that proved successful and have not been faced with specific doubt!..."[326]. Doppelt argues that Shapere's such words involve a kind of circularity, even a paradox: for, there are only shifting, contingently acceptable standards of success; and yet it presupposes some rationality of shifts in these standards which rest on some more fundamental universal sense of success. So a pertinent question arises: "How could philosophy of science judge the rationality of the scientific corpus of beliefs at time $T_2$ as more successful that its predecessor at $T_1$, if the success of each is exclusively judged relative to its own special standards(s) of success?".[327]

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[324] Shapere, 1982d, p. 458.
[325] Doppelt, 1988, p. 116.
[326] Shapere, 1984d, in 1984a, pp 226-7.
[327] Doppelt, 1988, p. 118.

### 4.1.3.3 The Need for Some Universal Standards – Against Shapere's Demands

A sort of *Canon of consistency* can be formulated from Shapere's view: "The rational credibility of the scientific corpus at a time $T_1$ depends (other things being equal) on the degree of consistency of (a) the theories that scientists accept (and judge as rationally acceptable) at $T_1$ with (b) the aims and standards governing theory acceptance that they accept at $T_1$"[328] Without the assumption of such a canon Shapere can't show why it was rational for modern physicists to adopt a standard legitimizing unobservables (free quarks)... But it is very clear that Shapere[329] has denied that consistency is a universal requirement of scientific rationality and therefore it is rational in science sometimes to accept a particular inconsistency. Doppelt opines that Shapere's idea of scientific rationality actually presupposes some sort of universal aims, methods and standards, which run through the entire development of science and he strongly argues further that minus these important assumptions "(Shapere's) examples and account of rational change would involve a completely question-begging, irrelevant, ultimately empty appeal to 'success' in science."[330] To avoid this lacuna Shapere needs to agree with some universal standards. For instance, Doppelt argues, Shapere has to necessarily adopt a sort of universal notion of success. It may be, for instance, that the ultimate aim of all science is to maximize the over-all rational credibility of the corpus of scientific beliefs – this is actually a presupposition of universal notion of successful science; and the method would be to initiate changes of scientific beliefs that eliminate or reduce tensions, inconsistencies, shortfalls etc. This conception also presupposes a universal standard(s) of scientific rationality, i.e general canons of scientific reasoning to govern the degree of mutual epistemic support, consistency and over all credibility exhibited by the scientific corpus of beliefs at a given time.

### 4.1.3.4 The Notion of Epistemic Gains – Ignoring the Epistemic Losses

Shapere argues that the epistemic gains constitute the reasons for readjustment in aims, standards etc. of science and he does not mention anything about the epistemic losses and also not about the epistemic gains which would have occurred, if other readjustments had

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[328] *Ibid.*, p. 119.
[329] Shapere, 1984h, in 1984a, p 235-7
[330] Doppelt, 1988, p. 120.

been chosen. While epistemic gains constitute good reasons to accept the change rationally, the losses may equally justify the rejection of that change and the preservation of existing standards. It is only a possibility of epistemic losses in the abstract poses any real problem for Shapere. But, in fact, Shapere argues that philosophy of science must not rest content only with a study of what actually happened in science but also must consider what 'could have' and 'should have happened'.[331] For him a change in scientific standards is rational if and only if it enhances the over all 'success' or epistemic credibility of the scientific corpus at that time; that is, "against moderate relativism, can Shapere's conception show that a change to some new scientific standard B was more rational than continued adherence to its predecessor A and that the change was motivated on this basis...?"[332] To overcome this challenge Shapere has to show: either those epistemic losses are not genuine losses or the epistemic gains outweigh those losses (with the acceptance of new standards and therefore it is rational to change). However, he is not giving any elaboration on this, no example in actual history, or any philosophical argument; it is formidable without any universal standards of aims, methods, evidence etc. Shapere must elaborate the notion of enhancing the success or credibility to deal with the problems of epistemological loss / gains; or moderate relativism emerges! If his account does not show that new scientific standards were more rational to accept than their predecessors, then the way is open for non-cognitive (sociological etc.) considerations of these choice and further cognitive relativism too is not very far.

#### 4.1.3.5 Shapere – A Moderate Relativist!

Doppelt argues that Shpaere's position lands him, at least, in a moderate relativistic position, as Shapere himself seems to be interested in avoiding only extreme relativism. For, Shapere declares, all that is important in philosophy of science is avoiding 'extreme relativism' (which says science is largely irrational or non-rational)[333]. However, Shapere's claims about science made elsewhere in his writings, force him to have a conception of science, that has to overcome *even* moderate relativism: for instance, Shapere says, a) Philosophy of science must show that modern science is 'better' than its predecessors, which had 'wrong'

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[331] Shapere, 1984i, in 1984a, pp. 194-5
[332] Doppelt, 1988, p. 121.
[333] Shapere, 1984j, in 1984a, p. 330; 1984k, in 1984a, p. 415

(not just worse) aims, standards, methods etc.[334]; b) Science generates 'increasingly' well-founded and reliable beliefs; its cognitive achievements are cumulative and steadily increase in history of science.[335]; c) He wants to give an account of scientific change that avoids non-cognitive, sociological, economical, psychological explanations of rational scientific development; thus it is clear that he values the avoidance of sociological relativism[336]; and d) He prefers a realistic interpretation of science on which science achieves discoveries, knowledge, truth, 'discovery of the way the things are'.[337] Apart from this discrepancy in Shapere's claims, Doppelt points out that the reasons for a theory change must be more rationally compelling than those earlier reasons, which favoured A over B in the past. The good reasons for preferring B now must actually motivate the historical proponents of A to reconsider their choice. This would avoid **even moderate relativism,** that is, one does not have equally good reasons to adhere to older theory. This overcomes the relativism concerning the gap between rational scientific theories and irrationally / non-rationally motivated scientific beliefs.[338]

Shapere's account of scientific rationality fails to satisfy his own pictures of science. This shortfall is due to "a failure to appreciate the distinct anti-relativist requirements and relativist challenges at issue in a completely adequate account of scientific rationality"[339] and by just giving 'good' reasons for the scientific change, one may avoid extreme relativism, but still the challenges from moderate relativism remain. All trends of post-Kuhnian era will do well if it realizes the mistake of taking "any account that overcomes extreme relativism" to also overcome "moderate, sociological, and cognitive relativism."[340]

No doubt, Doppelt does recognize the great achievements of Shapere and other post-Kuhnians as they have efficiently challenged the thesis of extreme relativism and radical incommensurability. But the relativist challenges to scientific rationality are subtle; it needs to be tackled by them and other philosophers of science in the post-Kuhnian trends as well.

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[334] Shapere 1984h, in 1984a, p. 211.
[335] *Ibid.*, pp. 205, 228-231.
[336] Shapere, 1984l, in 1984a, p 306.
[337] Shapere, 1984h, in 1984a, p. 227
[338] Doppelt, 1988, pp. 105-107.
[339] *Ibid.*, 132.
[340] Doppelt, 1988, p 132

### 4.1.4 Toby Linden: Shapere's Problematic Views on Observation

#### 4.1.4.1 Objections over the Notion of Observation

Shapere analyses the concept of observation with examples to show what it is to be directly observable (observed).[341] But Linden[342] shows a contradiction by arguing that these two experiments are probabilistic in nature while the analysis is absolute.

Shapere gives many examples of famous astrophysicists, who agree that the core of the sun, which is at enormous high pressure and heat, is directly observable, though it has 400,000 miles of opaque material form the surface of the sun, which is normally said to be beyond our direct access for ever. Shapere cites two ways of getting information about the core of the sun: **a)** by studying the electromagnetic radiation (light photons) that is emitted from the core of the sun, and **b)** by collecting the neutrinos coming from the sun. Here the former is said to be the 'indirect' method, as the photons get scattered, absorbed, or radiated, and thus any information that we are able to arrive at by studying these photons will be 'indirect'. On the other hand, neutrinos have less probability of interacting with other particles on their way to the surface from the core, and therefore it is direct. From these, Shapere concludes: "X is directly observed (observable) if **a)** information is received (can be received) by an appropriate receptor, and **b)** that information is (can be) transmitted directly, i.e., without interference, to the receptor from the entity x (which is the source of the information)".[343]

**Linden's Objections**: **a)** Shapere points out that the only contrast between these two experiments is that the neutrinos have less probability for interfering with other particles, while such probability of photons is quite high. But from such probability considerations one cannot derive an absolute condition: "No interference is possible if direct observation is to take place"[344]; and **b)** The level of probability of interference cannot be the key element in analysis. It may give us only an account of what it is for something to be observable. "The

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[341] Shapere, 1985.
[342] Linden, 1992.
[343] Shapere, 1982c, p 492. For more details on this, see **3.2.2.3.**
[344] Linden, 1992, p. 294.

likelihood of the interference (alteration) is not relevant to whether an observation has taken place on a particular occasion"[345].

**Linden's Analysis of the Neutrino Experiment**

The features of the examples can be pointed out as the basis of what it is for something to be directly observable (observed): * the probability of interference, * the magnitude of interference with radiation and * the magnitude of alteration to the information carried by the radiation.

**a)** In the case of photons, Shapere claims, due to radiation, the information is altered and in that of neutrinos it is not altered. His analysis seems to ignore the difference between the *interference with radiation* and the *alteration to the information carried by radiation.* Objects may be interfered with but the information carried by them need not be. The probability of interference cannot do the work that Shapere wants his analysis to do.

**b)** The magnitude of interference with the radiation does not seem to be so crucial as Shapere shows it to be. For, with regard to photons the interference with radiation is so severe that the actual radiation is changed, while he is not explaining how it is that the neutrinos are not affected by the radiation; further he talks only about *the transmission of the information* and not about *the character of radiation*; and most importantly, Shapere focuses only on the interference between the source and the receptor and ignores the interference that occurs after the radiation reaches the receptor. He may subsume all such details under 'background information' yet one must check whether or not interference takes place after the radiation reaches the receptor.

Human elements are essential for something called 'observation' to take place. As Shapere puts it, "whatever information is received through the 'appropriate receptor' must be

[345] Linden, 1992, p. 294.

transformed... into humanly-accessible form"[346]; nevertheless he further states that a human perceiver need not be there "for years. Yet it still counts as observational"[347]. This is a bit far-fetched, as we cannot claim the process of detecting the far-away galaxies observational, if somehow humans don't enter in the long process.

Shapere suggests that the reliability of the experiments depends on the background beliefs of neutrinos and photons. If the background beliefs are doubtful then the reliability is less. In the case of neutrinos the probability of interference (and therefore the alteration in the information) is less; that is there is no specific reason to doubt the background beliefs, whereas in the case of photons such probability is high because there are the specific reasons to doubt its background beliefs. But in future if the background beliefs of photons have overcome all doubts, then photons too can be used to observe the core of the sun. Thus, as of now, he claims that the observation (of the core of the sun) based on photons is inferential (therefore *indirect observation*) and while that based on neutrinos is non-inferential (therefore *direct observation*). But he frequently uses 'directly observe' and 'observe' interchangeably.

#### 4.1.4.2 Modification of Shapere's Definition of Observation

Linden points out that Shapere is not consistent in using the terms 'directly observe' and 'observe' as he uses both the expressions interchangeably. More crucially, the neutrinos, as Shapere himself is aware, do not carry the information as to where they come from. In science it only means that the receptor is pointed in the direction of the source to be observed. But Shapere decides that we can safely conclude that the neutrinos come from the centre of the Sun, because those from other (possible) sources are below the capacity of the apparatus to capture them. It must be noticed, as Linden argues, that "it is the theory of the source and transmission, not the directionality of the receptor that permits us to say that we have made an observation. Shapere is explicit that he intends his analysis only to provide sufficient and not both necessary and sufficient conditions for observation" [348]. Linden is sure that Shapere's view is in need of some focusing, without which Shapere's view will not

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[346] Shapere, 1982c, p 508.
[347] *Ibid.*, p. 509.
[348] Linden, 1992, p 299. Linden quotes from Shapere, 1982c, p. 510

even be sufficient. With these considerations, Linden proposes a correction in the definition of 'observable' proposed by Shapere: "X is observed (observable) if: i) information is received (can be received) by an appropriate receptor, from an entity x (which is the source of information); and ii) that information is (can be) transmitted *reliably* (not *directly* as Shapere worded it), i.e., there are no specific reasons for doubting that any interference to the radiation is accounted (accountable) for"[349].

Having seen some of the major critics of Shapere I now proceed to the next Section to see what Shapere has as a response to these critiques.

## 4.2 SHAPERE'S RESPONSE

Here first let me focus on the two important papers in which Shapere explicitly answers the objections raised by Doppelt and Leplin. Then I turn to the discussions that I had personally with him.

### 4.2.1 "Doppelt Crossed"

As Shapere understands, Doppelt critique can be grouped under three groups:[350] a)Regarding the concept of 'success' (no analysis is provided, and therefore the concept of 'reason' unexplained; in need of some universal criterion); b) Regarding the role of standards/criteria in science (how they are related with the substantive beliefs, the possibility of rejecting them); and c) Regarding his becoming a prey to the challenges of (moderate) relativism (underdetermination of beliefs; problem of loss in scientific change).

Doppelt charges Shapere that the notion of 'Success', which plays a primary role in Shapere's account of rational scientific change, is not defined properly. But Shapere points out Doppelt's oversight in this regard, as there are papers which elaborately discuss the notion of success. For instance, "Objectivity, Rationality and Scientific Change"[351] explains that a theory is successful if it is able to account for its domain and "Method in Philosophy

[349] Shapere, 1982c, p. 492.
[350] Shapere, 1988a
[351] Shapere, 1984g, in Asquith and P Kitcher, 1984

of Science"[352] provides other characteristic of success, namely, the absence of any specific doubt in giving that account for the domain. So, that which is successful and free from these doubts becomes a part of the 'background information'. Similarly Doppelt mistakenly equates the idea of what counts as reason in science only with the criterion of 'success'. It is better that he is aware of the other factors[353], namely coherence with other domains and the element of 'given', which make up rationality in science.

Doppelt claims that since there are many approaches available to decide upon the idea of success, one needs a universal standard of criterion, apart from the process itself. Shapere agrees that there are many approaches available and the piecemeal approach is one among them (the others approaches are mythic, holistic, rationalistic etc); However the *piecemeal was favoured finally because of the following considerations*: i) what that approach promised could be done really could be done, ii) through that approach, it turned out that results could be obtained whose relevance, possibility, or conceivability was denied by rival approaches, and iii) that approach and the critical standards it carried with it, it could refine / alter beliefs in such ways that an increasing number of specific beliefs were found satisfying those standards, that it was possible to build further inquiries on those beliefs, and that approach was able to unify accounts of different domains. These don't refer to another surreptitious application of more basic 'criterion'... 'Being able to do something which other approaches said could not be done' – is not a criterion; to hold it as one of the presuppositions that lay down standards with specific content is to invite a confusion of a philosophically dangerous sort. "The victory of a standard of success, like that of the piecemeal approach to inquiry, need not presuppose some more fundamental criterion (in the sense of a specific theoretical presupposition) of success"[354].

Doppelt thinks that since there are many ways of resolving conflicts and tensions in scientific framework the danger of relativism looms large again. However Shapere reiterates: "the fact that there are typically many ways of resolving problems in science does not necessarily imply relativism".[355] For instance, in 1905, to resolve photoelectric-effect

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[352] Shapere 1986b, in Nersessian (ed ), 1986.
[353] Shapere 1984g, in Asquith and P. Kitcher (eds.), 1984, pp 656-657.
[354] Shapere, 1988a, p. 136.
[355] *Ibid.*, p. 137.

problem, many proposals,[356] besides Einstein's were available; yet, finally it was decided in favour of quantum theory. Though the alternatives are logically consistent there can be other criteria for selecting. Just because the alternatives are logically consistent one cannot decide that there is no other criterion to choose one among them; for, "logic by its very nature cannot say anything about the *content* of the alternatives in question, and so says nothing about whether there are contentual criteria by which some, or even all but one, might be ruled out."[357] Thus, when conflicts are examined, in many cases, except may be a few, there are good reasons available to choose an alternative. One can also give a 'defensible account' with good reasons to justify that particular choice.[358]

Doppelt blames Shapere that he ignores the problem of 'epistemic losses', as gains justify the theoretical changes, the losses may justify the preservation of old theory. Shapere does not deny the fact of the epistemic losses but the mere possibility does not imply they do actually exist; it does not mean that we cannot recognize and deal with any losses that actually occur; and further, it does not mean that always there must be losses, and losses need not be equal in weight with regard to the epistemological gains, which justify theory change. It would do well to realize that an initial gain may turn out not to be a loss at the end; science is not all-at-once process; because a theory may be proposed first as a hypothesis, and may not achieve as the old theory did; they may realize that nothing was lost from earlier views Moreover, the transition from A to B can be a gradual one, not that all the standards of the new theory have to be clearly formulated at an initial stage. In the beginning it may be proposed as a 'working hypothesis' and may not have clear idea about its standards, whether it will be borne out or not in course of time. Doppelt points out that when there are good reasons to favour B over A, and there may be equally good reasons for adhering to the old theory, then how to settle, in other words, the problem of: "Underdetermination of scientific changes by good reasons". Shapere asks in return, 'Does it mean that there are never *better* reasons for one alternative over another?' Such a view would be an exaggeration and would be as immoderate as extreme relativism as well. There are cases where better (if not conclusive) reasons available. History of science shows that there are some cases, where there is such *better* reason.

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[356] See: Steuwer, 1975, Chapter 2.
[357] Shapere, 1988a, p. 137.
[358] *Ibid.*, Shapere, p. 138.

### 4.2.2 "Leplin on Essentialism"

Shapere in his paper, "Leplin on Essentialism,"[359] refutes most of the charges levied against him by Leplin. He strongly disagrees with Leplin regarding the accusation that Shapere's concept of rationality in science is self-certifying. In "Objectivity, Rationality and Scientific Change"[360] and many other papers Shapere has demonstrated how the notion of scientific change is not self-certifying: **a)** a vast, vague competing variety of way of classifying elements of experiences, conceiving problems related to them, how to understand and to explain them, to answer them etc. were suggested by every day experience; **b)** the piecemeal approach carried with it a standard according to which explanations were required to account for an isolated domain of purported facts; **c)** that approach gradually proves its capability to give such accounts, and more generally of doing what it promised it could do; **d)** that approach gradually triumphed over competing conceptions of what counted as a reason and how to learn about the world; and **e)** accounts of separated domains frequently proved coherent, identical, or unifiable with one another, so that a further standard of reasoning, the coherence of accounts of different domains, arose, and that gradually, again as a matter of contingent fact, the piecemeal approach itself began to be transcended in an increasing unification of science[361].

Regarding Leplin's charge that Shapere's view of chain-of-reasoning does not solve the problem of incommensurability, Shapere points out that the very example that Leplin provides (notion of electron) has been used in many of his papers[362], to show how there is a rational progress along the developments in science. Therefore Shapere explains that "those ends appear to be incommensurable only when viewed in abstraction form the intervening chains of reasoning".[363]

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[359] Shapere, 1991c.
[360] Shapere, 1984g, in Asquith and P. Kitcher (eds.), 1984
[361] Shapere, 1991c, p. 658
[362] See: Shapere, 1984j, in 1984a and 1984 (Chapter 15), and 1989a.
[363] Shapere, 1991c, p. 663. Here I like to point out that though Leplin rejects Shapere's idea of overcoming incommensurability as untenable, Leplin himself reflects Shapere's position for rejecting the idea of incommensurability: Incommensurability is nothing "but an artefact of a particular program in the theory of meaning... [which] is best resisted not by ambitious philosophical analyses of scientific rationality, but by disowning that program's model and reference". [Leplin, 1988a, p. 508 ]. But this is precisely what Shapere has been arguing over the years on the thesis of incommensurability. [Shapere, 1964b, 1982a; 1982b, in Hacking 1982; 1982c; 1988a; and 1989a]

Leplin sees that Shapere's view cannot help constitute knowledge, due to the ever-present possibility of scientific change. But for Shapere, though the possibility of doubt is possible in principle, yet, the conclusion does constitute knowledge. Therefore he asserts, "I hold that there is such commitment so long as we have no significant reasons for doubting a successful scientific claim, which they count as knowledge."[364] Commenting on Shapere's position Leplin charges that "it is impossible to regard conceptual diversity as a rational development".[365] Shapere rejects this as yet another misunderstanding by Leplin. For, background information is never a monolithic body, it provides conceptual sources to understand what the problems are and to provide answers to those problems. This fact expresses the incompleteness of science, containing gaps, inconsistencies, ambiguities and other sorts of problems. Heterogeneous background of ideas which are 'internal' to science provides such variety. Hence it is wrong to say that reasoned diversity is impossible and it is not that the only possible source of conceptual diversity in science is external influence.

Regarding Leplin's campaign for the H-D method to be the method of science, Shapere argues that Leplin seems to be unaware of the problems involved in the H-D method. In addition to the defects with the 'deductive' aspect, it (H-D method) also fails to acknowledge the extent to which new hypotheses are built in the light of prior knowledge; further "it fails to recognize that, when science has reached a high level of sophistication, it only rarely, if ever, needs to appeal to external considerations".[366] The new hypothesis in 'some sense' relies on the 'free creativity' on mind. But science is based on or derived from the best science available. It guides further investigation, the formation of hypothesis etc. At the same time, it is not true that science allows anything in the name of 'free creation' on mind. Science does not stop any abstract speculation outright. However, unless there is a serious reason, it won't take up any hypothesis for genuine consideration[367]. Thus, though, Shapere agrees with Leplin in saying that the history of science does not vouch for inductive method, yet he disagrees with Leplin in upholding H-D method. In fact, the weakness and the strength of the H-D and inductive methodologies can be mutually complementary, so as the weakness of the one is the strength of the other.

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[364] Shapere, 1991c, p.662.
[365] Leplin, 1988a, p. 509.
[366] Shapere, 1991c, p. 672.
[367] *Ibid.*, p. 673.

