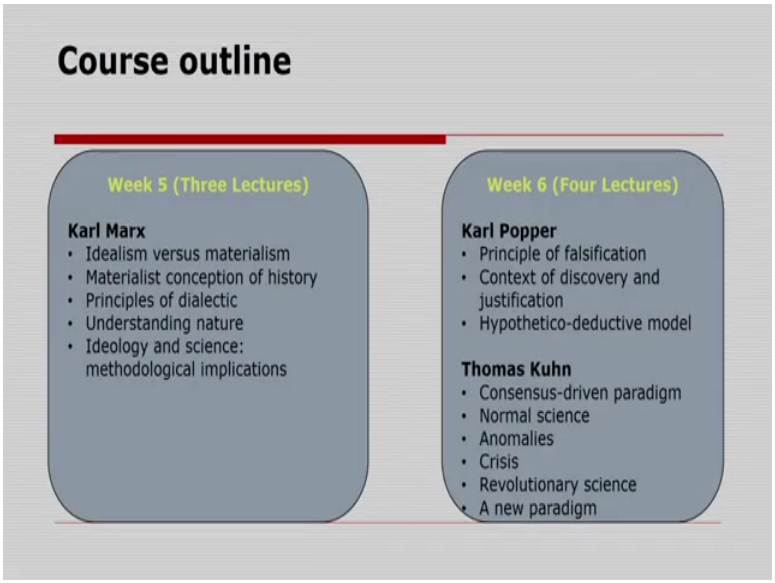
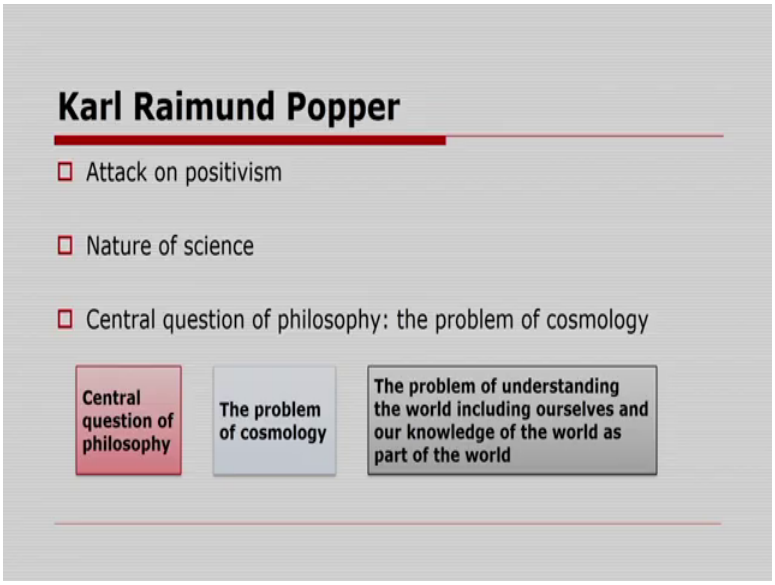
Philosophical Foundations of Social Research
Professor Sambit Mallick
Department of Humanities and Social Sciences
Indian Institute of Technology, Guwahati
Week 6 : Lecture – 17
Popper Versus Kuhn

Hello everyone, welcome to the 17th lecture of this massive open online course on Philosophical Foundations of Social Research.



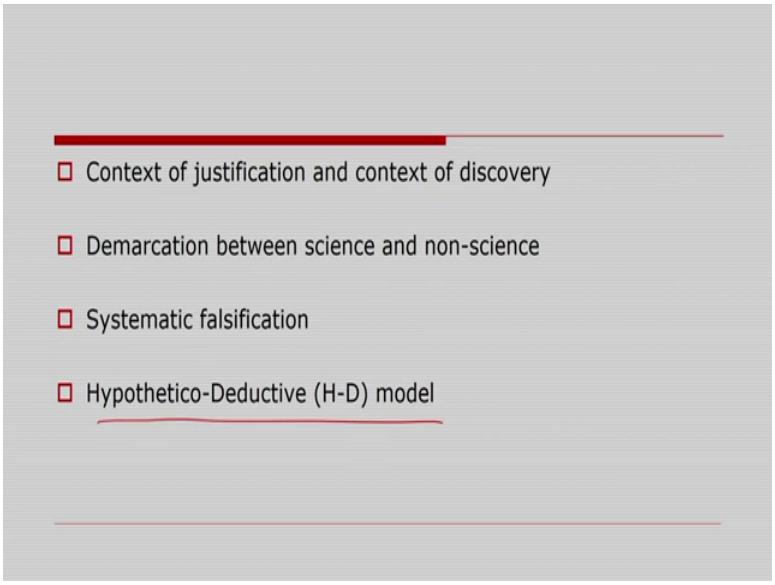
If you slightly recall, we are in the sixth week of this course, and this is the last lecture of the sixth week. In this week, what we have done, we have discussed Popper's view on scientific method and Thomas Kuhn's views on scientific method. In the case of the controversies or the debates within philosophy of science, so far as Popper and Kuhn are concerned, we have discussed how Popper tried to attack positivism.