Shapere does not agree with Leplin in saying that there is no positive evidence to prefer one method over the other; for "we do in fact have powerful and convincing evidence to that our construction of theories should be constrained by consideration stemming from science itself"[368]. We always need something to work on. Though we don't rely on naïve induction, we need something to begin with, to derive from: "In an important sense, there was no first philosopher, no first scientist, no first observer; no one starts out with nothing in terms of which to conceive and interpret, to raise questions, to provide expectations, and to inquire critically".[369] Human experiences provide the background from which inquiry has departed. Thus it is not correct to say that there is no evidence, no reasons for preference to a particular methodology.

Many objections were clarified by Shapere himself during my **personal interviews** that I had with him, on several occasions from July till October, 2006. Some of the major points that came up in our discussion are given below.

### 4.2.3 Toby Linden's Objections on Observation

While analyzing the neutrino experiment Linden charges Shapere that there is no distinction made between *the interference with radiation* and *the alteration to the information carried by radiation* **(4.1.4.1)**. But Shapere clarifies, again in the same personal interview that "the information *is* the state of photon, and it is not to be treated as something added to photon, as if photon is carrying the information on its back, and hence the distinction that Linden points out is meaningless".[370] Similarly, he points out that Linden does not seem to realize that the radiation is information, and hence one cannot speak of *the transmission of the information* and *the character of radiation* as two different aspects (refer no. iv above). Shapere affirms the preference to use neutrinos, rather than photons, in the experiment, because neutrinos are weak in interactions with the other particles during its journey to the surface of the sun and to the receptor, whereas photons in their long journey of 100,000 years to get out of the sun they bump against other particles at every millisecond and that is

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[368] *Ibid.*, p. 675.
[369] *Ibid.*, p. 673.
[370] Regarding Linden's objection that Shapere wrongly derives an absolute condition based on probability considerations Shapere sharply reacted in the personal interview on 15th Sep, 2006. He just said: "It is a stupid idea to call it probability consideration".

called interference. And finally, Shapere finds no interesting and remarkable advantage with rewording of his definition of observation (observable) by Linden.

### 4.2.4 Clarifying Other Minor Objections

Nickels reviewed Shapere's book, *Reason and the Search for Knowledge*, in 1985[371]. Now that more than two decades have passed since then, one can expect some changes and transformations in Shapere's views on certain issues. In some cases he has modified or transcended his previous positions. Sometimes he has branched into new realms to address new issues, as demanded by the recent developments achieved by contemporary physics in the past two decades. Here I just mention three of them: the notion of success, differences with Pragmatism and his unwillingness to identify himself with historicists.

Shapere does not define 'success' in a pragmatic way. He also does not see success as 'definition of truth'. Many misunderstood Shapere, as Niiniliuoto[372] does, to claim what is successful as true. Shapere gives 'success' only as a criterion of 'reason' not as 'truth'. He clarifies, "'success' and 'relevance' do not define 'truth'; for no matter how successful an idea might be... it is always possible in principle that specific reasons for doubt may arise. It is this possibility that breaks the connection between 'reason' and 'truth';[373] and this break is important for his account of the circumstances under which a scientific claim may be said to be true. A hypothesis can be taken to be true when it is successful with respect to its domain, coheres with the theories of other domains and "satisfies other such criteria (like, that is not a conceptual device – fiction, idealization, and so on)"; however, what it precisely means to be true "must be given by the science involved".[374]

There are further significant differences between Shapere and traditional pragmatism: i) For traditional pragmatism there was presumably something ultimate about the 'consequences' in terms of which beliefs were to be judged successful; but for Shapere what corresponds to 'consequences' are specifically designated as the items of a domain and domains can alter in the light of new discoveries and new theoretical explanations; ii) Other criteria of

[371] Nickles, 1985.
[372] Niiniliuoto, 1984
[373] Shapere, 1980b, in Nickles (ed ), 1980, p xi
[374] Shapere, 1991c, p. 658-9, foot note 2.

acceptability (besides success) with regard to a domain have arisen in the course of inquiry, and these can, under specifiable conditions lead to the conclusion that even "Success in accounting for a domain is not a sufficient condition for truth, or even for belief; under certain specifiable circumstances, it is not even a necessary condition".[375]

From all the discussions above it is obvious that Shapere has strong appreciation and inclination towards historicism. He firmly believes that the role of history is very important and the knowledge of history is essential to understand the knowledge-seeking process, so much so, people like Doppelt finds fault with Shapere that he pays more attention to history of science at the cost of content of science. However he is not happy to identify himself with the historicists, as he claims his views are significantly different from those of the historicists.

## 4.3 MY ASSESSMENT OF SHAPERE'S VIEWS

Shapere's views[376] are unlike the ones held by either the logical positivists or the historicists. His views deserve serious consideration. His position may be viewed, **not just as an attempt to tread a balanced path between the two opposing trends of logical positivism and historicism, but also a bold effort to go beyond of both of them, whereby he inculcates the strengths, and avoids the weaknesses, of both of them.** Thomas Nickels[377] finds a healthy combination in him, which is quite rare among the philosophers of science: Shapere though follows a thorough historical approach (highlighted by Kuhn and Feyerabend) and yet highly critical of it. He is different and determined in his approach to the issues of philosophy of science. He clearly brings out that the Positivists' account of science is very formally objective and rational but irrelevant to actual history of science,

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[375] *Ibid.*

[376] Shapere's journey into philosophy of science spans over the past four decades and still, in his rather advanced age of 81, he is intellectually sharp and physically healthy to carry on with his valuable contributions to philosophy of science. I had the privilege of discussing his ideas in person, between July – October, 2006, at his residence, at Winston-Salem, North Carolina, USA. He is known for his innumerable, even complicated, case studies from the history of science to drive his points home. He is presently busy giving final touches to his forthcoming book, *The Rational Dynamics of Scientific Inquiry*, which he aims to be highly comprehensive of all his vigorous and persistent research in all these long years. He plans to come out with another book on *The Values of Knowledge* As I understand it is not going to be merely an academic accomplishment, rather a study of his own personality development That is why, about this project he mentioned in a personal meeting on 6th October, 2006, "I mainly do it (writing the book) for myself, it clears up what I am"

[377] Nickles, 1985, pp. 310-312

while historical account (Kuhn and Feyerabend) of science is highly relevant, but relativistic and irrationalistic. Thus an account of science is normally seen as either in ironclad logical standards or in relativistic historical practices. But Shapere thinks it is possible to have an adequate account which includes a measure of both the views; and so he demands that "an adequate philosophy of science must show how it is possible that we *might* know, without guaranteeing that we *must* know"[378]. He seems to be unique in handling a certain concerns of the area, so much so that Nickles observes, "He has ever been a 'loner' rather than a 'party man' (e.g. a positivist or a Kuhnian), and hence has never switched parties. The result is a coherent and often attractive vision of scientific inquiry"[379]. In this Section I like to assess some of the significant contributions of Shapere.

### 4.3.1 Background Information and Its Proper Role in Science

Rationalists did not give much importance to Background information, while Historicists, though recognized its role, yet they did not decipher the actual need and its role in science. As the Historicists failed to realize that there are valid checkpoints in background information they could not avoid the danger of relativism. But Shapere has shown, rightly so, as to how science bases itself on background information and at the same time preserves its rational character in terms of the 'given'. Shapere claims that the developments in modern science (about 400 years) have shown, that we need 'to learn how to learn' about reality, how to think and speak about it, how to refer to what we study and how to judge the results of our investigation[380].The demarcation of science and non-science is not given or discoverable by armchair logic, but develops with the growth of a distinction between beliefs that are worthy of being included or not in the pool of background information. From this we realize, that the demarcation between the observable and the unobservable, the scientific and the non-scientific, scientific possibilities and impossibilities, scientific problems and pseudo-problems, scientific claims and pseudo explanations – all these ***"are not something given once and for all, but rather shift as our knowledge and understanding accumulates"***.[381] Therefore, science is an enterprise that has evolved over

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[378] Shapere, 1984h, in 1984a, p 227
[379] Nickles, 1985, p. 310.
[380] Shapere, 2001a, in Hoyningen-Huene and H. Sankey (eds.), p. 200.
[381] Shapere, 1978, p. 1000 (emphasis mine).

generations, as a tradition that has been criticized and constructed, and as a process of inquiry, in which we build on background information.

Further, observation, theory, objects of study, and conceptions of our objects of our study – all depend on the body of knowledge available at a given time, and evolve with it, often leading to a recategorization, reconceptualization, and even redescription of the furniture of the world. Therefore, **historical development is not something external and accidental to the very understanding of reasoning and knowledge.** Looking at science as a part of the evolution of human species entails a radical reformulation of the aims, methods of philosophy of science and of much the philosophical enterprise in general. Science must be both the object of our investigation and the framework within which they are undertaken. As a growing enterprise we can't say anything about the limits of science. We cannot know in advance what turns science would take as centuries go by. It is arrogance to say that science can learn everything, while it will be ignorance to lay unavoidable limits in its quest for knowledge. We can't say that what we know is as things are! Therefore, "We must, after all, build our beliefs about the world we live in on the basis of the best information we have, wherever possible believing what we have reason to believe and doubting what we have specific reason to doubt."[382]

### 4.3.2 Knowledge-Seeking Process as Contingent Interactional Empiricism - Its Implications

Shapere argues that the usual criticisms against classical empiricism show ***where*** it went wrong and ***why***, but could not show that ***in principle*** it went wrong. Further, even if all the claims of classical empiricism were to be positively fulfilled that would not have given us the complete and real understanding of science. With his strong arguments (about the non-availability of 'the given'; the theory ladenness of observation and the empirical nature of the empirical doctrine itself), he has shown how empiricism alone would, not only not help science to progress but also would positively hinder the progress. The doctrine of empiricism itself is empirical, and not analytical; therefore Shapere argues, "When rightly understood, empiricism itself, like the processes and conclusions it addresses, is an empirical

[382] Shapere, 1978, p. 1001.

doctrine, and can in principle bring us to a stage at which it outgrows itself".[383] Therefore one has to go beyond empiricism especially in the context of contemporary science.

Shapere prefers to call his understanding of science as **'Rational Descendent of Classical Empiricism'.** It agrees with the classical empiricism in that all our knowledge is based on the *interactions* with the world; but at the same it departs from it, in understanding what that interaction means. An interaction is determined by our knowledge; different fields understand interaction differently; a given field may exclude or ruthlessly limit the role of sense perception. Thus it is a correction to classical empiricism to show that there is no necessary dependence on sense perception. However, it goes beyond sense perception; it expands the meaning of sense perception to include instruments, and what is invisible; and it recognizes background information and thus it is *rational.*

Shapere's view of science is ***neither absolutistic (foundationalistic), nor relativistic:*** it is not the former, because even the highest levels of background beliefs are also revisable, and nor is it the latter because the background beliefs are based on reason. The picture of the knowledge-seeking enterprise which emerges here is ***neither an a prioristic rationalism, nor a sensory empiricism.*** It gives importance to both what we infer from observation and to what we add to the interpretation of the given situation (i.e. the background beliefs). It recognizes that we need background beliefs to draw inferences from observation and of course these beliefs too can be modified or rejected. ***It is an emergence and departure*** from more primitive conceptions. The concepts of reason, explanation, method and science themselves develop and change in the light of the increasingly sophisticated interactions with the universe around us. So we learn how to learn!

Shapere's view of science is ***both historical and rational*** at the same time. For what counts as rational is something we learn in our historical contacts with nature. There is no universal or ahistorical method for science. The efforts to find such method for science have always been a failure. As Werner Heisenberg discovered the uncertainty principle in quantum physics, Jozef Zycinski thinks that we can speak of epistemological uncertainty principle; i.e. the attempts to find one universal set of cognitive procedures and methods are

[383] Shapere, 2000, p. 162.

baseless.[384] ***It overcomes undue scepticism.*** Doubts may arise about our background beliefs and consequently the knowledge claims that we make, but until they arise we have to hold them as knowledge. Unlike the traditional philosophy of science, ***it is far more concerned with content than of the formal structure of science.*** Our ancestors' primary concerns were of day-to-day life, like, food, family, shelter. Their concepts or beliefs were often unclear, inconsistent; they were just enough to deal with their daily life concerns. From such beliefs, our today's sophisticated ideas have descended. ***So any knowledge-seeking enterprise must take this aspect of evolutionary context of inquiry seriously.***

### 4.3.3 Chain-of-Reasoning and the Rejection of Essentialism

Shapere denies both ***the Pre-suppositionist view*** (i.e. there are some higher level standards of rationality to judge the changes in the lower level) and ***the Relativist view*** (i.e. the changes in the criteria are not rational and therefore no progress in science). Shapere rejects all presuppositionist theories, not just because of, as Doppelt points out[385], the dogmatic contention that there is no fixed meta-scientific logic, structure, standards, but also for two other reasons: a) philosophers have failed to find such structure (in future they might find out!); and b) even if they did that would not avoid relativism (why not?), but would merely place the grounds for relativism in the structure of the way we must inescapably think. Therefore as a working hypothesis, let us see how much of the scientific enterprise can be accounted for without such fixed meta-scientific features.

Shapere proposes 'a chain of developments connecting two consecutive sets of criteria' and a rational evolution can be traced down between the two sets. The aims of science and the notion of 'reason' itself change, just as the lower-level theories change, in accordance with the changes in the substantive beliefs about the world. Thus Shapere is opposed to, what he calls, 'essentialism' (i.e. there are defining and unchanging characteristics of science in the face of new discoveries about the world). But Shapere demands that even the laws of logic may have to be modified in the light of scientific practice. Nothing is beyond revision but the change is gradual and piecemeal. If everything changes, one can wonder, as McMullin does, whether science will one day become an activity like foot ball; for "If change extends

[384] Zycinski, 1995, p. 257
[385] Doppelt, 1988, p. 112.

to all levels, are there then no constraints on the kind of activity science might become? Could it, in principle, become something entirely unlike what it is today by way of piecemeal change?"[386] Shapere cannot claim that it won't become an activity like foot ball without taking recourse to some essence, or some transcendental argument. We cannot anticipate the future forms of scientific rationality, which would be like expecting Democritus to have known the modern atomic physics. Some sort of running thread is presupposed here, I guess. Though Shapere denies such unity for Kuhn (which can be seen, in fact, as an element of Essesntialism), Shapere himself seems to be relying on such a notion in his conception of rationality in science. He cannot afford to reject essentialism outright, while his concept of chain-of-reasoning implies a ray of essentialism to ensure some line of continuity of the enterprise.

### 4.3.4 Problems with Notions of 'Success' and 'Adequacy'

One of the elements to assure rationality in science, for Shapere, is the element of 'success'. But success, in my opinion, need not be the deciding factor for rationality. For, an action even if it does not meet with success, can very well be rational. Though he gives it as one of the criteria, I think, it can't be a necessary criterion.

In the absence of universally accepted basic standards of rationality, Laudan and Shapere, as Doppelt claims, have to rely upon the notion of 'success' to show that the changes are rational. But they are in need of giving a universal notion of success or will end up question-begging notion of internal success. Doppelt argues that we need a 'global' view of success to rationally justify changes in scientific methods and changes. But Stump asserts that global notion of success is unwarranted "as we don't have the burden of showing that there are no losses over the entire history of science, rather only that any particular choice of a theory or a standard is better than its rival"[387]. For Shapere also success is in the sense of 'domain' specificity, not a universal one. Further, Shapere[388] answers Doppelt that his notion of rationality needs lot more than success.

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[386] McMullin, 1988b, in 1988a, p. 18.
[387] Stump, 1991, p. 461.
[388] Shapere, 1988a, p. 134-6.

Shapere gives two general sorts of criteria for science: ***success*** (how an account of science accounts for the items of its domain) and ***adequacy*** (which is expressed in terms of consistency, completeness and compatibility). These criteria are historical products. Though they are once thought to be transcendental, are now internalized to judge a scientific belief. However these two criteria are changeable themselves. Though these have been established as an ideal for science, his tendency to fallibilism makes him give us a warning regarding the future changeability of these criteria themselves, that is, however fullfillable and long-cherished ideals they may be, one needs to be prepared to modify or even reject them in the light of new findings[389]. But if the ideals of *success* and *adequacy* are modified or rejected, McMullin rightly wonders, then success can no longer be a normative principle in accounting for the data and accurate prediction need not be concern for science. If the predictive success can in principle be kept aside from science we have to face far reaching consequences. For we have strong hopes in the present science that "it is at least partially 'correct', that its findings have some permanent worth, that its goals have been at least partially fulfilled" but if "these goals might have to be entirely set aside, our convictions about the epistemic and ontological status of the best-supported theories in contemporary natural science would have to be substantially qualified"[390].

### 4.3.5 Shapere - Giving Less Importance to Social Considerations?

Shapere obviously gives importance to the historical context in understanding science. But he does not seem to give due importance to the sociological (external) factors that shape the scientific enterprise. He says there is no appeal, even implicit, to 'social context'. He even claims that as science becomes more and more sophisticated it becomes more and more autonomous in its reasoning. But is science describable without any reference to the social context?... He is against the 'the strong programe' of Sociology of science; he says that one needs to decide the role of internal and external factors "case-by-case..." - that means, in some cases, is 'the strong program' right in saying only external factors shape science? To learn the influence of internal and external factors, he demands, one must consider science case-by-case, and he ends up saying that shows the need of the piecemeal approach. Is the piecemeal approach true for the modern science too? If nature is studied in a

[389] As quoted by McMullin, 1988b, in 1988a, p 21
[390] *Ibid.*

compartmentalized manner, then what about all the merits of the unification of various domains of the 20th century? Further, we do see that more sophistication in science necessitates interdisciplinary approach with other fields of knowledge-seeking enterprises of humanities. If so, how can autonomy in its reasoning increase? What is a good reason needs also to be decided in an inter-disciplinary way, not in an autonomous manner.

### 4.3.6 Correcting Historians of Science!

After the World War II, History of science became a separate discipline. Historians of science neglected or even denied rational considerations. They focus more on external factors, like psychological, social, religious, institutional contexts and political affiliations. All these factors are relevant and important to the study of science. There is no eternal unchanging line of demarcation (like Popper's falsification), rather it emerges from history of science over the decades. Further, what is considered to be a reason, and why it is considered as a reason also evolve. Historians use historical episodes (not classical empiricism's induction or H-D Method) to understand science. However, ***historians make some basic assumptions***: Content of science may change, but not its nature (what counts as a reason / goal / methods don't change) and Shapere does not agree with them. It is true, the role of history is fundamental in understanding science; but historians mistakenly thought that the distinction between science and non-science cannot be, and even should not be, made. Philosophers, on the other hand, focus on logic of science, meaning of meta-scientific concepts, and absolute line of demarcation and methods of science in order to derive the 'essence' of science; but Shapere argues that this view is also wrong. We must not focus on the essence of science, rather on the development of what counts as a reason in science. Thus Shapere makes a correction to the approaches of the historians, and it seems to be quite a valid one.

### 4.3.7 Shapere on Observation

Shapere's analysis of the need of the background information to understand what observation is has shown to be more necessary and intrinsic than what the traditionalists used to think about it. He explains how the element of 'the given' in the background information prevents the danger of relativism in this issue. He, as we have seen earlier, has

made it clear that, in modern science, observation cannot be limited to sense-perception. Sense perception was thought to be both necessary and sufficient to understand science; but experiments in modern sciences show that it is neither. It is shown that sense perception does not have any central role, rather only a limited role, and that too pushed to the periphery of the investigation, only to interpret the results assembled by the instruments.

Today's science seems to uphold the causal theory of observation, that is, observation is just a causal process(es) from the object to the brain. These processes are explicable in scientific terms. The real world is not as it is perceived. Actually an object is a colorless matter consisting of innumerable atoms. They have a propensity to absorb or reflect certain rays of light of different wave lengths. We are able to see a given colour depending on the way our eyes and brain have been constructed. The sensation is the culmination of the long causal process(es) between the object and the brain, and therefore, it is not the real property of the said object. Shapere seems to go even a step further to claim that for 'observation' there is no need of even a human observer. For him, observation is basically an interaction between an object and the receptor. The interaction is such that some information of the object is transmitted to the receptor, which may be human or a machine. As an interaction, the observation process largely depends on the background information. Both the observation and observability depend on certain theories.

Jan Faye, however, argues that an observation as such needs some human observers. Observation involves some sort of beliefs and therefore what is done by an instrument is in fact only a measurement. If no such beliefs are involved in observation there is hardly any difference between a camera 'seeing', a scanner 'reading a document' and human observing. Since ***beliefs are involved in human observation***, two people need not necessarily agree about what they see, though the causal processes from object to brain are of the same type. So Faye argues that perception and scientific observation consist in belief acquisition; therefore, we are not merely seeing something, but are seeing that 'something is the case'. It is not the case that we see something and then decide what it is and "this intentional component is that which elevates perception to observation".[391]

[391] Faye, 2000, p. 173.

Further, Shapere makes a distinction between ***direct and indirect observation***; if the information from the source reaches the receptor without any interaction with the passing medium, it is a direct observation (e.g. observing the core of the sun by collecting neutrinos). Indirect observation is where the information has some interactions with the medium before it reaches the receptor (e.g. observing the core of the sun by studying photons). However, Peter Kosso argues that the demarcation between the direct and the indirect observation is not clear; for it depends on where one has the boundary line of the receptor. For, the neutrino experiment (said to be a direct observation!) involves a receptor with a cleaning fluid, with which neutrinos interact to send positrons from the decaying argon, to the particle counter; the neutrinos are not directly recorded there. A similar situation can be shown in the photons experiment (said to be an indirect observation!) as well. Why can't one take the interaction of the photons with the outer material of the sun to be analogous to the cleaning fluid of the receptor? Why can't one call this too as a direct observation? Thus, since there is no clear and non-arbitrary demarcation it seems to be only an artificial distinction[392]. Though Kosso seems to have a point, Shapere is not completely wrong. For, there are other interactions that the photons undergo, not only before they reach the receptor, but also even before they reach the surface of the sun itself; the photons take $10^5$ to $10^6$ years to travel the distance of 400,000 miles to reach the surface of the sun, while **neutrinos take only very very negligible time** to reach there! Lots of interactions are bound to be there and that makes the experiment with the photons to be an indirect observation.

Shapere, in spite of all his efficient analyses of background information, does not seem to give sufficient importance to the aspect of ***consensus in the scientific community***. Perhaps, he thinks that the notion of background information takes care of this aspect. But I think it is so important in modern science that it needs a specific mention and even it needs to be a separate condition, along with Shapere's three conditions discussed earlier, for something to be observed (observable). Therefore, in Chapter 5, "A Holistic Understanding of Rationality in Science", I make an attempt to compare Shapere's elaboration of the neutrino experiments with the Gravitational Wave Experiments, to show how the scientific

[392] Kosso, 1989, pp. 20-22.

community plays a crucial role in determining what is, or is not, an observation (observable).

In general, one may think, as Nickles (in spite of his great appreciation for Shapere's work) does, that Shapere lacks "crisp, logical and methodological formulas"[393]. However Nickles himself is aware that Shapere might answer that this sort of fuzziness is unavoidable, for that is the way science and reality are; and further "The single truth, and the precision, simply are not there..."[394] Having said that, I must acknowledge that no one can deny that Shapere is known for his patient and persistent analysis of the issues in philosophy of science. He sees values both in the traditional empiricism and rationalism. While being faithful to philosophical inquiries he keenly listens to scientists as well. I agree with Robert Cohen and Marx Wartofsky when they say that "He (Shapere) sorts things out, with logical care and mastery of the materials, as with an epistemological curiosity for the historical happenings which is both critical and respectful"[395].

About his own approach, Shapere seeks a serious consideration from the world of philosophers of science. If so, he is convinced that his new approach will be seen as paving the way for an enriched understanding of the inquiry of science, incorporating the strengths of the traditional views, while removing their weaknesses.[396] I am fascinated by the way Shapere sees a vibrant dynamism in the human inquiry of knowledge. We seem to move on to the unknown from the known. He succinctly puts it: ".. we build on what we already know (or at least believe), we learn how to learn, we learn how to understand etc."[397] He seems to be right because in the long process of evolution, the unbelievable potentialities of human brain are slowly and steadily revealing themselves as centuries unfold. The human brain is unravelling the enormous mysteries of reality and only the sky (if any!) seems to be the limit. The summary of Shapere's ideas must include, I think, his words reflecting his noble attitude and a sincere realization, which, in my opinion, every genuine seeker of knowledge must possess: "We must be prepared for the possibility that there are indeed

[393] Nickles, 1985, p. 312.
[394] Shapere, 1984m, in 1984a, p.22.
[395] Cohen and Marx Wartofsky, in editorial preface, of Shapere, 1984, p viii.
[396] Shapere, 1991, p 676.
[397] Shapere, over personal email, on 30 Sept, 2003, p 2

Ambedkar, "The Buddha's law of *Karma* applied only to *Karma* and its effects on the personal life. There is however an extended doctrine of *Karma*. According to it, *Karma* included *Karma* done in past lives. This is a most pernicious doctrine. This doctrine is often found to be attributed to the Buddha."[287] One can clearly understand the strong motive behind Ambedkar's rejection. Because the principles like *Karma* upheld as metaphysical justification for the social oppression, views the sufferings of the downtrodden as punishment for misdeeds in former lives. However, at the same time, Ambedkar found certain merits in the *Karma* theory, especially in the element of causality. "No Buddhist will deny that everything is under the sway of causality. Unless are regard all humankind as linked together as parts of one universal whole, we cannot perceive the full significance of the doctrine of *Karma*. Not only are the murderer and thief responsible to society, but society is equally responsible for breeding such characters." [288]

Ambedkar considers four noble truths as a leader monkish accretion; for Ambedkar, the four noble truths as presented in the Canonical account of the Buddha consist of the first Sermon, (*Dhammachakka Pavattana Sutta*) was problematic for their attribution of suffering to the ignorance and craving of suffers. Ambedkar's main objections to the four noble truths are as follows: Since suffering is a material reality, or at least predominantly a material one, any kind of valid account should mainly focus on the material aspect of it, i.e., socio-political aspects of the suffering. Social conditions should be considered into the main account of suffering. However, the four noble truths treat suffering in a purely psychological way. According to it, the mental state of the suffering is the cause of suffering. Virtually sufferer and his mental states is the cause of suffering. According to Ambedkar, this kind of psychological explanation of suffering is spreading permission in the suffering. He wrote in the introduction of his work, 'the four Aryan truths deny hope to man and make the gospel of Buddha a gospel of pessimism.'

[287] Ambedkar,B.R, '*The Buddha and His Dhamma*' Siddhartha Publications, Bombay, 1991, p 338.
[288] Ahir D.C., *The Pioneers of Buddhist Revival in India*, Blue Moon Books, New Delhi, 1996, p 238.

# AN INTEGRATED VIEW OF RATIONALITY IN SCIENCE

## 5.0 Introduction

In this Chapter I attempt to arrive at an integrated view of rationality in science. I first analyze a few traditional views of rationality, in **Section 1**, to bring out their inadequacies. I evaluate in some detail the view of equating ***rationality with deducibility***, which has been quite influential in the past few centuries. I am not of the opinion that every aspect of the traditional account of rationality needs to be rejected or reformulated. For instance, I explain the role of **inductive reasoning**, in developing an adequate account of rationality in science. Due to the shortcomings of the traditional account of rationality, there is a need to revise it. Therefore, in **Section 2**, I elaborate on the need for such a revision. I support my arguments with the views and alternatives of the traditional account of rationality, put forward by **Hilary Putnam** ('Integrated View of Rationality'), **Stephen Toulmin** ("Over-reliance on Rationality), **Christopher McMohan** ('Collective Rationality') and **Stephen Nathanson** ('Reasonable form of Rationalitsm').

Next, I elucidate, in **Section 3,** my account of rationality in science. **Reasonableness is the distinguishing character of a comprehensive account of rationality.** I enumerate some of the features of the notion of reasonableness, like Imagination, the Role of the agent, Common sense, the rejection of Zero-tolerance, Skeptical attitude, an Enriched notion of Objectivity, a bit of Pragmatism, the role of Judgment, and the Consensus of the scientific community. I categorize these features for the sake of more simplicity and precision, under three groups, though they need not be taken as water-tight compartments; namely, **Reasonableness in Scientific Methodology, Reasonableness in Scientific Practice and Reasonableness at the Personal level of Scientists.** I further explain how this notion of reasonableness plays a role in Skepticism and Critical Thinking.

consensus of the scientific community seems to assume a greater importance in the emporary scientific research frontiers, like Cosmology, Astronomy, and Particle Physics

community plays a crucial role in determining what is, or is not, an observation (observable).

In general, one may think, as Nickles (in spite of his great appreciation for Shapere's work) does, that Shapere lacks "crisp, logical and methodological formulas"[393]. However Nickles himself is aware that Shapere might answer that this sort of fuzziness is unavoidable, for that is the way science and reality are; and further "The single truth, and the precision, simply are not there..."[394] Having said that, I must acknowledge that no one can deny that Shapere is known for his patient and persistent analysis of the issues in philosophy of science. He sees values both in the traditional empiricism and rationalism. While being faithful to philosophical inquiries he keenly listens to scientists as well. I agree with Robert Cohen and Marx Wartofsky when they say that "He (Shapere) sorts things out, with logical care and mastery of the materials, as with an epistemological curiosity for the historical happenings which is both critical and respectful"[395].

About his own approach, Shapere seeks a serious consideration from the world of philosophers of science. If so, he is convinced that his new approach will be seen as paving the way for an enriched understanding of the inquiry of science, incorporating the strengths of the traditional views, while removing their weaknesses.[396] I am fascinated by the way Shapere sees a vibrant dynamism in the human inquiry of knowledge. We seem to move on to the unknown from the known. He succinctly puts it: ".. we build on what we already know (or at least believe), we learn how to learn, we learn how to understand etc."[397] He seems to be right because in the long process of evolution, the unbelievable potentialities of human brain are slowly and steadily revealing themselves as centuries unfold. The human brain is unravelling the enormous mysteries of reality and only the sky (if any!) seems to be the limit. The summary of Shapere's ideas must include, I think, his words reflecting his noble attitude and a sincere realization, which, in my opinion, every genuine seeker of knowledge must possess: "We must be prepared for the possibility that there are indeed

[393] Nickles, 1985, p. 312
[394] Shapere, 1984m, in 1984a, p.22.
[395] Cohen and Marx Wartofsky, in editorial preface, of Shapere, 1984, p. viii.
[396] Shapere, 1991, p 676.
[397] Shapere, over personal email, on 30 Sept, 2003, p 2.

Ambedkar holds a perception that the religion is a vital force, a scheme of moral governance and foundation for human society. He also says "While I condemn a religion of rules, I must not be understood to the opinion that there is no necessity for a religion. It is the foundation of society, the basis on which all true civil governments rest and both their sanction. Consequently, "when I urge that these ancient rules of life be annulled, I am anxious that a Religion of principles, which alone can claim to be a true Religion, shall take its place."[352] For Ambedkar, religion is necessary as a system of values and as a science of social reconstruction. Religion is necessary for the over all development of an individual and it is a system of such socio-cultural values, which would carry all the individuals on equal plane and would create an equal status for all communities. He looked at the religion not as a road to salvation but as the basis for social interaction. Ambedkar wanted a religion, with morality in order to build up nationalism with the association of Indian culture. He always wanted a religion with complete Indian culture and nature. He also emphasized that a religion should be free from exploitation, and true religion does not justify exploitation.

According to Ambedkar, the ideal of religion always wins over the secular practical ideal. This shows how great the difference in the force and sanction of these two ideals over the human mind. A religious ideal never fails to work so long as there is faith in that ideal. There is a criticism against Ambedkar that says that Ambedkar was against religion and wanted to destroy the religion, in contrary, one should remember that he called for the destruction of religion of rules and not of principles [353] On such principle, he tries to impress upon the necessity of religion. Thus he condemns a religion of rules. Here, Ambedkar agree with Burke that, 'True religion is the foundation of society, the basis on which all true civil government rests, and both their sanction".[354]

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[352]Moon, Vasant, ed, B.R Ambedkar's, *Writings and Speeches*, Vol III, Govt of Maharashtra, Bombay, 1989, p 73
[353]Ibid, p 75.
[354]Ibid, p 76.

Ambedkar deems religion to be essential to personal as well as social life. Religion exercises a great pressure of moral power over a person's heart and mind, builds up the person's character, it is a powerful driving force for human activity and it instills hope. According to Ambedkar religion can only satisfy the human being who is not satisfied with material things. A liberative religion alone can renovate the human minds of those who are socio-culturally enslaved. Ambedkar pertinently illustrates "the dominion which religion exercises over the minds of men."[355]

Ambedkar says that the true religion holds together society based on the moral force that exercises over the members. Its ethical power prevents social evils, crimes and atrocities, thus religion alone can cultivate equality, liberty and fraternity and the enforcement of justice and order. Thus religion is an important governing principle in the society. For Ambedkar "That which governs people is Religion. That is the true definition of Religion." [356] For him, religion is also an important source of power in the society. Ambedkar recognized the influence of religion over people and its function as effective power-source in Indian society. And, he rejects the view that the religion to be idiosyncratic worship of God for the salvation of one's soul. His idea of religion is basically social and, it is defined in terms of moral and social order based on its ideal and principles. Consequently, the perception of Ambedkar on religion is based on principles, values and ideals where a society is governed by both individual and society that are preserved, promoted and sanctified.

According to Ambedkar, Hinduism as a religion faith is based on the infallibility of *Vedas*. Ambedkar says that, "The Hindu is not prepared to face any inquiry; there is no act of the Hindu, which is not covered or ordained (his) Religion."[357] He also refutes the idea that Hinduism holds all religions that are good and true. By saying this it wants to avoid the application of reason or the criterion for acceptance or non-acceptance of religion. Ambedkar believes that religion could be either liberative or oppressive; it all

[355]Ibid, p 77.
[356] Ambedkar B.R, *Why Go for Conversion?*, Dalit Sahitya Academy, Bangalore, 1987, p 16.
[357] Ibid, p 22.

depends on various factors. Religion could function as a tool of domination if it propagates infallibility and requires total surrender to its totalitarian perspective. Religion is liberative if it is open for the notion of revolution or change. The social ideal of a particular religion, which is the divine scheme of governance of that religion, decides whether it is good or not good.

On the question of God's existence and the role of religion and morality, Ambedkar says that the religion is necessary for man and society to manage the secular and moral affairs of man kind, but to hold the view that, all religions are equally true and good is to cherish a wrong belief. Most of the existing religions are theistic and metaphysical; but to maintain that God is an essential element of a religion is also to nourish a mistaken faith. Religion, according to Ambedkar, wish to develop the social systems of their own choice to bring men together in peace for progress; but to bestow a divine governance over them so as to prevent the growth of an open society. The Religions must preserve their Textbooks for guiding the people in right direction; but to believe in their infallibility and divine authority is to mar the growth of free inquiry and critical reason. The eternal soul is unknown and unseen, a mere metaphysical speculation and to say that an individual's aim of life is to achieve its salvation *(Moksha)* is to escape the social responsibility bestowed on him as a member of society.

All the religions develop some sort of prayers and pilgrimages, rituals and ceremonies, as religious duties for men, simply being certain appendages to a religion; but the most integral part of a religion is the Morality it professes for the welfare of mankind. The center of Religion and Man, the base is Morality, the aim is the secular welfare of Mankind, and the means is the righteous conduct embedded in social responsibility that all human beings owe towards their fellow-beings living in human society. And lastly, the test of Justice and Utility must be applied to judge the relevance of a Religion, and that consists in the trinity ideal of Liberty, Equality and Fraternity to effect the necessary change in its social norms of cruel and dynamical nature."[358]

[358] Keer, Dhananjay,*Dr Ambedkar Life and Mission*, Popular Prakashan, Bombay,1991, pp 4 94 – 4 95

For Ambedkar the function of religion is to provide legitimacy to the set of values and rules that would help establish a moral order among human beings. These values and rules could be particularistic, relatively arbitrary and community specific when the communities were small and isolated. Concepts of local deities and of behavioral norms that were thought to please them were an adequate base for a semblance of social order so long as they served the interests of the power elite in the community. But with the changes in technology, in the means of production and the means of communication, isolated human groups were forced into contact with one another, and the need arose for new values and rules which were more universal. Thus what were needed were a more universal morality and more universal concept of Godhood.

Ambedkar reiterates that the religion is a social force and stands for a scheme of divine governance. The scheme becomes an ideal for society to follow. The ideal may be non-existent in the sense that it is something, which is constructed. But although non-existent, it is real. For an ideal it has full operative force which I inherent in every ideal. Those who deny the importance of religion not only forget this; they also forget to realize how great the potency is and sanction that lies behind a religious ideal as compared with that of a purely secular ideal. A religious ideal has a hold on mankind, irrespective of an earthly gain; this can never be said of a purely secular ideal. A religious ideal never fails to work so long as there is faith in that ideal." [359] For Ambedkar, God who permits the survival of immoral social divisions in the society like caste is no God. Ambedkar objects the worship of God who permits the existence and survival caste system. Advocating Buddhism he discarded the *Shastras,* and also their authority as did by the Buddha and Nanak.

## The *Dhamma* as true Religion

The final rejection of all religions and "religion" as such, as understood in the theistic sense, took place when Ambedkar chose the non-theistic Buddhist *Dhamma* as the true

[359] Moon, Vasant, ed., *Dr. Babasaheb Ambedkar's Writings and Speeches,* Vol I, Govt. of Maharashtra, Bombay, 1989, p 68.

religion. In his book that he wrote for the Neo-Buddhism titled, *The Buddha and His Dhamma,* denounces "religion" and contrasts it with the *Dhamma* of Buddha which is not considered a "*religion*" by all the European theologians. Here by religion he means a theistic religion: "This is what Religion has come to be and this what it connotes-belief in God, belief in soul, worship of God, curing of the erring soul, propitiating God by prayers, ceremonies, sacrifices, etc."[360] Stating that *Pradanya* and *Karuna* are the corner stones of Buddha's *Dhamma*, Ambedkar explains the difference between the subject matter of religion and the subject matter of *Dhamma:* "The two are poles apart. The purpose of Religion is to explain the origin of the world. The purpose of *Dhamma* is to reconstruct the world."[361]

Ambedkar equates *Dhamma* is with morality. He regrets that in non-*Dhamma* religions morality is not given prominence nor is it effective. He asks the question that what the place of morality in *Dhamma* is and gives the simple answer that morality is *Dhamma* and *Dhamma* is morality. In other words, in *Dhamma* "morality takes the place of God although there is no God in *Dhamma*. In *Dhamma* there is no place for prayers, pilgrimages, rituals, ceremonies or sacrifices."[362] Morality is the essence of *Dhamma*, without it there is no *Dhamma*. "Morality in *Dhamma* arises from the straight necessity for man to love man. It does not involve in the sanction of God. It is not to please God that man has to be moral. It is for his own good that man has to love man."[363]

The rational and scientific principle is the other pillar on which *Buddha-Dhamma* of Ambedkar needs to be stressed and substantiated. Being a man of science and a philosopher, who was influenced by secular scientific rationalism that swept the West, Ambedkar, was cautious to avoid anything that would smack of superstition, and verge on the border of the irrational. Nothing that cannot be proved rationally and argued logically can be part of his philosophy. The influence of Western Philosophy on his modern scientific mind was great. Not solely a single school of thought, but various

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[360] Ambedkar B. R., *The Buddha His Dhamma*, Siddhartha Publications, Bombay,1991, p 226
[361] Ibid, p 227.
[362] Ibid, pp 230 – 231.
[363] Ibid, p 231.

trends in philosophy such as the secular humanism of Renaissance and Enlightenment, Socialism, Marxism, Positivism, Liberalism, Utilitarianism, engaged his attention and left their marks on his mind.[364]

In the light of all these, Ambedkar strove hard to make his new religious sect thoroughly rational. He hinges his arguments unshakably in the Buddha's rational epistemology of "dependent origination", that is, things are related to each other in cause and effect relationship in the ceaseless change of reality.[365] Accordingly, the speculative and supernatural beliefs in God *(Brahman)* or the eternity of the *Soul (Atman)* or heaven *(Moksha)* do not enter his scheme. *Dhamma* is not a belief in the supernatural being but the striving for a moral humane fraternal social life. *Dharma* in the *Vedic* Brahminic religion was to offer sacrifices *(Yagnas),* rituals and prayers to worship God (*Brahman*). These praises, offerings and sacrifices are offered in order to gain heavenly benefits hereafter, along with the earthly gains.

Ambedkar lays stress on the Buddha's reinterpretation of *Dhamma* as morality and his rejection of Brahminic understanding of *Dharma* as sacrifices and prayers. Thus, Ambedkar comes to reject all the theistic religions and the age-old Hindu beliefs, the existence of God *Brahman* is an *Atman, Soul, Samsara* theory of transmigration, the *Karma* theory of the effects of past, affecting the present life, and the *Moksha* theory of life after death. Infallibility of *Vedas* is not accepted and *Upanishadic* thought is considered pure imagination.[366] Further, Ambedkar, while accepting the Buddha and his *Dhamma,* presents him as the most rational and enlightened of human beings, and his *Dhamma* as the most scientific system, at least as Ambedkar understands and interprets it.

The Buddha is presented as one who did not force his followers, but who gave complete freedom of thought. He rejected the infallibility of sacred books, divine authority and the revelation. The Buddha, emphasizes Ambedkar, unlike the other founders and innovators

[364]Jatava D R, *The Social Philosophy of B R Ambedkar*, Phonenix Publishing Agency, Agra, 1965, pp 41- 43, and 267 – 268.
[365]Ambedkar B R, *The Buddha His Dhamma*, Siddhartha Publications, Bombay, 1991, p 247
[366]Lederle M, *The Untouchables' Claim to Human Dignity*, Journal of University of Poona, Humanities Section, Poona, 1976, pp 71 – 72.

of religions like Moses, Jesus, and Mohammed does not claim to be of divine origin, nor receiver of divine revelation as a divine prophet. The Buddha claimed to be only in 'Enlightened' human being who, in turn, is a *marga-data,* the finder and giver of the way, and not, as others have claimed to be, a *moksha-data,* giver of salvation.[367] Finally, according to the rational scientific principle, Ambedkar tries his best with all the intellectual calibre that was at his disposal in great store, to clarify and reinterpret some of the accusations against Buddhism, which he calls "misunderstandings." He gives scientific explanations for the same and proves them to be useful to the society.

Ambedkar affirmed the inevitability of a religion. He said that "a man made with hunger did not resort to theft not feared the legal consequences, but because of pressure his religion exercised over his mind". Religion had a direct connection with the laws based on the reason. He often said that whatever good he had in him were the fruit of religion, he also emphasizes that, he wanted religion, but did not want hypocrisy in the name of religion. To him, religion is the driving force for human activity. Man cannot live with bread alone. Since he has a mind it needs food for thought. He considered the foundations of religion to be essential to the practices of society."[368] Ambedkar's personal philosophy of life and political involvement was based on religion. His whole philosophy was based on the fundamental principles of liberty, equality and fraternity which borrowed from the teachings of his master, the Buddha.[369]

Herbert Spencer describes religion as "the weft, which everywhere crosses the warp of history." This is true in every society. But religion has not only crossed everywhere the warp of Indian history, In fact it forms the heart and soul of the Hindu mind. From his birth to death, the life of Hindu is influenced by his religion in relation to his food, dress,

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[367]Keer Dananjay, ed , *Dr Ambedkar's: The Buddha and His Dhamma*, Siddhartha Publications, Bombay, 1991, pp 151 – 157

[368]Kuber W. N , *B R Ambedkar*, Publication Division, Ministry of Information and Broadcasting, Govt of India, New Delhi,1990, p 80.

[369]Keer Dananjay, *Dr. Ambedkar: A Memorial Album*, Popular Prakashan, Bombay, 1982, p 459.

occupation, marriage, etc.[370] Another reason why Ambedkar lays stress on religion as a social force is that it provides the people with the motivation to realize the same religious ideals that are more powerful than the practical secular ideals. Religion, social status and property are all sources of power and authority, which one man has, to control the liberty of another and also leads to legitimacy.[371]

Ambedkar separated religion from theology, in order to ascertain the functions and purpose of religion. Ambedkar insists that "The primary things in religion are the usages, practices and observances, rites and rituals and theology is secondary, its objective is to rationalize them."[372] In the same way, religion should also be distinguished from what is considered to be supernatural. It is not to think religion as though it was super-natural.[373] It is not right to view religion as an individual, private and personal matter, nor is it to be mistaken as the zenith of the special religious instinct inherent in the individual nature. The correct view is that the religion, like language is social for the reasons that either it is essential for social life or individual has to have it because without it's involvement he cannot participate in the life of the society.[374]

Ambedkar spells out its functions: *Firstly*, from the savage society to our present day the main social function of religion is concerned with life, life processes and the preservation of life. The religious ceremonies are related with the stages of life with events like birth, puberty, marriage, death, sickness, war, drought, pestilence or concerned with the cultivation of food grains and cattle that furnish to human social life.[375] God's place in religion is only as a means for the conservation of life and that the end of religion is the

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[370]Moon Vasant, ed., *Dr.B.R Ambedkar's, Writings and Speeches*, Vol .III, Govt. of Maharashtra, Bombay,1989, p 23

[371]Moon,Vasant, ed., *Dr B R Ambedkar's, Writings and Speeches*,Vol I, Govt of Maharashtra, Bombay,1989, p 45.

[372]Moon, Vasant, ed., *Dr B R Ambedkar, Writings and Speeches*, Vol V, Govt of Maharashtra, Bombay,1989, p 407.

[373]Ibid.

[374]Ibid, p 409.

[375]Ibid, p 407.

end of conservation and sanctification of social life.[376] In the same way this is true for the present society also, though this essence of religion is hidden or forgotten. "The life and the preservation of life make up the essence of religion even in the present day society are beyond question."[377]

*Secondly*, Ambedkar asserts that the best statement regarding the purpose of religion given by Charles A. Ellwood who had written that, "Religion projects the essential values of human personality and of human society into the universe as a whole. It unavoidably arises as soon as man tries to take up a valuing attitude towards this universe, no matter how small and mean that universe may appear to him .. What the reason does for ideas, religion does then for the feelings. It universalizes them; and in universalizing them, it brings them into harmony with the whole of reality.[378] As C.A. Ellwood understands 'social values are universalized and also continued to be spiritualized by religion for the realization of a specific social purpose'.

Ambedkar says that Religion emphasizes, universalizes social values and brings them to the mind of the individual who is required to be familiar with them in all his acts in an order that he may function as an approved member of the society.[379] *Thirdly*, maintaining the social control and social order is the significant function of religion. Religion acts as an organization of social control by prohibiting the individual's beliefs and practices that go divergent to the good of the larger group. Thus religion is an influential way of social control, more powerful than the Law and Government. Ambedkar again quotes Ellwood to strengthen his argument, "Without the support of religion, Law and government are bound to remain a very insufficient means of social control. Religion is the most powerful force of social gravitation without which it would be impossible to hold the social order in its orbit."[380]

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[376]Moon, Vasant, ed., *Dr.B.R.Ambedkar, Writings and Speeches*, Vol I, Govt.of Maharashtra, Bombay, 1989, pp 408 - 409.
[377]Ibid, p 407
[378]Ibid, p 409
[379]Ibid.
[380]Moon,Vasant, ed, *B R.Ambedkar, Writings and Speeches*, Vol I, Govt. of Maharashtra, Bombay,1989, p 411.

Though, different religions given different theistic explanations about the purpose of Religion, Ambedkar rejects them all and offers his own formulation. According to him, the purpose of religion is "To make the world a Kingdom of Righteousness"[381]. What does he mean by the Kingdom of Righteousness? What does it entail? What are the means to realize this ideal scheme? Can this goal be reached at all? Ambedkar clears all these doubts in the following verses, which he puts in the Buddha's mouth: To the question "What is the purpose of religion?" The Buddha's answer is very different. He did not tell people that their aim in life should be to reach some imaginary heaven. The kingdom of righteousness lies on earth and is to be reached by man by righteous conduct. What he did was to tell people that to remove their misery each one must learn to be righteous in his conduct in relation to others and thereby make the earth the kingdom of righteousness.[382]

In addition, two other purposes were also added, they are, the training of man's mind, instincts and dispositions and the courage to stand by what is right, even alone.[383] A religion that does not have as its core, morality essential for social order and progress, is anathema for Ambedkar. His religion of Neo-Buddhism is nothing else but the way, the *marga,* which would realise not the kingdom of God here on earth or in the otherworldly heaven, in *moksha*, but a religious path that would usher in the just, moral "Kingdom of Righteousness."[384]

The *Dhamma* would not only enforce morality by detachment,[385] it would purify the mind and cleanse it of all the passions,[386] bring forth harmony, cater to the growth of all the individuals in the society without discrimination, thus fostering equality and fraternity.[387] It would establish proper human relationships essential for happiness,[388] with *karuna* and *maitri*[389] and thus remove sorrow *(Dhukka).*[390] It would in a special way

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[381]Ibid, p 201- 202.
[382]Ibid, p 201.
[383]Ibid, pp 201 – 203
[384]Ibid, pp. 200 – 202.
[385]Ibid, pp 170 and 296.
[386]Ambedkar B. R.*The Buddha His Dhamma*, Siddhartha Publications, Bombay,1991, pp 73 – 74.
[387]Ibid
[388]Ibid, pp 146 – 147, and 178.
[389]Ibid, pp 38 – 39.
[390]Ibid, p 83.

protect the weak leading their liberation, and stop the class-caste conflicts resulting in a class-casteless society.[391] Psychological revolution is brought about by shedding of the ego and the desires through detachment and enlightenment. But one cannot stop with this. He/she must continue with the social revolution to remove the causes of *Dukkha.* Love, *karuna with maitri*, demands this. Liberation of the oppressed and the *Dalits* is the task of the En-lightened persons.

## Religion, Modernity and Nation building

Ambedkar regarded that religion is necessary for nationalism, since religion is the essence of cultural heritage and value system that are very much necessary for the formation of a civil and political community and, necessary factor for building a powerful nation. Ambedkar was not in favour of the depressed classes converting them selves into Islam or Christianity, as both these religions are alien to Indian culture and therefore they cannot provide the foundations of a political and social community. Ambedkar's theory of religion based on this concept is expressed as, "If the depressed classes join Islam or Christianity they not only go out of the Hindu religion but they also go out of the Hindu culture. On the other hand, if they become Sikhs, they remain within the Hindu culture. This is by no means a small advantage to Hindus. What the consequences of conversion will be to the country as a whole is well worth bearing in mind, Conversion into Islam or Christianity will denationalize the depressed classes. If they go to Islam, the number of Muslims will be doubled and the danger of Muslim domination also becomes real." [392]

Ambedkar opens up a big problematic territory here. It had touched the many issues related to the concepts of religion, culture and nation. Ambedkar has evaluated each one of these concepts from the marginalized interest point of view. One might wonder about the Ambedkar's differentiation of the terms 'Hindu religion' and 'Hindu culture'. His coinage of the term Hindu culture seems to be, thoroughly equivalent to Indian culture. Scholars ought to differ from Ambedkar's equation of Hindu culture with that of Indian culture. But we may accept with his implied view that culture is a broader category than religion. The second issue dealt by Ambedkar is the question of conversion. While

[391]Ibid, p 232 – 234.
[392]Moon, Vasant, *Why Go for Conversion?* Dalit Sahitya Akademy, Bangalore, 1987, p 19.

preferring conversion into Indian religions such as Buddhism and Sikhism, Ambedkar discards conversion into Islam and Christianity on the ground that they are not Indian in origin.

Here Ambedkar's option could be named as soft moderate or limited conversion. The reasons behind this limitation may be his nationalistic concern and his fear of alienation of the *Dalits* that he did not want to leave his followers with the risk of losing their national identity. Even after clarifying these aspects, Ambedkar's conclusion remains debatable. It clearly implies that he considered both religion and culture as constituent element of nationalism. That is why he was searching for such a religion within the Indian culture. His concept of religion became not only highly political but came very closer to social living.

The religion can also be tested by yet another set of criteria that Ambedkar has outlined in his article, 'Buddha and the Future of His Religion.' B.A.M. Paradkar gives an astute summary of these criteria in his essay, "The Religious Quest of Ambedkar': Apart from the classification of religion into a 'Religion of Principles' and a Religion of Rules, Ambedkar maintained four essential criteria as the ways of testing the utility of a religion. Firstly, a society in order to hold itself together, it must have either the endorsement of the law or the sanction of morality. But the part played by law in this respect is very small. It is proposed only to keep the minority within the range of social discipline. "The majority is left out and has to be left out, to sustain its social life by the postulates and sanction of morality. Religion, in the sense of morality must therefore remain the governing principle in every society."[393] Secondly, in order to function, Religion must exist with reason, which is merely another name for science. In other words, an understanding between science and religion should not be preposterousness. Thirdly, moral code is not enough for religion, but its moral code must recognize the essential canons of social life, namely liberty, equality and fraternity and finally, religion must not consecrate or ennoble poverty. Ambedkar said, 'Renunciation' of riches by those who have, it may be a blessed state but poverty can never be. To announce poverty to be a

[393]Paradkar B. A. M., *The Religious Quest of Ambedkar*, Ajay Prahaghan, New Delhi, 1968, p 51.

blessed state is to misrepresent religion, to perpetuate vice and crime, to consent to make earth a living hell.[394]

According to him, most important of all, "The problem for the Depressed Classes was to find a solution along the lines which would preserve their national homogeneity with in Indian culture. While seeking a definable religious identity, they had to strive for national and political unity."[395] It should also be stressed, as explained below, that finally Ambedkar's choice fell on Buddhism because he had rejected all other theistic religions as irrational and superstitious, not only because it belongs to Indian culture. This seems to be reason why he preferred to revive a degenerated and profligate Buddhism, than to join any of the live religions readily available now in India.

While discussing the reasons for the conversion, Ambedkar goes into the societal functions of religion, namely, the protection of life and the social control which are achieved by religion, by spiritualizing and sanctifying the values of life as final.[396] These social functions can also serve as the criteria to judge the value of a religion. To some extent, a particular religion is able to fulfill the social function of a religion, only to that extent, it can be deemed to be good religion. Ambedkar himself favourably uses this criterion and questions the usefulness of Hinduism. He asks whether it acknowledges the personal dignity and equality, strives for justice and promotes the social advancement.

The untouchables or *Dalits* need three possessions: "First thing that they need is to end their social isolation. The second thing is, to free them from their lowliness complex. The third thing is, Will conversion meet their needs?"[397] Again he asks, "Can religion alter this psychology of the untouchables? Will conversion raise the general social status of the

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[394]Ibid.
[395]Ibid, p 53
[396]Moon, Vasant,ed , *B R Ambedkar's Writings and Speeches,* Vol V, Govt of Maharastra, Bombay, 1989, pp. 407-410.
[397]Ibid.

untouchables?"[398] These questions also serve as the criteria to judge the value of a religion in the line of Ambedkar's thought.

More over all the religions may not pocess the identical nature. Besides being an authority, which defines what is good, religion is a motivating force for the promotion and spread of the 'good'. Are all religions approved in the means and methods they advocate for the promotion and spread of good? The Philosophy of Religion, as Ambedkar defines it, differs much from the comparative Religion. All the religions are equally true and good, but not in the field of Ambedkar's 'Philosophy of Religion'. In his view Philosophy of Religion begins where the Comparative Religion ends. He accuses comparative Religions for creating the impression that all religions are equally good and true, and that there is no need of discerning between them. According to him, this belief is positively and perceptibly wrong and there is no greater error than this.

He also elaborates that Religion is an uncertain phenomenon, it can be constructive or harmful, it can help to promote the good of society or it can bring adversity, it can also be liberative or oppressive. For instance, particular religion is more ready to lend a hand than others, or a religion can cause more harm compared to the others. It is a fact of experience, and it is to determine this fact properly that we need a norm to judge the value of various religions. To dismiss the false ideology that all religions are good and to point out that religion can also be harmful or helpful. Ambedkar quotes Prof. Tiele's vivid survey of the progress as well as destruction caused by a religion.[399] A force which shows such a strange difference in its result can be accepted as a good religion without examining the form it takes and the ideal it serves. It all depends upon what kind of social ideal that a given religion, as a divine scheme of governance, holds out. This is a question, which is not answered by the science of comparative religion. Indeed, it begins where comparative religion ends. "The Hindu is simply trying to avoid it by saying that

[398]Ibid, p 418.
[399]Ambedkar quotes the following perceptive passage of Prof. Tiele, Moon, Vasant, ed.,*B R Ambedkar's Writings and Speeches*, Vol V, Govt. of Maharastra, Bombay, 1989, p 24.

although religions are many, they are equally good."[400] "Ambedkar strongly condemns this ideology that all religions are true."[401]

According to Ambedkar, God is a human creation. In the primitive period the primitive man regarded anything as divine power, which he was not able to understand. "This power was originally malevolent, but later on, it was felt that it could also be benevolent. Later the power was called God or the creator."[402] So man developed the theory of God to explain natural phenomena. Ambedkar raised a question that if God was benevolent then why his own creations are considered untouchables. In his perception, God was an embodiment of hatred and injustice because it was said that the unjust social structure, which gave birth to Untouchability, is a God given one hence it cannot be changed. Hence, Ambedkar rejected the idea of God created by religion.

The efforts of Ambedkar to engage into a hypothetical and practical analysis of the Hindu social and philosophical order, attempted to build counter-ideology in order to re-construct Indian society, to cleanse impurity, to unify the untouchables, to give an identity and a goal, to fight for devising ways of advancing the social, political and economics conditions of the downtrodden. Ambedkar's analysis on the Hindu social order seriously questions the centrality of caste system and its viewpoint of social domination and successive oppression and intolerance. Ambedkar asserted the pathway of social resistance to the debasing Hindu social order. He said, "however sympathetic you may be to our cause, the fact of your being orthodox Hindu, your being part and pillar of the orthodoxy, deprives you of any right to advise us... this is a question of power, of caste, of self-interest and partiality. This is not a question of knowledge, intelligence, of the reason this you should desist from preferring us. Say what you may but we are not willing to tolerate this injustice."[403]

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[400] Ibid.

[401] Ambedkar B. R,"*The Buddha and the Future of His Religion*," The Mahabodhi, April-May 1950, p 203. Cited by Paradkar B A M, *The Religious Quest of Ambedkar*,in T S.Wilkinson and .M.M.Thomas, eds , *Ambedkar and the Neo- Buddhist Movement*, Bangalore, CISRS, 1972, p 52.

[402] Keer, Dhananjay, *Dr Ambedkar; Life and Mission*, Popular Prakashan, Bombey, 1991, p 253.

[403] Gore, M. S., *The Social Context of an Ideology – Ambedkar's Political and Social Thought*, Sage Publications, New Delhi, 1993, p 98.

Ambedkar's criticism of Hindu social order is based on his understanding of the democratic heritage of the western society. His hypothetical beginnings are derived from the clarification and rational tradition of modern Europe. From that tradition, he had inherited the values of liberty, freedom, equality and fraternity and he measured the Indian society on the foundations of these values. According to Ambedkar, the indispensable future of a social order is that it should be built on the initial notion of freedom. Freedom as both philosophy and practice is the basis of human society, as human beings naturally possesses the freedom of will. As they grow and progress, so would be the social order, which must be flexible as to allow newer changes according to the science of the times and human progress.

The other important concept in Ambedkar's direction of good social order is that it should distinguish the individual in the society. By recognizing the individual, a good social order together recognizes the good of the community. The individual is not to be sacrificed for the sake of collectively. So, the chief role of a good society is accepted as a person and not a cog in the wheel turned for the purpose of social mobility alone. He/she needs to be respected in the society for the reason that he is a human person.

Ambedkar emphasises that the human existence is not to be treated solely in the physical sense alone, but it has to be valued in the sense of something higher than that. According to which every human being has a spiritual super-existence through knowledge and love. In Ambedkar's ideology, respecting the every individual devoid of any caste or class stratification is sacred. "The inviolability is at the core of the concept of liberty."[404] According to Ambedkar, three important kinds mark the principle of a reconstructed social order. Human society is to be built on the foundation of freedom or liberty, equality and fraternity. These values are based on the notion that an individual is not a means but an end itself. While the notion of liberty emphasizes the inviolability of the human person, the concept of equality insists the right of the individual to be treated as an equal and to be respected as a complete member of the society irrespective of his attainments. According to Ambedkar, fraternity is the "disposition of an individual to

[404]Ibid, p 261.

treat men in reverence and love and dignity and the desire to be in unity with other fellow beings."[405] It strengthens the society and it gives vigour for the individuals to commit for the welfare of all. According to Ambedkar the Hinduism comprises of caste social order is an order of graded inequality. "*Sanskritization*"[406] is impossible that one can not change his caste and fraternity must also be sacrificed as the proper climate for the change of caste status, merely by adopting the behavioral development of personality."[407]

Ambedkar is of the opinion that the non-Aryan depressed classes are the "the broken-men", who eventually came to be treated as marginalized, belonged to Buddhism. Ambedkar's theory is that the contempt of Buddhism and beef - eating is the root of unsociability in Hinduism. It was his disputation that the outcastes, by converting themselves into Buddhism were only improving their original dignity "which was earlier clouded by the 'horrible and vicious dogma' of caste and untouchability."[408] Ambedkar held that *Dalits*, the broken people, who fled from the villages after the tribal wars and came to be expelled from the *Chaturvarna* social system of the *Vedic* Brahmins and later, came to be treated as the depressed classes were Buddhists by religion.[409]

Ambedkar's theology of Religion is praiseworthy on many counts. It has emphasized the *social* function of religion without neglecting to emphasize its necessity for *personal* growth. It laid more stress on *orthopraxis,* the right moral conduct based on love, than doctrines, cults, rituals and devotional practices. Many magical trappings of religion and doctrinal binding chains have been broken down by his theology. He has emphasized the liberative, prophetic, critical dimension of religion.

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[405]Moon, Vasant, ed , *Babasaheb Ambedkar's Writings and Speeches*, Govt of Maharastra, Vol III, Bombay, 1989, p 97.
[406]Srinivas M.N, *Social Change in the Modern India,* Orient Longman, Hyderabad, 1988, p 67
[407]Moon, Vasanth ed, *Dr. Babasaheb Ambedkar's Writings and Speeches*, Vol III, Govt of Maharastra Bombay,1989, p 99
[408]Paradkar B. A M, "*The Religious Quest of Ambedkar*," Ajay Prahaghan, New Delhi, 1968, p 63.
[409]Zelliot E, "*Religion and Legitimation*", Princeton University Press, Princeton, 1969, p 98.

Ambedkar's Theology is *humanistic and anthropological*, his thought is Social Humanism.[410] Ambedkar's main concern was to regain the full humanity deprived of caste oppression and sex discrimination, which are not only economic alienations but also primarily anthropological alienations. In his theology, Ambedkar gave importance to the common good, and the establishment of a humane social order, a society based on liberty, equality and fraternity of all the people. As a part of it, *Holistic human development* was much insisted upon. He would never take rest only with the fulfilment material well-being, and often reminded his people of the spiritual salvation, mental enlightenment, cultural transformation, social status, unity, love and peace, which are essential for happy and holy life.

Ambedkar religion is a religion of humanity, a religion at the service of humans to understand the humanness.[411] It is very much *contextual and cultural* He would not accept wholesale, the imported Marxian theory, which does not take into account caste and religion, which are very powerful and influential factors in the Indian context and culture.[412] He rejected also Islam and Christianity that are foreign and were attached to the anti-national and imperialistic countries. By the revival of Buddhism, Ambedkar did a great service to the *Dalits*. The return of Buddhism not only gives identity and explanation to the *Dalits*, it has also revived the Dalit Dravidian, non-Aryan, non-Brahminic "Indian" culture, whose ancient religion was Buddhism.[413] It has exploded the myth of Hindus, who equate Indian culture with Hindu-Hindi culture, and India with Hindustan.

Ambedkar's theological approach was *analytical as well as synthesist.* His writings

[410]Ibid, pp 4 – 5, and 261 – 269.
[411]Ibid, pp 265 – 267.
[412]Jatava D. R, ed, *On contextuality of Ambedkar's thought, The Political Philosophy of B R Ambedkar,* Phoenix Publishing Agency, Agra,1965, p 2 Sections 3. 4 2. and 6. 4.
[413]Jatava D. R, *The Political Philosophy of B R Ambedkar*, Marathi Dalitha Sahitya, *Marathi Dalit Literature Movement*, a unique one of its kind, was inspired by Ambedkar, *for a collected translations of modern Marathi Dalit literature*, Arjun Dangle, ed , Poisoned Bread, New Delhi, Orient Longman, 1992, R. S. Khare, *The Untochable as Him self, Ideology Identity, and Pragmatism among the Lucnow Chamars*, New York, Cambridge University Press, 1984; Ibid., pp 6 – 8, 139 – 143, and 150 – 151; Donald E. Smith, India, *As a Secular State*, Princeton, Princeton University Press(1963), 1967, chapter 13: " *Hinduism and Indian Culture*," pp. 372 – 378; P. 2

expose his inquisitive mind, which would not rest content with simplistic understanding but would reach to the heart of the matter. Posing one question after another that takes him deeper, and deeper Ambedkar comes up with the real causes and reasons for the matter in argument.[414] At the same time his theology exhibits many points of synthesis. Steering clear of the existing "*isms*", ideologies and schools of thought, and assimilating the best from them, Ambedkar offers an original synthesis that follows the Buddhist middle path.[415] As already mentioned, there is a synthesis of the clarification of the East and the West in his thought. Similarly, in his Theology we find salient features of American Liberalism and Russian Socialism, individualism and collectivism, materialism and spiritualism, scientific positivism and religious wisdom, which blend together in his synthesis. His liberative praxis also uniquely combined in its scheme both the Gandhian *Satyagraha* and Marxian class struggle. The social analysis of Ambedkar was again a blend of the economic analysis including Dialectical Historical Materialism, and the cultural analysis of religion, culture and social institution of caste.[416] His Dalit revolution included both the Cultural Revolution and social revolution.

Ambedkar's Theology is essentially *stereological and eschatological* Its aim and dream was to build up the Kingdom of Righteousness and *Dhamma Raj by* perfecting the social order gradually. To begin with, socio-religious reform for equality, national independence, democratic constitutional forms of government and state socialism are to be realized. The transformation of the social relationships and attitudes, based on the new value-system of liberty, equality and fraternity, is the foundation of the new just egalitarian society. Justice, social, economic and political, is to be secured for every member of the national and the human family. Only then can humane divine state of love and peace can reign in the universe, with blessedness and happiness for all creatures, the

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[414]Jatava D. R , *The Social Philosophy of B R Ambedkar*, Phoenix Publishing Agency, Agra,1965, pp 39 - 42.

[415]Jatava D R, *On contextuality of Ambedkar's thought*, (ed)*The Political Philosophy of B R Ambedkar*, Phoenix Publishing Agency, Agra, 1965, p 2 Section 6. 4 5

[416]Philip Mathew and Ajit Murican, eds , *Religion, Ideology and Counter – Culture*, his "*Non – Brahmin and Dalit Movements and their implications for Anti – Caste Struggle*," in Bangalore, Horizon book,1987, pp 207 – 226.

humans and the nature. With this eschatological hope, the Ambedkar spiritual struggle for the *Dhamma Raj* strives ahead. Another striking feature in Ambedkar's theology is non-dogmatism and provisionalism. As his guru, the Buddha, he strives hard to influence us to be rational and scientific, and not to believe anything on the word of someone else, because so and so said it, or because it is claimed to be a divine revelation. He made it very clear to his people that he does not want blind followers, and also that nothing of what he has written is perennial, infallible and dogmatic.[417] Instead, he calls attention many times to the Buddhist principle of impermanence and constant change.[418] Hence, "Ambedkar was also ready to admit, 'There can be no finality in thinking."[419] A responsible person must be ready to learn and rethink, and not to get enslaved by consistency, which is a '*virtue of an ass*'; he wants neither himself nor us to belong to that category.[420]

At the same time, we also find his theological approach *universalistic in nature.* It wishes the welfare of all people. It wants the end of class-caste struggle, so that all can live in peace and prosperity. Ambedkar urged the *Dalits* to strive not only for their own welfare, also for universal liberation and peace. The benefits of growth and social reform, according to Ambedkar, must not be usurped by the minority but accrue to all.[421] Ambedkar's Theology emphasized the common good, the just social order that will secure justice and equality for all the citizens. It strives for the universal peace of the Kingdom.

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[417]Keer,Dananjay. *Dr Ambedkar*, p 489; and D R. Jatava, *The Political Philosophy of B R Ambedkar*, Phoenix Publishing Agency, Agra, 1965, p 6

[418]Moon, Vasant,ed., *B R Ambedkar's Writings and Speeches*, Vol III, p 442; Ambedkar B R, *The Buddha and His Dhamma*, Siddhartha Publications, 1991 pp 169, 370, 388, 399, and 415

[419]Jatava D. R, *The Social Philosophy of B. R Ambedkar*, Phoenix Publishing Agency, Agra, 1965, p 3

[420]Ibid.

[421]Ibid, p 293.

# CHAPTER-VI

# CHAPTER – VI

# AMBEDKAR'S VIEWS ON PHILOSOPHY AND MORALITY

The main objective of this chapter is to highlight the Ambedkar's philosophy of morality. For Ambedkar, morality is the basic need of humanity, as it would create a just and powerful community. He believed that morality was necessary for the growth of a strong and powerful nation. He says that religion is a system of socio-cultural values, which would bring all the individuals and would create a spiritually powerful community. Ambedkar said that Religion was a force which promises equal opportunity to all. He was also categorical that Buddhism alone could create a climate favorable to human equality and except Buddhism rest of the religions appeared to be false and unjust in their nature. As Hinduism already became corrupted and degenerated since it separated itself from the key element of morality. The critique is seen in operation in the rejection of religions and ideology, which clearly shows that without the existence of morality sufficient justice, cannot be promoted for the marginalized in the society.

The aim of this chapter is to explain the perception called 'new theology of morality' of Ambedkar who offered philosophical reasons to reject all religions and ideologies to prefer Buddhism as true dynamics of moral religion. He is of the opinion that morality is the central element for any religion. He has reinterpreted the Neo-Buddhism from the original teachings of Buddha that is purely based on the morality. Ambedkar emphasises on the transformation of the marginalized in the ideological terms as well as in the practice. In his view, morality is very much necessary for their 'spiritual ideology reforms' in the Hindu society. His quest and struggle for the liberation of marginalised had aimed to enter into the *Hindu* temples and consequently burnt the *Manu Smriti*, his ideological foundation for the egalitarian society remained as the core of his moral philosophy. Hinduism detached itself from morality so it degenerate and become corrupted. Hinduism has lost the three principles of liberty; equality, fraternity; and values necessary for the restructuring of Indian society based on Buddhism. This chapter explains the various reasons for his rejection of Hindu religion and its immoral ideologies; therefore he had decided to join Buddhism.

The underlying moral and logical assumptions of Ambedkar can be understood in terms of technical metaphysical concepts of liberty, equality and fraternity that associated with the philosophical notions of universality and rationality. Further, the inner essence of Ambedkar's intellectual development also can be understood as the attempt to realise his concepts of freedom and fraternity. Thus Ambedkar's main concern shifts from proclaiming the philosophical nature of freedom to ever-deepening interests of the social and historical conditions that produce inequality, exclusion and alienation. Ambedkar's writings are full of moral judgements - implicit and explicit. From Ambedkar's early writings and also from his childhood experience made him to attack on the Hinduism. His analysis on the Hindu religious order with specific reference to the problem of the *caste* and *Untouchability* is potential of providing a viewpoint of liberation. Ambedkar made scathing attack on Hinduism as a philosophy and religious immoral order and how it paved way for a practice of *Untouchability* and social degradation. Ambedkar was fired by outrage, indignation and the burning desire for a better world through the establishment of true *Dhamma.*

According to Ambedkar, morality is a "form of social consciousness; it is a social institution which regulates the conduct of people in all spheres of their social life. Morality expresses the general social requirements and interests of society through generally recognised injunctions and evolutions that are supported by the people. Ambedkar says that an individual relaying on the moral conceptions produced by society, assimilating them in the process of education, the individual may independently regulates his behaviour to a considerable extent and judge about the moral significance of all developments that takes place around. Thus Ambedkar says that the individual should not only act as the object of social control, but also as its conscious subject. Most of the philosophical, theological, religious, ethical writings of Ambedkar, along with his sociological writings are polemical in character."[422] Even, "*The Buddha and His Dhamma,* his most systematic book on religion, contains many passages which are polemic and apologetic, besides the dialectical disputes of the Buddha."[423]

[422]Keer Dananjay, *Dr Ambedkar: A Memorial Album*, Popular Prakashan, Bombay, 1982, p 3
[423]Ambedkar B. R, *The Buddha and His Dhamma*, Sidharth Publications, Bombay,1984, pp 156 – 157, 159, 351– 364, and 370 – 371.

Morality being a complex social formation it concerned with: what are rights, rightness, duty, responsibility, obligation, justice, punishment, virtue, conscience and wisdom? How are customs, public opinion, laws, contracts, authority, self realisation and god or religion is related morality? What actions are accepted in a society, what norms of behaviour are adopted for the people to follow, what part do intentions play in determining rightness, can practical moral problems be solved generally, or do specific problems like caste, race and religion require separate treatment?. All these forms of moral consciousness are united into a logically ordered system which can prescribe, motivate and appraise moral actions. In addition to general human elements morality also incorporates historically transient and class, caste norms, principles and ideals. According to Ambedkar morality is socially constructed, and says that, the morality and moral norms are formed in the moral consciousness of society.

Ambedkar says that the Hinduism is a religion, which is not founded on morality. Whatever morality Hinduism has it is not an integral part of it. He argues that the morality is not embedded in Hindu religion, for him, it is a separate force which is sustained by social necessities and not by the injection of Hindu religion. According to Ambedkar, the Hindu social order lacks the spirit of solidarity. Ambedkar says that, "the reasons for this want of solidarity is not far to seek. It is to be found in the system of graded inequality where by the Brahmin is above every body; the *shudra* is below the Brahmin but above the untouchables. If the Hindu social order were based on the inequality, it would have been over thrown long ago. But it is based on graded inequality so that the *Shudra* while anxious to pull down the Brahmin, he is not prepared to see the untouchables raised to his level. He prefers to suffer indignities heaped upon him (rather than) to join the untouchables for a general levelling down of social order. The result is that there is nobody to join the untouchables in (there) struggle (against the oppressive caste system). He is completely isolated."[424] Thus, Ambedkar argues very resplendently that Hindu social order is caste bound and rooted in a morality called *varnasramadharma,* hence, it is no more remains to be a moral order or dharma. It turns

[424]Moon, Vasanth, ed, *Babasaheb Ambedkar's: Writings and Speeches* Vol V, Government of Maharastra, 1989, p 116.

out to be an *adharma* or immorality. While many of Ambedkar's arguments criticizing the caste social order are embedded in the modernist enlightenment tradition of the west, equally important are his criticisms, which are hailing from his moral conscience. He evaluates the moralistic foundations of Hindu social order.

Ambedkar, in his thesis on the *Annihilation of Caste of 1936* provides a brief analytical summary of caste social order and the need for the total annihilation of it. While attempting to flatten the caste Hindu apologies for the prevalence of casteism, Ambedkar insisted that caste is not merely a division of labour but more truly it is a division of labourers. It attaches a value hierarchy. It is hegemonic in its structure. The division of labour is not based on choice ether; it is based on one's birth in a specified caste group. Thus, the Hindu social order is no a free order of human choice. It upholds a theory of the predetermination so as to evade or escape radical interrogation of the system. The function of Caste, Ambedkar observed, is to divide and disorganize the social groups for the social, culture and political monopoly of the high caste Hindu. Caste, for Ambedkar is an uncivilized social act about which the caste Hindu is not prepared to bring about any change. As a system of social organization, caste performs the role of 'divide and rule' method of domination of the lower social groups.

The terrible suffering, pain and pathos of cultural deprivation, economic exploitation, social ostracism, and political domination caused by the ruthless monstrous caste-system, made Ambedkar whole-heartedly hate the caste system and anything or anyone related with its continuation. As he admits, such hatred for injustice is a must for the activists who wish to fight for a just and egalitarian order;[425] yet it should not, as it was in the case of Ambedkar, make one blind to the advantages, though few, of the jatilcaste-system.[426] Here we are not referring to the *Brahminic Varna vivastha,* caste-social order, the in egalitarian hierarchical ideology, slave system, and the system of *Untouchability* which must be totally abolished. It is due to some advantages that caste system, in its present

[425]Moon, Vasant,ed.,Ambedkar's preface to his, Ranade, Gandhi and Jinnah (1943), *Writings and Speeches*, Vol V, Government of Maharassstra, Bombay, 1991, pp 208 – 209.
[426]For a discussion of advantages and disadvantages of politicized of caste system, J. Murdoch, *Review of Caste in India*, Prem Rawat, Jaipur, 1977, p 216

form of *jades,* still survives and is on the flourish, even in our modern times leading to gruesome atrocities and gaining political out.[427]

Ambedkar points out the intricacy cabled in the order of casteism. According to him, the social order of Hinduism does not contain any principle of social transformation. In the caste order, other than the Brahmins, those who occupy the higher caste order aspire to become higher and higher by 'infection by imitation' however in practice such an upward movement is not a possibility. In the order of its hegemonic hierarchy, the upper or middle caste groups do not and cannot have any inclination towards equilibrium or change towards equality and justice.

Ambedkar asserts that the Hindu is morally unconcerned about the untouchable He had no conscience in this matter. By his absence of conscience, the caste-Hindu is a great obstacle to the removal of *Untouchability.* The untouchable does not belong to the society of the Hindu and the Hindu does not feel that he and the untouchable belong to one society. According to Ambedkar's observation, the Hindu social order is an outright denial of both spontaneity and a life freedom for mankind. Instead it upholds the belief in the tradition of *manana* (transmission of the old knowledge to generation) and conformity of the past rules and regulations of tradition. It is infected with a strong sense of finality and fixity paving no way for any scientific progress and revolution in society.

Ambedkar observes that the Hindu Social order tends to deprive moral life of freedom and spontaneity and to reduce it to a more or less anxious and servile conformity to externally imposed rules. There is no loyalty to ideas; there is only conventionality to command. The laws are inequities in that they are not the same for one class as for another. "The laws are made arranged to be the same for all generations. The laws made by certain persons called as the lawgivers. This code has been invested with the nature of finality of fixity."[428] This passage in the writings of Ambedkar shows his deeper

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[427]For an understanding of politisization of caste, Rajni Kothari, *Caste in Indian Politics*, Orient Longman. New Delhi, Section 1. 1

[428]Moon, Vasant, ed., *Dr Babasaheb Ambedkar's Writings and Speeches*, Vol V, Government of Maharastra, Bombay,1989, p 118.

consideration of the dynamics of an ideal source of the society. It presupposes that a society must include in itself the sources of its own change and transformation without which it cannot promise its forward movement and growth. Ambedkar's assessment of the instant of spontaneity as one of the sources of social dynamics helps him to appraise the Hindu social order and come to the conclusion that it lacks such a basis.

From the previous discussion and analysis of Ambedkar, we can record a few and methodological structure of Ambedkar's observations about the theoretical backdrop of his analysis of the Hindu social order. For Ambedkar, the Hindu social order is grounded in immorality. It is against justice, liberty, equality and fraternity. It is a collection of closed units that enclose themselves leaving no room for relationship and social intercourse. It is an order of self-imprisonment that enslaves the human into the caste prisons. It segregates 'infection by imitation' which in turn affects every consecutive caste groups and eventually. The Indian society is a system that degrades and alienates human labour and labourers. It lacks any social conscience for being in union. Spontaneity and moral freedom is alien to the system of caste social order. Participation and communication for social living is methodically prohibited in it. Its social expression is the social exclusion whose increasing effect is laid very seriously on the shoulders of the broken people.

Therefore for Ambedkar, rebuilding of the identity of the broken people and through that restructuring Indian society on a moral basis becomes a life mission. Ambedkar's criticism of the caste social order is indivisible from his criticism of Hindu religion. This does not develop into his biased position but on the other hand the nature of the object of his study i.e., the caste social order itself objectively suggests this position. If he starts with evaluating the caste system inevitably, he ends up with the criticism of Hindu religion. If he starts with the assessment of Hindu religion he unavoidably ends up with the disapproval of caste social order. This predictability, we mean, is involuntary in the nature of the object itself. The interconnectedness of caste and religion in India seems to be one of the oldest facts of Indian society. It is notable to remind here that many of the native reform and complaint movements handled the Hindu religion and the caste order,

united in the sense that one cannot be criticized without leaving the other. One can quote the examples of *Carvakas,* Buddhism in the ancient India as well as Phule, Periyar and Ambedkar in modern period. Perhaps, Ambedkar is the one who has provided a consistent hypothetical criticism of the Hindu social order and its caste basics.

Ambedkar has a strong backdrop of western clarification of thought that helped him to assess the Indian social structure from the point of view of liberty, equality, and fraternity. When he goes for assessing the structural elements of the Indian society, he looks up into the society from the point of view of individual, as the indispensable unit of the system on the one hand and from the point of view of social whole as the universal aspect of the society. Thus, the individual and the social are the two complimentary vital elements in the theoretical frame of Ambedkar analysis. He is interested not only to define a society or to provide a theoretical discourse of society except basically his intention lies in indicating and providing necessary foundations of a humane society. And for this he strongly believes that that the sources of change and transformation for the forward movement of a society are essential. Such an approach of Ambedkar helps him to assess the Hindu *order* at a deeper level.

Another very significant facet of Ambedkar's method is the social democracy and democratic constitutional feature of his thought. Ambedkar powerfully holds that social democracy is an explanation to relocate the caste social order. Ambedkar criticizes the Hindu social order from a moral direct of view. For him, since the Hindu social order lacks any moral conscience and value basis, he gave an advice that the Hindu society has to be reconstructed on the basis of an ethics of emancipation. For Ambedkar, liberty, equality and fraternity are the values that would offer a viable and humane Indian social order. From Ambedkar's study of the Hindu social order we could deduce the following projects of Ambedkar. The purpose of Ambedkar is to establish an alternative to the Hindu social order. Such a task in Ambedkar may be classified in two folds: On the one hand, Ambedkar wanted to establish the identity of the untouchables as an indigenous social religious '(Buddhism) group that resisted caste inequality from its very inception. And on the other, he ignited an ongoing social, educational, political movement, an

action for liberation, which would continue to raise the cause of justice in the Indian society, irrespective of the pains and sufferings in its encounter with the orthodoxy.

## Morality as Inclusive

Ambedkar as a humanist he fight against untouchably or the evil of casteism is not a simply a fight for the downtrodden people. Moreover it is a fight for the moral redemption of the humanity. Existence of *Untouchability* may be only a direct challenge to the downtrodden only. But it is a moral challenge to all humanity. Caste and *Untouchability*, therefore it is crucial problem for humanity in general, rather than an only problem of down trodden. Deconstructing the identity of the untouchables, in the case of Ambedkar, is sill of reconstructing a society, which in turn conceives the possibility of building up a humanized world. Therefore, if the human society requests to be really a social whole, then it should attend to the broken- particular, namely the discriminated. The universal to be universal needs to restore the broken particular if not what is claimed to be universal is pseudo. Such a task he envisaged needs to be carried on at two interlined levels. One at the level of the philosophical or theoretical, while the other at the level of the practical. At its philosophical level of Ambedkar sets example for the need for a clear lucid and serious understanding and analysis of the theoretical foundations of an oppressive system. At the realistic level, he has suggested the need for a continuous discourse and a communication of resistance against any oppressive forces like caste and *Untouchability*.

The major theme of Ambedkars' analysis of morality is that the religious immorality is based on the philosophical and practice of social dominance. The Hindu religious philosophy and its socio-cultural appearances are grounded on the belief that human life is unequal and immoral, therefore cannot scream for religious and social equality. Those human beings are pre-determined to be born unequal and therefore cannot lay claim to equality either in terms of their religious-spiritual status or in terms of their social, economic, civic or political status in the community. The morality is also played main role to survive religion to right path. The religion is survived in the wheel of morality in action and the Hindu religious moral ideology always hurting to the depressed people.

This shows the morality of the Hindu is purely social. This means that the level of his morality is merely traditional and customary. There are two evils of customary morality. In the first place there is no surety that it will always be charged with sincerity and purity of motive. For it is only when morality penetrates to the deepest springs of purpose and feeling in' the individual that pretense will cease to find a place in human behavior. In the second place customary morality is an anchor and a drag. It holds up the average man and holds back the man who forges ahead. Customary morality is only another name for moral stagnation. This is true of all cases where morality is only customary morality. But the customary morality of the Hindus has an evil feature that is peculiar to it. Customary morality is a matter of meritorious conduct. Ordinarily this meritorious conduct is something that is good from the general or public point of view. But among the Hinduism the commendable conduct is not concerned with the worship of God or the general good of community. Meritorious conduct in Hinduism is concerned with the giving of presents, of good and of honour to the Brahmins. Hindu Ethics is worship of the superman.

The morality arises from the "direct necessity for man to love man."[429] Ambedkar makes it comprehensible that, "it is not to please God that man has to be moral, rather for his own good qualities that man is to love man."[430] In the struggle for existence the individual's rights may not' be catered for, and at times his or her interests can be, rare by the group. Similarly, "a weak group may also be discriminated by a stronger group, hence the indispensability; ability of the *law of love*, fraternity and brotherhood, which is another name for morality."[431]

The norms devised by Ambedkar, as criteria to assess the ideal scheme of obligations, were mainly to deal a deathblow to Hinduism. He was persuaded that Hinduism badly needed reform, and wanted to expose the oppression it had unleashed and the slavery it had perpetuated on the depressed. He was one of the victims of the social system of Hinduism, and so he should know what Hinduism aimed at. Which of these was Ambedkar attacking? What Hinduism did he condemn and reject? After discussing,

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[429]Jatava D.R, *The Social Philosophy of B R Ambedkar*, Agra, Phoenix Publishing Agency,1965, p 231.
[430]Ibid. and A.Thumma, *Prema Yoga*. Oxford University Press, New York, 1974, p 232.
[431]Ibid, pp 233 – 234.

various meanings of the word 'Hindu' as denoting a religion, parentage, country and a race. Ambedkar points out that he is dealing with Hinduism in which caste has become indispensable as doctrine, ideology and sanctified social order. Hinduism that is object of his derisive attack is that Bahrainis variety, a Hinduism who's 'care is the creed 'of caste',' and where "the *Manu Smriti* must be accepted as the Book of Religion."[432] Ambedkar quotes Max Muller and affirms that his target is, "Modem Hinduism rests on the system of caste as on a rock which no arguments can shake."[433] Ambedkar sees that Hinduism is not a religion for individual justice with equality, fraternity and liberty and it fails to bring social utility of just, free and moral social order as the ideal scheme of divine governance. In the sense Hinduism has failed to lift the depressed.

Ambedkar arrives at the final judgment of Hinduism: The only answer is that Hinduism is overwhelmed with the fear of contamination. It has not got the power to purify. It has not the desire to serve and that is because by its very nature it is in human and unmoral. It is a misnomer to call it religion. Its philosophy is against to very thing for which religion stands.[434] Hinduism is destined for failing the trial by the first norm of justice. It is found advocating inequality as the dependable doctrine: "This brief analysis of the Philosophy of Hinduism from the point of view of justice reveals in an obtrusive manner how Hinduism is adverse to equality, antagonistic to liberty and opposed to fraternity. Indeed, inequality is the *Soul* of Hinduism."[435] The second norm of social utility equally fails to free from domination: "If these conclusions are sound, how can a philosophy which disconnects intelligence from labor, which expropriates the rights of man to comfort vital to life and which prevented society from mobilizing resources for common action in the hour of danger, be said to satisfy the test of social utility."[436]

Ambedkar puts the rational and logical question that what difference would it have made if I had taken Hindu Ethics as the basis for deducing the philosophy of Hinduism? Most

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[432]Keer Dananjay and Dr Ambedkar, *Babasaheb Ambedekar's Writings and Speeches*, Vol III, p 336 &Vol IV, pp .5 – 8, *The Buddha and His Dhamma*, Which was being written at the same time, Sangan Books, London, 1987, p 487.
[433]Ibid, p 488.
[434]Keer Dananjay, *Dr Ambedkar: A Memorial Album*, Popular Prakashan, Bombay, 1982, p 92.
[435]Ibid, p 66.
[436]Ibid, p 71.

students of Hinduism do not remember that just as in Hinduism there is no difference between law and Religion so there is no difference between law and ethics. Both are concerned with the same thing namely regulating the conduct of the low class Hindus to *subserve* the ends of high Caste Hindus. The false pictures of Hinduism in as much as "I have omitted to take into account the *Upanishads* which are the true source of Hindu philosophy."[437]

Ambedkar reiterates that the Inequality is the *Soul* of Hinduism. The morality of Hinduism is only social. It is unmoral and inhuman to say the least. What is unmoral and inhuman easily becomes immoral, inhuman and infamous. This is what Hinduism has become. Those who doubt this or deny this proposition should examine the social composition of the Hindu Society and ponder over the condition of some of the elements in it. It is essential to emphasize the great part played by crime in the general life of these peoples. A boy is initiated into crime as soon as he is able to walk and talk. No doubt the motive is practical, to a great extent, in so far as it is always better to risk a child in petty theft, who, if he were caught, would probably be cuffed, while an adult would immediately be arrested. Women, who, although they do not participate in the actual raids, have many heavy responsibilities, also play an important part. Besides being clever in disposing off stolen property the women of the Criminal Tribes are experts in shoplifting. The only answer is that Hinduism is overwhelmed with the fear of pollution. It has not got the power to purify. It has not the impulse to serve and that is because by its very nature it is *inhuman* and *unmoral.*

The concepts of rightness and wrongness lie close to the core of Ambedkar's moral thought. His explanation of rightness is in relation to duty, responsibility, oughtness, justice, virtue and wisdom. Acts are right because they produce good results for the most people. Rights consist in acting for the benefit of others; wrong action is one's own benefit. Self-seeking is selfish and selfish is the root of all evils. The cure for this evil is to pursue the opposite course that is love others and promote their good. For Ambedkar democratic form of government is considered right because it is believed to produce the best results for the most people.

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[437]Ibid, p 73.

Ambedkar's morality is not only with rightness, but also with rights. This is more often associated with political and legal philosophy, since people seem to be more concerned about their legal than their moral rights. According to Ambedkar, "rights are real only if they are accompanied by remedies. It is no use giving rights if they aggrieved person has no legal remedy to which he can resort when his rights are invaded. Consequently when the Constitution guarantees rights it also becomes necessary to make provision to prevent the Legislature and the Executive from overriding them. This function has been usually assigned to the Judiciary and the Courts have been made the special guardians of the rights guaranteed by the Constitution."[438] Ambedkar says that the "rights are protected not by law but by the social and moral conscience of society. If social conscience is such that it is prepared to recognise the rights which law chooses to enact, rights will be safe and secure. But if the fundamental rights are opposed by the community, no law, no Parliament, no Judiciary can guarantee them in the real sense of the word."[439] Thus the right is the minimum claim upon the services of others as a duty is the minimum claim of others upon us.

For Ambedkar fraternity is another name for morality. He says that the fraternity is nothing but another name for brotherhood of men and women which is another name for morality. Ambedkar concludes that the "fraternity is the name for the disposition of an individual to treat men as the object of reverence and love and the desire to be in unity with his fellow beings."[440] According to Ambedkar "fraternity strengthens socialites and gives to each individual a strong personal interest in practically consulting the welfare of others. It leads him tom identify his feelings more and more with their good or at least with an even greater degree of practical consideration for it. Ambedkar argues that with a disposition to fraternity, the individual comes as though instructively to be conscious of himself as being one who of course pays a regard to others. Thus the good of others

[438]Moon, Vasant, ed., *Dr Babasaheb Ambedkar's Writings and Speeches*, Vol I, Government of Maharastra, Bombay,1989, p 406.
[439]Ibid, p 222.
[440]Moon, Vasant, ed., *Dr. Babasaheb Ambedkar's Writings and Speeches*, Vol III, Government of Maharastra, Bombay,1989, p 97.

becomes to him a thing naturally and necessarily to be attended to like any of the physical conditions of our existence."[441]

For Ambedkar morality and religion are inseparable and that morality is able to be understood only in the context of religion and it has been at the center of his philosophical discussion. According to Ambedkar, religion must be essentially moral; religion cannot live unless it interacts with other forms of spiritual life as morality, beauty, and truth. Religion is thus when compared with morality it turns out to be at once *infra* and *supra* ethical. The fact that the religion takes as its point of departure human life, for this it provides a goal. Without such a destiny in sight religion cannot exist, provided with it faith passes on far beyond the realm of morality.

Ambedkar says that the religion is not an end in itself It is meant for the preservation of life and human welfare. Hence, religion is not the one that has the final say; it is not infallible, absolute, inflexible nor permanent. Jesus insisted that the Sabbath is made for the humans and not for preventing the saving and the preservation of life of human beings and other animals. So also, Ambedkar stressed that religion is for humans and not humans for religion.[442] For him, "man and morality must be the centre of religion."[443] Humanist to the core, Ambedkar was ready to throw away any religion or religious practice; however, ancient and sanctified that does not promote human welfare.

For Ambedkar, morality is based on love.[444] Morality is sacred and has taken the place of "God" in his Philosophy. It must not be desecrated even by the mighty, so that it is able to protect the weak in the society. He felt that the foundation of morality is love. The reason for this love is not anything mystical, it arises from man's natural condition, out of the necessity of peaceful coexistence, the need of protecting oneself and the weak, and to bear each other for a happy life on earth.

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[441]Ibid, pp 97-98.
[442]Jatava,D. R. *The Social Philosophy of B. R Ambedkar*, Phoenix Publishing Agency, Agra,1965, Section 3. 3. 3. 2.
[443]Moon,Vasant, ed., *B. R. Ambedkar's, Writings and Speeches*, Government of Maharastra,Bombay,1991, Vol.III, p 442.
[444]Jatava D.R, *The Social Philosophy of B R .Ambedkar*, Agra, Phoenix Publishing Agency, 1965, p 267.

The ultimate vision and "goal of Ambedkar's liberative struggle is the Kingdom of Righteousness which, according to him, is the important purpose of *Saddhamma:* The Buddha by his *Dhamma* laid foundation to the Kingdom of Righteousness on earth and urged both the *Bhikkus* and the laypersons to strive for it."[445] The kingdom of righteousness consists of love, peace and justice for all.[446] It is the total and integral liberation of all, of every human being, every community and every nation on earth. Ambedkar's struggle all his life to liberate the oppressed community, which was the worst, affected by the caste system.[447] The liberation of the *Dalits* was not an end in itself, nor does it fulfil the ultimate goal of establishing the kingdom of righteousness, which entails the liberation of all peoples. Ambedkar urges the *Dalits* to work for the liberation of all at the first *deeksha* ceremony: "You must pledge today that you, the followers of Buddha, will not only work to liberate your-self, but will try to elevate your country and world in general... go forth to liberate people."[448] Dalit revolutions are for the liberation of all, to build the Kingdom of humanism.

The ideal of the kingdom of righteousness is realized in practice in a new society that is just and egalitarian, that is based on the principles of liberty, equality and fraternity.[449] The blue print for the new society of Ambedkar's dream was drawn out by him from Buddhism that was incorporated in the Preamble of India's Constitution. All the members of this ideal society are assured of justice-social, economic and political; Liberty of thought, expression, belief, faith and worship; Equality of status and have opportunity. Fraternity is assuring the dignity of the individual and the unity of the Nation. In the new

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[445]Moon, Vasanth, ed , *Babasaheb Ambedkar's Writings and Speeches*, Vol V, Government of Maharastra,1989, pp 318 – 319

[446]Ambedkar B. R, *Buddha and His Dhamma*, Siddhartha publications, Bombay, 1991, p 79.

[447]Keer Dananjay, ed , *Babasaheb Ambedkar's, Writings and Speeches*, Vol II, 1982, pp 609, and 655 – 656; pp. 449 – 500; G. S. Lokhande, B. R. Ambedkar – *A Study in Social Democracy*, Intellectual Publishing House, New Delhi, 1977, pp 143 – 156

[448]Moon, Vasant, Thus Spoke *Ambedkar's, Writings and Speeches,* Government of Maharastra, Bombay, Vol II, 1982, pp 164 – 165.

[449]Ambedkar B. R., *The Buddha and His Dhamma*, pp. 318 – 319; *Writings and Speeches*, Vol I, pp 57 – 58; Jatava D.R., *The Social Philosophy of B R Ambedkar*, pp 86 – 93 and 231 – 269, G. S Lokhande, Ambedkar B. R.– *A Study in Social Democracy*, Intellectual Publishing House, NewDelhi,1977, pp 50 – 63; Section, 3. 4. 2.

ideal society, "what is important is high ideals and not noble birth. No caste, no inequality; no superiority; no inferiority; all are equals."[450] Thus the new society is socialistic in its economic structure; democratic in political structure and egalitarian in social structure. It is free from every form of exploitation, dictatorship, domination and the oppression of caste, class, gender, ethnic nationality and culture. The just society is where even the weakest group receives recognition, equal respect, dignity and identity, and is bequeathed with special affirmation, reservations and privileges to promote itself.

Ambedkar proposes that the "Cleansing the mind of it's the impurities,"[451] "Training the mind to turn bad disposition into good disposition,"[452] awareness of the impenitence of all things, cultivation of detachment,[453] controlling of all passions[454]and cessation of all desires and craving.[455] Only armed with detachment and enlightenment an individual and society can strive for the Kingdom. This psycho-cultural revolution must precede and accompany the socio-political revolution. Ambedkar emphasizes "A good disposition is the only permanent foundation of and guarantee of permanent goodness."[456] To state it positively, the process of detachment and enlightenment unleashes the powers of love, which are the basis and the force of revolution. Unless one overflows with "an all-embracing love for the entire universe,"[457] one cannot worthily and effectively participate in the struggle for the Kingdom. None of the other means employed to attain realization, "has a sixteenth part of the value of loving kindness. Loving kindness, which is the freedom of heart, absorbs them all, it glows, shines, it blazes forth."[458] The Kingdom of Righteousness can be made an historical reality only if both the monks as well as the lay - persons strive in practice to love and serve. Mere preaching "would not result in the creation of that ideal society based on righteousness. Compassion that is the essence of

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[450]Moon, Vasant, Thus Spoke Ambedkar, Vol II, 1982, pp 164 – 165, D R Jatava, *The Political Philosophy of B R Ambedkar*, Agra, Phoenix Pub House, 1965, pp 81 – 160.
[451]Ambedkar B. R, *The Buddha His Dhamma*, Siddhartha Publications, Bombay, 1991, p 166.
[452]Ibid, p 202.
[453]Ibid, p 170.
[454]Ibid, pp 156 and 165.
[455]Ibid, p 296.
[456]Ibid, p 202.
[457]Ibid, p 301.
[458]Ibid, p 214.

the *Dhamma* requires that every one shall love and serve, and the *Bhikkhu* is not exempt from it. A *Bhikkhu,* who is indifferent to the woes of mankind, however perfect in self-culture, is not at all a *Bhikkhu.*"[459]

Any religion that enslaves the minds of the people by fear or force, curtailing their liberation and freedom, that denies justice, equality and democracy that hinders universal fraternity, is no religion at all. Such religious practices, ceremonies and customs are to be rejected, and such doctrines are to be corrected. Even when a single person or small group is oppressed by a religion, a religious person or a religious class, that religion is in need of urgent reform. Domination of the clergy, exploitation of people in the name of devotions, superstitious and magical ceremonies, and outdated and irrelevant practices, over-spiritualization of religious doctrines, and deification of religious figures and saints, distort religion. We need religion for the liberation of humanity, but from the religion that does not liberate humanity we need liberation.

Ambedkar urges the *Dalits* to free themselves of such superstitious and magical religion and the fatalistic attitudes inculcated by the enslaving doctrines of *karma* and *love*.[460] These not only impoverish and enslave, they also entrap the minds. While Ambedkar bequeathed the *Dalits* a religion of wisdom and compassion, a religion of loving service and self -sacrifice, and a religion of morality of love, to strive for the Kingdom of Righteousness, he condemned all superstitious practices. Ambedkar says that what is needed for salvation are not these but a critical, prophetic, liberative religion. Further, he reiterates that a liberative religion alone can inspire and inform the people with wisdom, and empower them with detachment and love, to struggle for the political power, to transform the unjust structures, and to usher in the *Dharma Raj.*

[459]Ibid, pp. 318 – 319.
[460]Keer, Dhananjay, *Dr. Ambedkar· Life and Mission*, Bombay, Popular Prakashan, 1991, pp 233 – 235.

In short, the purpose of the liberative religion is to "teach the virtues of fellow feeling, equality and liberty"[461] and thus build the Kingdom of *Dhamma*. Hence, the urgency for all the religions to purge themselves of the magical practices, outmoded cults and ceremonies, irrelevant institutions and traditions, outdated doctrines and dogmas, and unleash the liberative elements and the revolutionary potential that is present in all of them. Only then can they be effective paths to the Kingdom.

## *Dhamma* as a scientific morality

Ambedkar emphasized that the Buddhist ethics is not a mere rules or guidelines for the individual purity and its sanctity. Certainly Buddhist ethics very much talk about the importance of minds to be cleansed. But that is not confined in itself. If we look on the morality of the all other religion we could have find out that all principles are directed towards the individual aspect of ethics. They are narrowed down as some kind of instruction to the individuals. One thing which we have to notice is that it does not mean that socially aspects are totally excluded from it. But social aspects are also included in the frame work of individuality. The best example of this is Christian dictum "Love thy neighbour as you love yourself"[462]. The dictum which can be considered as the paramount of social concern is also exactly a preaching of individual oriented ethics. Actually that principle is also an advice to an individual to change his mind from the selfish motives. Other religions if we look we can find out that certain instruction to an individual which are quite appropriate to keep the current social order. Hinduism is the evident example. But only in Buddhist ethics we can find out the ethical aspects which address society as whole, which emphasizes with the social concerns.

Ambedkar makes out this difference very clearly and emphasizes the social-morality of the Buddhism in 'Buddha and His *Dhamma*'. "What is the purpose of religion? Different religions have given different answers. To make man seek after God and to teach him the importance of saving his *Soul* is the commonest answer one gets to this question. Most

[461] Ibid, p 273.
[462] Dr. Billy Graham, "*The bible is a book*", ed, The Bible, *New Testament Gospel According to Luke*, Chapter X, verse,27

religions speak of three kingdoms. One is called the kingdom of heaven. The second is called the kingdom of earth and the third is called the kingdom of hell. All the religions preach that to reach this kingdom of heaven should be the aim of man and how to reach it is the end of all." But Ambedkar emphasize that for Buddha, the purpose of religion was entirely different. To the question what is the purpose of religion Buddha's answer was entirely different. "He did not tell people that their aim is life should be to reach some imaginary heaven. The kingdom of righteousness lies on earth and is to be reached by man by righteous conduct "[463]

Ambedkar tries explains that the Buddhism is not related to the concept of God but morality. But what become now evident in Buddhism is that the purpose of morality is defined as to make the earth of righteousness. One should here note that many religions talks about the earth of love, but only Buddhism talks about the earth of righteousness. According to Ambedkar in Buddhism virtue is defined in socially aspects. It is this which distinguishes Buddhism form all other religions[464]

Moreover what is appealing is that Buddhist ethics is not the denial of the Individual ethics, beyond it, the individual ethics and social ethics both are construed and formed in the critical engagement with each other. May be one wonder that how we can categorically define certain values as social and individual. It is true that this division is not a water tight division. But in emphasis, one can define that certain values are socially oriented and certain others individual oriented. Certainly righteousness is social virtue. It is because righteousness is not merely a person's attitude towards others. This is a virtue which exists in the social relation only. This is not something which resides in one person and expressed towards other. But something which is only evolving in social relation. In certain sense we can distinguish both these kinds of values as follows: Social relation is quite necessary for the definition of the social value. Individual value also most of the time includes social relation, but for the definition of it social relation is not a necessary one.

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[463] Ambedkar B. R , *Buddha and His Dhamma*, Siddharth Publications, Bombay, 1987, p 283
[464] Ibid.

But at the same time Buddhist ethics are not the denial of individual aspects of ethics. But what we can see in Buddhist ethics is critical engagement between individual aspect and social aspects. In Buddhism both guides each other while in other religions it is only one-way relations. That is individual aspects determines the social aspects. But Buddhism offers the possibility of interaction of both it is evident from following: "Only righteousness can remove this inequity and the resultant misery. That's why Ambedkar said that religion must not only preach but must inculcate upon the mind of man the supreme necessity for being righteousness in his conduct "[465]

Ambedkar proposed the ideal of *Saddhamma*. For Ambedkar: "*Dhamma* is *Saddhamma* when it makes learning open to all. *Dhamma* is *Saddhamma* when it teaches that mere learning is not enough. It may lead to pedantry *Dhamma* is *Saddhamma* when it teaches that what is needed is *prajna* (Pranya). *Dhamma* is *Saddhamma* only when it teaches that *Prajna* is not enough. *Sila* must accompany it. *Dhamma* is *Saddhamma* only when it teaches that besides *Prajna* and *Sila,* what is necessary, is *Karuna Dhamma* is *Saddhamma* only when it teaches, that more than *Karuna* what is necessary is *Maitri, Dhamma* to be *Saddhamma* must break down barriers between man and man. *Dhamma* to be *Saddhamma* must teach that 'worth' and not' birth' is the measure of man. *Dhamma* to be *Saddhamma* must promote equality between man and man."[466] The functions of *Saddhamma* are in the first place to cleanse the mind of its impurities and in the second to make the world a kingdom of righteousness. In order to practice *Saddhamma,* however, *Dhamma* must promote *prajna* or insight, and this it does by making learning open to all, by teaching that mere learning is not enough as it may lead to pedantry, and by teaching that what is needed is *Prajna* or right thinking.

Moreover *Dhamma* as *Saddhamma* only when it teaches that *Prajna* must be accompanied by *Sila* or right action as well as by *Karuna* or compassion for the poor and helpless and by *Maitri* or love for all living beings. It follows that, in order to

[465]Ibid, p 284.
[466]Kuber W. N, *B R Ambedkar*, Ministry of Information and Broadcasting, Govt. of India, New Delhi, 1978, p 96.

*Saddhamma, Dhamma* must break down the barriers between man and man must teach the worth and not birth and must promote equality between man and man. According to Ambedkar the practice of *Saddhamma* includes, to cleanse the mind of its impurities; to make the world kingdom of righteousness; to make learning (*knowledge*) open to all; to teach the relevance of what is learnt in education; to practice moral *virtues (Sila);* to promote mercifulness *(Karuna);* and to promote *Maitri* or fellowship. As part of negations, for the *Dhamma* to be *Saddhamma* it should involve in breaking away the barriers between men or among human beings. The *Dhamma* to be *Saddhamma* must teach worth and *not* birth as the measure of man. Buddha is against the theory of the supremacy of birth as described in the concept of *Chaturvarna.* Instead, he preached the idea of the worth of man. He says no one is an out caste by birth- and no one is a *Brahmin* by birth and the most important element in the *Saddhamma,* more than *Prajna* is *Sila.* The *Sila* is *Karuna,* love of human beings and *Maitri* which is love of all living beings.[467]

According to Ambedkar, merits of Buddhist philosophy were as follows: Buddhism demanded living experience and a life divine, attainable there and now; not after death, it was realism and never idealism. It upheld liberty, equality, truth and justice; it emphasized humanity, love and peace. It was dynamic, scientific and all embracing. Its explanation of life and its meaning and purpose of birth and death and its aftermath were very clear, intelligible and logical. Above all, man was the center of his study and examination and not anything outside of him. Ambedkar tried to prove that the untouchables were Buddhists. In his thesis on the origin of *Untouchability* he made it clear that today's untouchables were once Buddhists.

"Buddhism was an Indian religion and the Buddha was nearer to the untouchable masses. Buddhism could withstand even the severest scientific test and had the power and capacity to direct destines of the modern world. The untouchables would join with the world Buddhist community and thus pave the way for world brotherhood."[468] Ambedkar said that, "Buddhism gives three principles in combination, which no other religion does.

[467] Jatava D.R, *The Social Philosophy of B R Ambedkar*, Agra, Phoenix Publishing Agency,1965, p 301.
[468] Ambedkar, B. R, *Buddha and The Future of His Religion*, Bheem Patrika Publication, Jalundur, 3rd Edn. 1968, p 5.

Buddhism teaches *prajna* (understanding) as against superstition and supernaturalism, *Karuna (love)* and *samata* (equality)... Neither god nor *Soul* can save the society,"[469] Referring to Marx's philosophy, Ambedkar observed that Man cannot live by bread alone. He has a mind, which needs food for thought. Religion instills hope in man and drives him to activity. Hindu religion has watered down the enthusiasm of the downtrodden. And "I found it necessary to change my faith and embrace Buddhism."[470] Ambedkar says that Religion emphasizes, universalizes social values and brings them to the mind of the individual who is required to be familiar with them in all his acts in an order that he may function as an approved member of the society.

Ambedkar's intervention in Hindu social order is considered as a Copernican revolution in the realm of morality and religion. Analysis shows that, Ambedkar's attempt to justify morality without reference to transcendental religious beliefs is a first step to make the realm of morality as an autonomous one. The concern for the universal well-being is the main consideration of Ambedkar's scheme of morality. Thus, external considerations are no longer being above moral principles. Ambedkar makes such a morality the basis of religion, which he constructed as *Dhamma.* In this construal, he redefines the centre of religion as morality rather than God. According to Ambedkar, Natural law is the basis of moral order of universe. *Dhamma* for Ambedkar is all-inclusive. The underlying meaning of the *Dhamma* is a message of equality and fraternity.

Ambedkar's position is that morality in religion would not be an effective one. In religion, morality is only a wagon which is attached to it. It is attached and detached as the occasion requires. Ambedkar notes that "Morality comes in only wherein man comes in relation to man. Morality comes into religion as a side wind to maintain peace and order....Be good to your neighbour because you are both children of God....The action of morality in the functioning of religion is therefore casual and occasional."[471] Ambedkar affirms that morality is *Dhamma* and *Dhamma* is morality that is inclusive. Further

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[469]Ibid.

[470]Rob Peter, ed, *Dalit Movements and the meaning of labour in Indian,* Oxford University Press, New Delhi,1993, p 18.

[471]Ambedkar, B. R, *The Buddha and His Dhamma*, Siddhartha Publications, Bombay, 1987, p 322

analysis shows that, Ambedkar's attempt to justify morality without reference to transcendental religious beliefs is a first step to make the realm or morality as an autonomous one. The concern for the universal well-being is the main consideration of Ambedkar's scheme of morality. Thus, external considerations are no longer being above moral principles. Ambedkar makes such a morality the basis of religion, which he construes as *Dhamma*.

In accordance with the Lord Buddha, Ambedkar also insists that the purpose or religion and spirituality are not mere quest of notion or truth. His analysis shows that this is not a defensible claim. Buddha also analyzes the metaphysical quest as follows; "Morality is justified in theistic religion in terms of reward and punishment give by God to the individual. Atheistic religions justify morality in terms of the doctrine of karma, according to which, morally good or bad lead to consequence, which are pleasant or painful to the agent. Therefore, the ethics in both theistic and atheistic religious lead to a kind of egoistic consequentialism."[472] This implies that the morality and its principles, roughly which can be considered as the benefit of all, is built on the egoistic basis. Morality is defined and prevailed in most religious by looking on the consequence of violation or maintenance, which ego would face. Here, suggests that in Ambedkar's reconstruction of Buddhism, is morality is justified in terms of universalistic consequentalism.

As we mentioned earlier Ambedkar extensively talks about the individual aspects of ethics through Buddhism. However, what one has to notice is that in this point also it differs from the other religion substantially. Through providing certain rule what other religion advocates the suppression of certain aspects of individuality and life. Advocation of asceticism is the best example for it. And these individual ethical values are also construed as looking toward some heaven or other supernatural ideas. But Buddhism stands for the fullness of life and formulated ethical principles by looking on the face of reality. According to Ambedkar, to live in *Nibbana* is *Dhamma*. According to Buddha, Nothing can give real happiness as *Nibbana*. Of all doctrines taught by the Buddha, the

[472]Pradeep P. Gokhale, *Reconstructing the World*, 'Universal Consequentilism A Note on Ambedkar's Reconstruction of Buddhism Sri Satguru Publications, New Delhi, 1993, p 127

doctrine of *Nibbana* is the most central one. Brahmanic Upanishadic and Yogic traditions consider *Nibbana* as salvation of *Soul*. There three ideas which underlies in the Buddhist conception of *Nibbana*. "Of these the happiness of a sentient being as distinct from the salvation of the *Soul* is one. The second idea is the happiness of the sentient being in *Samsara* while he is alive. But the idea of a *Soul* and the salvation of the *Soul* after death are absolutely foreign to the Buddha's conception of *Nibbana*. The third idea which underlies his conception of *Nibbana* is the exercise of control over the flames of the passions which are always on fire."[473]

And for the individual Ambedkar said that the "Buddhism teaches social freedom, intellectual freedom, economic freedom and political freedom to man."[474] Ambedkar's approach to Buddhism thus, is social, philosophical and ethical rather than and mystical, as even a short account from' *The Buddha and His Dhamma'* will be sufficient to reveal. Ambedkar wanted to explain the teachings of Buddha by using the classification used by Buddha himself, namely the classification of *Dhamma* into the three categories *Dhamma,* Not-*Dhamma (ADhamma), and Saddhamma* As per the understanding of Ambedkar the concept of *Dhamma* in Buddhism refers: "To maintain purity of life is *Dhamma;* to reach perfection in life is *Dhamma;* to live in *Nibbana* is *Dhamma,* to-up craving is *Dhamma;* to believe the all compounded-things are impermanent is *Dhamma.* And to believe that *Karma* is to be an instrument of morality, it is *Dhamma.*" [475]

Normally all the religions have either Scripture as their base or God as their center. But for Buddhism, Morality replaces both the scripture and God. Ambedkar observes, "The religion of the Buddhism' is morality. It is embedded in religion. It is true that in Buddhism there is no God in place of God there is morality. What God is to other refrains, morality is to Buddhism"[476] A morality, which was, based on the principles of

[473]Ambedkar B. R , *Buddha and His Dhamma,* Siddhartha publications, Bombay, 1987, p 234.
[474]Shashi, S. S, ed., *Ambedkar and Social Justice,* Vol I&II, Ministry of Information and Broadcasting, Govt. of India, New Delhi, 1992, pp 92 – 93.
[475]Kuber W. N, *B R. Ambedkar,* Ministry of Information and Broadcasting, Govt. of India, New Delhi, 1978, p. 93.
[476]Busi S. N, *Mahatma Gandhi and Babasaheb Ambedkar*, Saroja Publications, Hyderabad,1997, p 325.

truth and love. Hinduism, according to Ambedkar, did not recognize the principles of freedom and equality and had not succeeded in evolving a universal morality.

The *Dhamma* for Ambedkar is a practice of certain specified negation. To explain what a *Dhamma* is, *not-Dhamma,* Ambedkar lists various negations or immoral activities that Buddha advocated in order to promote its social message. "Belief in the Supernatural is Not-*Dhamma (ADhamma). Beliefs in Ishwara (God)* is not essentially a part of *Dhamma* based on union with *Brahma* is a false *Dhamma* Belief in *Soul* is *Not-Dhamma Belief in Sacrifices is Not-Dhamma Belief based on Speculation is Not- Dhamma.*"[477] *ADhamma* or *Not-Dhamma* consists in the belief in the supernatural as the cause of events, in the belief that the world was created by God, in the belief that *Dhamma* is based on union with *Brahma,* in the belief that sacrifices including animal sacrifices are a part of religion, in the belief that speculations regarding the origin of the self and the universe are a part of religion, in the belief that the reading of books is *Dhamma,* and in belief in the infallibility of sacred books like the *Vedas* as against *Adahmma,*

Morality is based on the Natural Order of the Physical world. It is evident from the natural phenomena that there is an order of the physical world. There is certain order for the movement of heavenly bodies, regularity for the seasons. These are called '*Niyamas*' in Buddhism. "Similarly there is a moral order in Human society. How is it produced? How is it maintained? Those who believe in God have no difficulty in answering the question. And their answer is easy. Moral order is maintained by Divined dispensation. God created the world and God is the supreme governor of the world. He is also the author of moral as well as of physical law. Such is the argument in support of the view that the moral order is maintained by Divine Dispensation."[478]

Ambedkar contests these arguments. He asks "For if the moral law has originated from God and if God is the beginning and the end of the moral order and if man cannot escape

[477]Ibid, p 95.
[478]Ambedkar B. R., *Buddha and His Dhamma*, Bombay, Siddhartha publications 1991, p 242.

from obeying God, why is there so much moral disorder in this world."[479] According to Ambedkar, Natural law is the basis of moral order of universe. "...God leaves it to Nature to work itself out in obedience to the laws originally given by him."[480]The moral order is maintained by Kamma Niyam and not God which maintains the moral order in the universe. "The moral order of universe rests on man and on nobody else. *Kamma* means man's action and *Vipaka* is its effect."[481]

The basic question is that an action right or wrong because God commands or prohibits it, or God commands or prohibit the action because it is already right or wrong? A divine command ethicist takes the position that the standard of right or wrong is the commands and prohibitions of God. According to the divine command theory "an action or kind of action is right or wrong if and only if and because it is commanded or forbidden by God."[482] According to the Natural law theory, the basic principles of morals are objective, accessible to reason, and based on human nature. An action is right if it serves to fulfill human nature and wrong if it goes against human nature. Our human nature includes various inclinations and tendencies. The task of reason is to discover, sort out and order these inclinations in accord with appropriate human fulfillment.

However, in the analysis of Ambedkar's position one can find out that Ambedkar clearly counter the argument for the divine command ethics. Major divine command ethics' arguments are based on the conception that God is the first cause. That is God cannot be causally affected by anything. Therefore it is difficult to claim that God chosen which is already good, that is God is causally affected. All the similar positions already assume the supremacy of God in all senses. This presupposition which Ambedkar denies thoroughly through out his theological positions and especially in his construal of Buddhism. If certain presupposition are accepted as certain, it itself is obstacle to the critical engagement and analysis. Divine command ethics can be defended only on the ground

[479]Ibid, p 243.
[480]Ibid.
[481]Ibid, p 244.
[482]Frankena W K, *Ethics*, 2nd edn, oxford university press, NewYork, 1989, p 28.

that it follows from certain beliefs we have about God's nature and status and about the character of the relationship between god and Human beings.

In Plato's *Euthyphro*, Socrates raises the question, "is what is holy because the gods approve it, or do they approve it because it holy."[483] According to Boyd and Vanarragon observe in their article 'Ethics is based on natural law" that "These questions, first posed in Plato's *Euthyphro* have long troubled theists, because each of the obvious question carries with it unpleasant consequences. In other words, these questions appear to introduce a dilemma, as can be seen in the following argument:

- If God's command makes an act right, then morality is arbitrary.
- If God commands an act because it is right, then God's command is not essential to morality.
- Either God's commands makes an act right, or God's commands an act because it is right.

  Therefore,

- Either Morality is arbitrary or God's command is not essential to morality."[484]

Ambedkar's position was that the natural order of the universe is the basis of the morality. Ambedkar interprets the concept of *Karma* as, "the law of *Karma* has to do only with the question of general moral order. It has nothing to do with the fortunes and misfortunes of the world. It is concerned with the maintenance of the moral order in the universe"[485]

*Dhamma* for Ambedkar is social. *Dhamma* is social in the sense that it is all embracing and for all humanity .In other religions, a person leading a secluded life and performing certain rituals is considered to be a religious man but in Buddhism a man's behaviour towards his fellow-beings is the test of his being religious. *Dhamma* teaches righteousness which means right relations between man and man in all spheres of life.

[483]Janine Marie Idziak, *Divine Commands are the foundation of Morality*, Oxford Clarendon Press, Oxford, 1978, pp 290-299

[484]Boyd, Craig A and Vanarragon, Raymond J '*Ethics is based on natural law*" Francis Printer, London, 1987, p 94.

[485]Ibid, p 95

Society, therefore, cannot do without *Dhamma* If *Dhamma* is not social and is not for the welfare of the people then it has no value for suffering humanity. Further, the underlying meaning of the *Dhamma* is a message of equality. Where there is equality, there is hope for individual initiative, progress and attainment of *Nirvana,* the supreme state of Bliss, the ultimate aim of every Buddhist.

Further, in most religions there is no place for morality but morality is the essence of the *Dhamma.* Without it, there is no *Dhamma* In *Dhamma* morality takes the place of God although there is no God in *Dhamma.* Then Ambedkar discusses the principle of *Ahimsa* of Buddha. In Buddhism *Ahimsa* is a principle and not a rule. Buddha made a distinction between the 'need to kill' and the '*will to kill*'. Buddha denounced *Himsa* (Violence) and advocated a ban on the killing of animals for the sake of food, sacrifice, sport or pleasure; but it is wrong to interpret that He banned *Himsa* under all circumstances. But Buddha said that no one should run away from the Army with a view to join *Sangha* This means that the Buddha was not against killing for the defense of the country. The principle of '*the need to kill*' and the 'will to kill' therefore is correct. To kill is entirely a matter of necessity and personal moral responsibility. Every act has to be guided by man's own *Prajna* and *karuna.* Buddhism in *Ahimsa* means non-aggressiveness; but in self -defense, if anyone needs to fight then he should fight.

Ambedkar tried to find the difference between *religion* and *Dhamma* in relation to their purposes and the way that different terminologies like *karma* and *Ahimsa* or non-killing are interpreted and used. Then he went to explore the relation between *Dhamma* and religion out of which he asserts that mere "Morality is not enough, but it must be sacred and universal."[486] Morality, he asserts, has no place in religion. Religion is concerned with the relation between man and God and morality is concerned with the relation between man and man. Though every religion preaches morality, morality is not the root of religion, it can be attached if it is needed or detached if it is not needed. The action of morality in the functioning of religion is not a serious one but casual and occasional.

[486]Kadam, K. N, *Dr Ambedkar The Emancipation of the Oppressed*, Sangam Books, London,1993, p 105

After describing the non-closeness of morality and religion Ambedkar takes *Dhamma* for his analysis and say that "Morality is *Dhamma* and *Dhamma* is Morality."[487]

As per Ambedkar's understanding Morality is the essence of *Dhamma* and the absence of it there is no *Dhamma.* Religion attaches every thing to God and man is expected to do every act to appease God. His responsibility himself to serve and save the fellow beings. But *Dhamma* is not like that every thing the man does, is for his own self. He says that the "Morality in *Dhamma* arises from the direct necessity for man to love man. Such morality does not require divine sanction. It is not to please God that man has to be moral. It is for his own good that man has to love man."[488] This morality, which is *Dhamma,* is not to satisfy a particular group but serves to protect the weak from the strong standards, and rules and which safeguards the growth of the individual. It is what makes liberty and equality effective, for if there is liberty for some but not for all and equality for few but not for the majority, what is the remedy? The only remedy lies in making fraternity universally effective. What is fraternity? It is nothing but another name for brotherhood of men, which is another name for morality.

That is the reason Buddha said that *Dhamma* is morality and as *Dhamma* is sacred so is morality. As he begins writing the portion on the *Dhamma,* 'and his interpretation of "What the Buddha Taught", Ambedkar lists out ' different views of the Buddha's *Dhamma*" on "What others have understood him to have taught": "What are the teachings of the Buddha?" This is a question on which no two followers of the Buddha or the students of Buddhism agree. To some *Samadhi* is his principal teaching. To some it is *Vippassana* (a kind of *Pranayam*). To some Buddhism is esoteric. To others it is exoteric. To some it is a system of barren metaphysics. To some it is sheer mysticism. To some it is a selfish abstraction from the world. To some it is a systematic repression of every impulse and emotion of the heart. Many other views regarding Buddhism-could be collected.' [489]

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[487]Ibid.
[488]Ibid.
[489]Ambedkar B. R, *Buddha and His Dhamma*, Siddhartha publications, Bombay, 1991, p 158.

Ambedkar is justified in his reinterpretation of Buddhism; he has left a few gaps unfilled. Firstly, by not linking his community of Neo-Buddhists to any of the existing Buddhist *Sangha,* he fashioned a gulf between them. He refused to accept the existing forms of Buddhism, as they were not, he deemed, faithful to the original teaching of the Buddha.[490] This shortcoming has not only isolated the Neo-Buddhists depriving them of historical continuity, and a continuous tradition, it also deprived them of a *Sangha* and religious leadership to guide them.[491] The sudden demise of Ambedkar widened this gulf much more.

Ambedkar tried to turn to Buddha's original teachings and *Dhamma* and the social order advocated by him. He had preferred among the various Buddhist forms the original Hinayana rather than the Mahayana form. The society must have either the sanction of law or the sanction of morality to hold it together. Without either the society is sure to go to pieces. Religion, if it is to function, must be in accord with reason which is another name for science. It is not enough for religion to consist of a moral code, but its moral code must recognize the fundamental tenets of liberty, equality and fraternity. Religion must not sanctify or ennoble poverty.[492] Ambedkar's principles, for interpreting Buddhism are rationalism and utilitarianism coupled with Socialism. He not only consciously employs them, also recommends them to those who are in doubt regarding the authenticity of the Buddha's teaching, as test-stones to clear the misunderstanding and confusion: One has therefore to be very careful in accepting what is said in the Buddhist canonical literature as being the word of the Buddha. There is however one test which is available. If there is anything that could be said with confidence that it is. He (Buddha) was nothing if not rational, if not logical. Anything therefore which is rational and logical, other things being equal, may be taken to be the word of the Buddha.

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[490]Asgar Ali Engineer, ed., *Religion and Liberation*, Delhi, Ajanta Publications, 1989; Stan Lourdusamy, *Religion as a Political Weapon*, Calcutta, Multi Book Agency, 1990; and Paul Puthanangady, *Towards an Indian Theology of Liberation*, Bangalore, NBCLC, 1986, Section 5. 2

[491]Michael Mahar J, ed., *The Untouchables in Contemporary India*, Tucson, The University of Arizona Press, 1972, pp 122 – 123.

[492]Keer, Dhananjay, *Dr Ambedkar Life and Mission*, Popular Prakashan, Bombay, 1991, p 421.

Usually science or reason is considered as in rival position of religion or religion bounded morality. The direct difficulty science could pose for religious belief would be direct scientific refutation of essential religious principles. But refutation can emerge only out of genuine conflict and that fact imposes some boundaries. For instance, many believe that science and religion operate in different domains or levels. If such positions are correct, there can be no genuine conflict. Any apparent conflict would represent trespassing or confusion. Further more, serious conflict between science and religion is possible only if both purport to be true. Consequently if religious commitment is non-negative or non-propositional, genuine conflict seems impossible. That's why Ambedkar's position one who takes religion very seriously must approach it with a scientific attitude. Otherwise our religion would be a superstition. Making religion more active or creative or critical is making it scientific. Making it non-scientific is blocking the growth religion; consequently it would become an ideology which advocates intolerance. And as per Ambedkar's position only through the critical engagement with science and reason one can draw the limits of religion. Drawing the limit is never deteriorating the system, it only corroborates it.

The second thing is that "the Buddha never cared to enter into a discussion, which was not profitable for man's welfare. Therefore anything attributed to the Buddha, which did not relate to man's welfare couldn't be accepted to be the word of the Buddha."[493] This test for dealing with the teachings of the Buddha, Ambedkar offers, is to distinguish between those matters in which the Buddha was certain and those in which he was not and so gave only tentative views. Social relevance, that is making the *Dhamma* relevant to the present Indian context and to the unequal oppressive situation of the *Dalits*, should be considered the major principle and key to his interpretation. For, the above mentioned second test of the three prescribed by him, to clear the doubts that arise out of confusion and suspicion, again reiterates the use of the principle of existential social utility as important in interpreting the *Dhamma.* Ambedkar, with other *Dalits*, was in search of a religion with a revolutionary social message and the ideal of equality that enforces the

[493]Keer, Dhananjay, *Dr. Ambedkar· Life and Mission*, Popular Prakashan, Bombay, 1987, pp. 254 – 255.

moral social order of a class-casteless prosperous fraternal human society.

Ambedkar was also desperately in quest of and consciously trying to remake a religion, that is relevant for the independent, democratic, socialist, secular, sovereign Republic of India. He was strongly convinced that Hinduism with its Brahmin domination, and the ideology of inequality, that maintains with fear and force the hierarchical social order, of ascending power and descending contempt, as its ideal scheme of divine governance, was no more relevant to new India. As it is evident from his historic 1956 talk, he was seeking to revive a religion that is relevant and useful to the present world situation.[494] The *Dalit* critical principle, which is the key to Ambedkar's *Dalit* Hermeneusis, is at work, as was shown earlier, in his critique of all theistic religions, and the ideologies of Gandhism and Marxism that is the basis of Indian Communism. It is all the more effective in the reinterpretation of Buddhism. Ambedkar offers a revolutionary version of Neo-Buddhism to serve the cause of *Dalits*.

The gospel of Buddha according to Ambedkar is only a part of the religious revolution of Ambedkar, namely, "First to produce a Buddhist Scripture/ Bible, second, to make changes in the organisation, aims and objects of *Bhikkhu Sangha*, third, to set up a World Buddhist Mission,"[495] came to be realized. The Buddhist Bible that he authored was first titled as *Buddha and His Gospel* and was later on changed to '*The Buddha and His Dhamma.*'[496] Ambedkar consulted all the available sources on the Buddha to write this book, considered to be his *magnum opus* It is a book of more than 400 pages, which was corrected again and again even as it was on print. So much was Ambedkar's concern to make it perfect, up to date, and relevant to the contemporary social situation, that even on the night of his death he lay correcting the preface for the same book.[497] A few copies had been first printed by him and circulated for comments, and the final version was out of the press only in 1957, a few months after his death.[498]

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[494]Ibid, p 490.
[495]Paradkar, "*The Religious Quest of Ambedkar*,"Ajay Prahaghan, New Delhi 1968, p 66
[496]Keer Dananjay, *Dr Ambedkar Life and Mission*, Popular Prakashan, Bombay,1987, p 489
[497]Ibid, pp 488 and 513
[498]Bhole's R. R, ed ,*Introductory Writings*,and Ambedkar B R, *The Buddha and His Dhamma*, Siddhartha Publications, Bombay, 1991, pp 105 – 108

As Ambedkar had originally intended, *The Buddha and His Dhamma* it reads like the Gospels with the biography of Compassionate Buddha interspersed with this teachings. The Buddha's inspiring life, noble mission, loving deeds, and the wise doctrine are combined to make the book a real Buddhist's Bible. Like the *Bible,* it is also broken down into books, chapters, and verses. It is rare to find a book on the Buddha and his *Dhamma* from which one can learn his teachings and life as much as one does from Ambedkar's gospel on the Buddha. It is in fact derived from Ambedkar's collection of hundreds of books on the Buddha.

The comments of Ambedkar on the original *suttas* and the biography are so inter-twined in, *The Buddha and His Dhamma;* at times it is difficult to distinguish who is talking. Ambedkar has also deliberately emphasized the social message of the Buddha. Ambedkar and reinterpreted his teaching and projected his personality to bring out not only the enlightened Siddhartha Gautama full of wisdom, *prajna,* but also the compassionate one, full of *karuna* and *maitri.* It is indeed a social gospel of Buddhism. It lays more stress on love and service than wisdom and insight. Doctrines of Buddhism did Ambedkar hold and teach? In the central part of his Bible, Ambedkar dedicates a whole book to summarise the main teachings of the Buddha and the main doctrinal matters regarding the *Dhamma.* He candidly presents what are *Dhamma, Adhamma* and *Saddhamma* according to the Buddha. The main titles and points of the book' 'What the Buddha taught' are: What is *Dhamma*? "It is to maintain Purity of Life; to reach Perfection in Life; to live in *Nibbana*; to give up craving; to believe that all compound things are impermanent; to believe that *Karma* is the instrument of Moral Order."[499]

What is *Saddhamma*? His answer is that *Dhamma* is *Saddharma* when it makes learning open to all; teaches that mere learning is not enough and may lead to pedantry, that what is needed is *Pradnya*, that *Pradnya* is not enough, but must be accompanied by *Sila*, that besides *Pradnya* and *Sila* what is necessary is *Karuna*, and that more than *Karuna* what is

[499]Ambedkar B. R, *The Buddha and His Dhamma*, Siddhartha Publications, Bombay, 1991, pp 229-233.

necessary is *Maitri*. *Dhamma* to be *Saddhamma* must break down barriers between man and man, teach that worth and not birth is the measure of man, and must promote equality between man and man.[500]

Ambedkar's views of the Perfection in Ethical and spiritual life comes through a) watchfulness, b) mindfulness and c) right understanding.[501] The virtue of liberty giving is essentially a product of compassion; compassion is the root of Bodhisattva's life. "His enlightenment is nothing but liberality or charity."[502] He thinks thus: "My neighbour suffers his pain just as I suffer mine; why should I be anxious about myself and not about him."[503] The perfection of charity leads to the equivalence of me and my fellow beings. When to me, as to others, pain and fear are unpleasant, there is no special to protect my own person and not others. Compassion is the only virtue to which a saint must apply himself; all other virtues will follow up naturally.[504] Nothing is superior to charity; even the vow of chastity. Liberality consists not only in giving material goods, things of enjoyment, but also in giving spiritual knowledge. Liberty born of compassion is the supreme means of conciliating creatures by alms giving, lovable speech, kind cooperation, and by sharing the joys and woes of beings.

The Ambedkar's essence of morality is self-preservation for the sole aim of benefiting creatures. It is therefore, necessary to ensure good rebirths in order to undertake the career of a Bodhisattva. For this purpose morality must be observed. Without self-preservation, one cannot preserve others. This self-preservation is accomplished by the constant study of the scriptures.[505] In order to increase morality one must beware of Marv's evil deeds. Evil must be avoided, frivolity must be avoided; friendship must be cultivated with those established in the Doctrine. In order to protect against evil lapse, the following must be avoided: bad friends; forgetfulness of the idea of Enlightenment;

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[500]Paradkar, "*The Religious Quest of Ambedkar*," Ajay Prahaghan, New Delhi,1968, p 69
[501]Joshi Lal Mani, *Studies in the Buddhistic Culture of India*, Motilal BanarasiDass, New Delhi,1977, p 101.
[502]Ibid, p 102.
[503]Ibid.
[504]Ibid.
[505]Ibid, p 103.

despondency and lack of enthusiasm. Evil must be discarded by active service of man, and of the *Sangha.*[506] Confession of sins before Buddha's and Bodhisattvas also contributes to moral growth.

Mind control, the Essence of Morality: since all actions are preceded by thought, all feelings, sensations and desire proceed from the mind.[507] When the mind is unfree from attachment and hatred, keep quiet like a wooden piece; whenever it becomes noisy, jovial, critical, self-praising, wicked and deceptive, keep quiet like a wooden piece.[508] When my mind runs after gain, honour, fame, and wants family and servants, "I sit idle like a wooden piece; my mind has turned away from the supreme good, has become selfish, wishes association and conversation, therefore, I am lying like a wooden piece; I do likewise when it becomes intolerant, indolent, fearful, wicked, talkative and partial. These are the ways by which a brave *Soul* brings about the control of vain and soiled minds. Self-possessed in the lap of truth and free from pride, I bold the mind as a created thing; I have rendered my body completely inactive, it does not react to the objects of sense."[509]

*Love thy foe*: Pain is disliked by all; those that are in the grip of passions and torture themselves, may torture others as well. Fire will burn wherever it is; anger rises out of this fire of passion and don't out of the objects. It is a pity that I dislike pain but like the body, the house of woe. It is unwise to be angry with men who injure us, for they are only acting under the influence of causes and conditions; and the foremost of these causes are our wicked deeds of previous existence. "My enemy takes a stick to beat me, and I have assumed this body, liable to be wounded, and destined to be beaten. Far from being angry with my enemy I ought to consider him almost as beneficial as the Buddhas, for he affords me the opportunity of practicing patience and forgiveness of wrongs, which blots out my sins. Am I to make this principle of salvation the cause of my condemnation? Let

[506] Ibid, p 104.
[507] Ibid, p 105.
[508] Ibid.
[509] Ibid.

us rather pity our enemies who ruin themselves by their anger, and let us think of means of saving them in spite of themselves as the Buddhas do."[510]

Further, he says that, it is because of anger that "I have suffered in hells a thousand times, but have always sought after my own good. It befits my career of patience that I should welcome such pain as would help removal of the miseries of the world. Never grudge the joy of others, rather be happy by the happiness of others."[511] He who wants Enlightenment wants everything for every body; he who is jealous of the property of others has no thought of Enlightenment.[512] Do not be misled by praise, honour or gain, they are false and deceptive. The living beings are the proper filed of spiritual career even as the Buddhas; worship of beings is the worship of Buddha; friendliness towards beings in fact amounts to Buddha-worship. Ambedkar has strong belief that all beings have the seed of Buddha-qualities.

[510] Ibid, pp106 - 107.
[511] Ibid, 107.
[512] Ibid.

# CONCLUSION

# CONCLUSION

The present study tries to explain Ambedkar's views on philosophy, religion and morality. It started with discussing Ambedkar's comments on the place of religion and morality in Semitic and Indic traditions. Ambedkar while commenting on the Semitic traditions, he considers that the altruistic nature of Judaism was under suspicion because of its special preference to Israel. He understood that, the preference may be because of the Jew community has been under the slavery for long time. In that sense, he appreciates the notion of Lord with the Oppressed. Ambedkar was very much enthusiastic and appreciative on the life of the Jesus and the principles of Christianity. However, he disagrees with them mainly on the affirmation of speculative ideas of the religion and other superstition in the practice. Moreover, his main criticism has been that the principles of equality and other valuable things withered by church in its practices. His complaint against another Semitic religion the Islam was mainly for its intolerance, which develops from the persistent affirmation of only one true God.

Ambedkar's analysis and criticism mainly concentrates on the nature of Indic tradition particularly the Hinduism. He criticizes Hinduism for its attempts to provide justification to the present hierarchical order of the society. Ambedkar says that the Hindu religious philosophy and its socio-cultural appearance grounded on the belief that human life is unequal and immoral therefore cannot scream for religious and social equality. According to Ambedkar human beings, in Hindu tradition pre-determined to be born unequal and therefore cannot lay claim to equality either in terms of their religious-spiritual status or in terms of their social, economic, civic or political status in the community. The major theme of Ambedkar's' analysis of religious immorality based on the philosophical and practice of social dominance thus, the Hindu religious moral ideology always hurting to the depressed people.

Ambedkar appreciate the democratic, equalitarian aspect of Buddhism and its realistic and scientific attitudes. Ambedkar says that the Buddhism is a true religion guided by the three principles of Knowledge, right path and compassion. Ambedkar provided a message that the change from Hinduism to Buddhism only can provide, honor, respect,

status, standard civilized life and freedom from slavery. Ambedkar said, it is impossible for humanity to live peacefully and righteously without Buddha and his *Dhamma* Ambedkar adopted Neo-Buddhism as the means to annihilate caste. Since Ambedkar rejected all other religions as theistic superstition, he chooses to revive Buddhism. His scientific rationalism was also too strong. This religious approach to the whole problem, we must admit, has led Ambedkar to give more importance to socio-religious reform and the caste struggle.

Ambedkar persuaded that Hinduism badly needed reform, and wanted to expose the immorality and oppression it had unleashed and the slavery it had perpetuated on the depressed. He was the victim of the social system of Hinduism. After discussing, various meanings of the word 'Hindu' as denoting a religion, parentage, country and a race. Ambedkar points out that he is dealing with Hinduism in which caste has become indispensable as doctrine, ideology and sanctified social order. Ambedkar sees that Hinduism is not a religion for individual justice with equality, fraternity and liberty and it fails to bring social utility of just, free and moral social order as the ideal scheme of divine governance.

Ambedkar arrives at the final judgment of Hinduism: The only answer is that Hinduism is overwhelmed with the fear of contamination. It does not have the power to purify. It has not the desire to serve and that is because by its very nature it is in human and unmoral. It is a misnomer to call it religion. Its philosophy is opposed to very thing for which religion stands. Hinduism is destined for failing the trial by the first norm of justice. It advocates inequality as the dependable doctrine. In his brief analysis of the Philosophy of Hinduism from the point of view of justice reveals in an obtrusive manner how Hinduism is adverse to equality, antagonistic to liberty and opposed to fraternity. Indeed, inequality is the soul of Hinduism. Secondly, its norm of social utility equally fails to free from domination. If these conclusions are sound, Ambedkar asks the questions that how can a philosophy that disconnects intelligence from labour, which expropriates the rights of man to comfort vital to life and which prevented society from mobilizing resources for common action in the hour of danger, said to satisfy the test of social utility.

The relation of religion and morality is an important in Ambedkar thought process. Ambedkar perhaps the one who has set forth most clearly the way in which the relation between specifically religious belief and the ideal of the good life should prevail in specific social formation. Ambedkar's thesis is that morality must be autonomous and that it must not be held in the leading strings of religion, theology or dogmatic metaphysics. Ambedkar adopts uncompromising position that the morality is not maintained by the Divine dispensation but it rests on the individual. The action of right and wrong is depends upon the God is repugnant to Ambedkar.

Ambedkar takes recourse to the classical argument to disprove the existence of God who allows evil and suffering in the world. According to him, the notion of God as good and the existence of evil and suffering are incompatible. Ambedkar develops a series of arguments for the futility of the notion of the existence of God taking recourse to Buddha's arguments. Ambedkar questions the integrity of God. He is basically raising the ontological question on the nature of God. If God is the answer to everything then he should take the responsibility for the evil also? The God who sanctions social discriminations cannot be said to exist. If God is omnipotent, man must be passive and in the final analysis, the freedom of the will is under question. If at all god is existed, then why there is so much evil why his hand so rarely spread to bless? *Man is only responsible to his own mistakes and creations, not applying for unknown God, whether God supposes to exist or not.*

This means that the idea of religion is abhorrent for Ambedkar. According to him what is loosely referred as the religious morality is thought to be authoritarian in spirit and antagonistic to the freedom of an individual. However, the possibility that morality might be need of religious foundations but its authoritarian character is not considered. It is the opposition to religious authority in the matter of motives and norms which alienates the fellow human beings rejected by Ambedkar. In this context Ambedkar says that the morality and the religion are inseparable and that morality is able to be understood only in the context of religion and it has been at the center of his philosophical discussion. According to Ambedkar, religion must be essentially moral; religion cannot live unless it

interacts with other forms of spiritual life as morality, beauty, and truth. Religion is thus when compared with morality it turns out to be at once *infra* and *supra* ethical. The fact that the religion takes as its point of departure human life, for this it provides a goal. Without such a destiny in sight religion cannot exist, provided with it faith passes on far beyond the realm of morality.

It must be remembered that Ambedkar categorically defends the autonomy of morality. Like Spinoza, Ambedkar says that the good life is not a means to something else but is itself a supreme end. Hence according to Ambedkar morality must be autonomous in the sense that, no alien considerations, like the fear of tyrannical God or deity from an absolute Hindu religious *Dharma* should be admitted as valid determining the conduct of human persons. Again he says that any consideration of earthly gain or worldly reward and success should not determine the truly moral conduct. The good is to chosen for its own sake, just as the good life is to be lived for its own sake. Thus in any respect according to Ambedkar the morality is truly autonomous. However, Ambedkar persistent question is still remains that which morality is dependent for its content on the norms and concepts derived from which religion. Here, Ambedkar makes clear difference between Buddhism and Hinduism and takes the position that the Hindu social order is immoral and it is against the human freedom and fraternity.

Ambedkar's model of theology on religion is a good model available for us in India to emulate. We need to follow Ambedkar's methodology not only to learn from the great master and achieve what he did, also to carry forward his struggle, and the liberation of all. It is quite clear that Ambedkar's intervention in the philosophical realm is clearly guided by the socio-political reason. Ambedkar holds a perception that the religion is a vital force, a scheme of moral governance and foundation for human society. In Ambedkar's sense, religion is necessary as a system of values and as a science of social reconstruction. He looked at the religion not as an instrument for the individual salvation but as the basis for social interaction. And Ambedkar focuses on the notion of Liberative religion. Through this notion what he emphasizes that notion of religion is quite essential to social transformation. But for him, all the factors in the social transformation are self-

subsistent in itself (i.e. social structure, individuals, religion etc). Ambedkar redefines the notion of religion also in the basis of reason and scientific method. He redefines the purpose of the religion. This redefinition is what makes him to embraces of Buddhism. Ambedkar equates *Dhamma* with morality.

The morality of love arises from the direct necessity for man to love man. He makes it comprehensible that it is not to please the God that man has to be moral but for his own good qualities, man has to love man. In the struggle for existence the individual's rights may not' be catered for, and at times his or her interests can be, rare by the group. Similarly, a weak group may also be discriminated by a stronger group, hence the indispensability ability of the *law of love*, fraternity and goodwill, which is another name for morality. The most important in, *Saddhamma,* more than *Prajna* and *Sila, Sila* is *Karuna,* love of human beings and *Maitri* that is all living beings.

Ambedkar stressed that religion is for humans and not humans for religion. For him, man and morality must be the centre of religion. Humanist to the core, Ambedkar was ready to throw away any religion or religious practice however ancient and sanctified if that does not promote human welfare. According to Ambedkar, Buddhism demands living experience and it was realism and never idealism. It upheld liberty, equality, truth and justice; it emphasized humanity, love and peace. It was dynamic, scientific and all embracing. Its explanation of life and its meaning and purpose of birth and death and its aftermath were very clear, intelligible and logical. Above all, man was the center of his study and examination and not anything outside of him.

Buddhism which was an early Indian religion and the Buddha was nearer to the untouchable masses. Buddhism could withstand even the severest scientific test and had the power and capacity to direct destines of the modern world. The untouchables would join with the world Buddhist community and thus pave the way for world brotherhood. Ambedkar said that, Buddhism gives three principles in combination, which no other religion does. Buddhism teaches *prajna* (understanding) as against superstition and supernaturalism, *Karuna (love)* and *samata* (equality). Neither god nor soul can save the

society, referring to Marx's philosophy, he observed, man cannot live by bread alone. He has a mind, which needs food for thought. Religion instills hope in man and drives him to activity. Hindu religion has watered down the enthusiasm of the downtrodden. And I found it necessary to change my faith and embrace Buddhism Ambedkar says that Religion emphasizes, universalizes social values and brings them to the mind of the individual who is required to be familiar with them in all his acts in an order that he may function as an approved member of the society.

Ambedkar's intervention is considered as a Copernican revolution in the realm of morality and religion. Analysis shows that, Ambedkar's attempt to justify morality without reference to transcendental religious beliefs is a first step to make the realm of morality as an autonomous one. The concern for the universal well-being is the main consideration of Ambedkar's scheme of morality. Thus, external considerations are no longer being above moral principles. Ambedkar makes such a morality the basis of religion, which he construes as *Dhamma*. In this construal, he redefines the centre of religion as morality rather than God. According to Ambedkar, Natural law is the basis of moral order of universe. *Dhamma* for Ambedkar is all-inclusive. The underlying meaning of the *Dhamma* is a message of equality.

Ambedkar's position is that morality in religion would not be an effective one. In religion, morality is only a wagon which is attached to it. It is attached and detached as the occasion requires. Ambedkar notes that the morality comes in only wherein man comes in relation to man. Morality comes into religion as a side wind to maintain peace and order....Be good to your neighbour because you are both children of God....The action of morality in the functioning of religion is therefore casual and occasional. Ambedkar affirms that morality is *Dhamma* and *Dhamma* is morality.

The terrible suffering, pain and pathos of cultural deprivation, economic exploitation, social ostracism, and political domination caused by the ruthless monstrous caste-system, made Ambedkar whole-heartedly hate the caste system and anything or anyone related with its continuation. As he admits, such hatred for injustice is necessary for the activists

who wish to fight for a just and egalitarian order. Towards the end of his life, Ambedkar had to stand lone most of his life, with no support from other ideologists, parties, and religions, because of his non-compromising attitude. His strong critique of them all and avoidance, made them also shun him. The adoption of Buddhism further isolated him. However, he refused to accept the existing forms of Buddhism, as they were not, he deemed, faithful to the original teaching of the Buddha. This shortcoming has not only isolated the Neo-Buddhists depriving them of historical continuity, and a continuous tradition, it also deprived them of a *Sangha* and religious leadership to guide them.

Study on Ambedkar reveals that his address towards religion is not a mere crave towards addressing a religion as a social institution but it was very deep that concentrated on the structure of social system in its wholeness. Ambedkar holds a perception that the religion is a vital force, a scheme of moral governance and foundation for human society. In Ambedkar's sense, religion is necessary as a system of values and as a science of social reconstruction. He looked at the religion not as an instrument for the individual salvation but as the basis for social interaction. He redefines the purpose of the religion. This redefinition is what makes him to embraces of Buddhism.

Religion is not an end in itself. It meant for the preservation of life and human welfare. Hence, religion is not the one that has the final say; it is not infallible, absolute, inflexible nor permanent. Ambedkar stressed that religion is for humans and not humans for religion. For him, man and morality must be the centre of religion. Religion instills hope in man and drives him to activity. Hindu religion has watered down the enthusiasm of the downtrodden. Ambedkar says that Religion emphasizes, universalizes social values and brings them to the mind of the individual who is required to be familiar with them in all his acts in an order that he may function as an approved member of the society. The concern for the universal well-being is the main consideration of Ambedkar's scheme of morality.

According to Ambedkar, merits of Buddhist philosophy were as follows: Buddhism demanded living experience and a life divine, attainable there and now; not after death, it

was realism and never idealism. It upheld liberty, equality, truth and justice; it emphasized humanity, love and peace. It was dynamic, scientific and all embracing. Its explanation of life and its meaning and purpose of birth and death and its aftermath were very clear, intelligible and logical. Above all, man was the center of his study and examination and not anything outside of him. Ambedkar tried to prove that the untouchables were Buddhists. In his thesis on the origin of Untouchability, he made it clear that today's untouchables were once Buddhists. Buddhism was an Indian religion and the Buddha was nearer to the untouchable masses. Buddhism could withstand even the severest scientific test and had the power and capacity to direct destines of the modern world. The untouchables would join with the world Buddhist community and thus pave the way for world unity. Ambedkar said that, Buddhism gives three principles in combination, which no other religion does. Buddhism teaches *prajna* (understanding) as against superstition and supernaturalism, *Karuna (love)* and *samata* (equality).. Neither god nor soul can save the society.

Thus, external considerations are no longer being above moral principles. Ambedkar makes such a morality the basis of religion, which he construes as *Dhamma.* In this construal, he redefines the centre of religion as morality rather than God. *Dhamma* for Ambedkar is all-inclusive. The underlying meaning of the *Dhamma* is a message of equality. Ambedkar's position is that morality in religion would not be an effective one. Ambedkar notes that morality comes in only wherein man comes in relation to man. Morality comes into religion as a side wind to maintain peace and order....Be good to your neighbour because you are both children of God....The action of morality in the functioning of religion is therefore casual and occasional.

Buddhism is the truly civilized earliest ethical system where man called upon to have himself governed by him. The Buddha alone has the glory of having rightly judged the intrinsic greatness of man's capacity to workout his salvation without extraneous aid. No other religion insists upon the values of knowledge and evil of ignorance so much as they are in Buddhism. No other religion lays so much stress upon keeping one's eyes open. No other religion has formulated such deep-laid plans for mental culture. The Buddhist moral

ideal, the *Arhat,* had to be both normally and intellectually great. The Buddha as essential to salvation, and ignorance as one of the two main causes of failure to attain it (craving or attachment being the other) always stressed knowledge. If there were any religion that would cope with modern scientific and spiritual needs, it would be Buddhism.

The teachings of a religion which is competent with modern science is essential for the future human race, the higher teachings on ultimate realities by Lord Buddha, that is known as *Abhi-Dhamma,* should be studied in schools and universities as "*Mental science*" or "*Ultimate Science*". The Buddha's *Middle way* is the only way, which can systematically eliminate all the defilements of the mind and thus offer total inner peace and eternal happiness.

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