And thereby he tried to provide an alternative image of science, the entire nature of science was discussed, and for Popper what is the central question of philosophy? Now, the central question of philosophy is the problem of cosmology. What is the problem of cosmology?

The problem of cosmology according to Popper, is the problem of understanding the world, including ourselves and our knowledge of the world as part of the world. And then we have discussed Popper's views about how philosophy of science must confine itself to the context of justification, and refuses to say anything about the context of discovery. Why philosophy of science must confine itself to the context of justification? Precisely because of its association with a rationalist account of science.

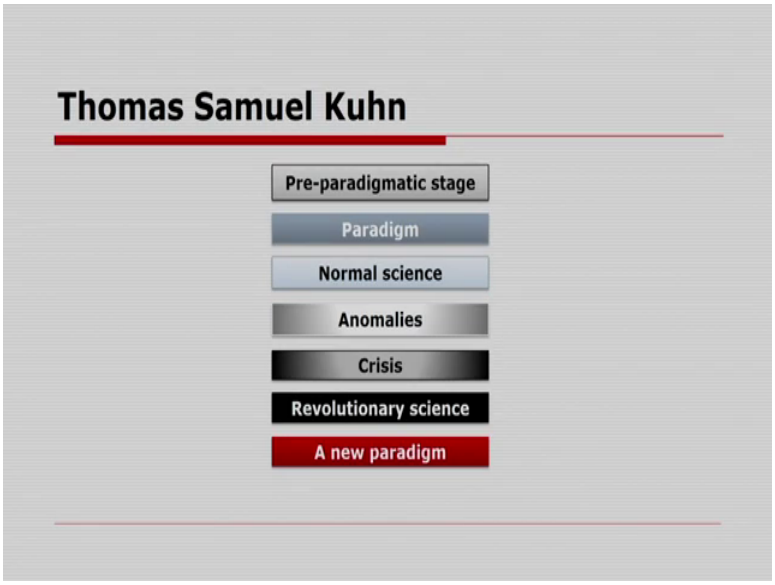
And, like positivists, like empiricists, like rationalists, Popper also sought to make a demarcation between science and non-science. When positivist suggested that the hallmark of science lies in the fact that all scientific statements must be systematically verifiable, Popper suggests that no, the hallmark of science lies in the fact that all scientific statements are systematically falsifiable.



Thereby, he provided the hypothetico-deductive model of scientific methods. For example, if I have to say, empiricists suggested that what is the method of science? The method of science is the method of induction. For hypothesis or rationalists what is the method of science?

No, the method of science is the method of hypothesis. For positivists like inductivists or empiricists, what is the method of science? Now the method of science is the method of induction. For Popper, the method of science is the method of hypothetico-deduction. And that is how he Popper tried to characterize scientific progress progress in science.

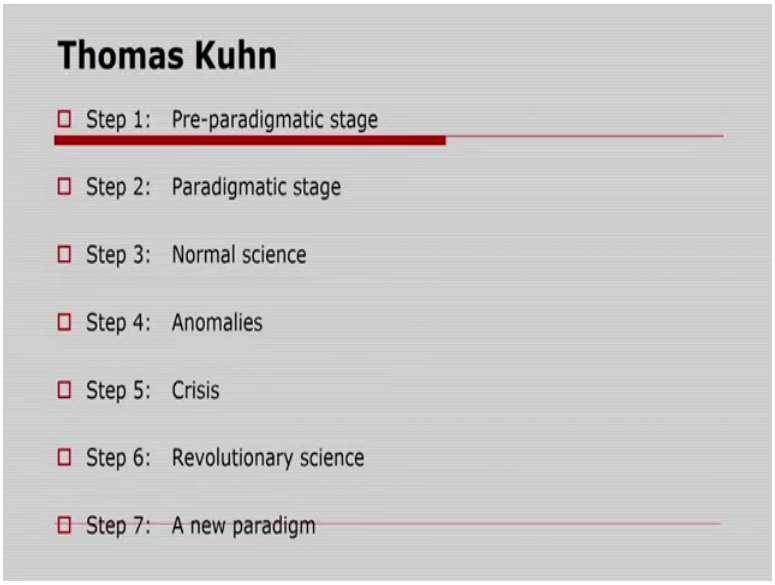
First, you have to identify a problem, suggest a tentative solution to the problem or hunch, in terms of hypothesis, then the hypothesis must be falsified; if it is falsified, then it is it must be refuted, and if it is not falsified, then it must be corroborated; the hypothesis has to be kept permanently tentative.

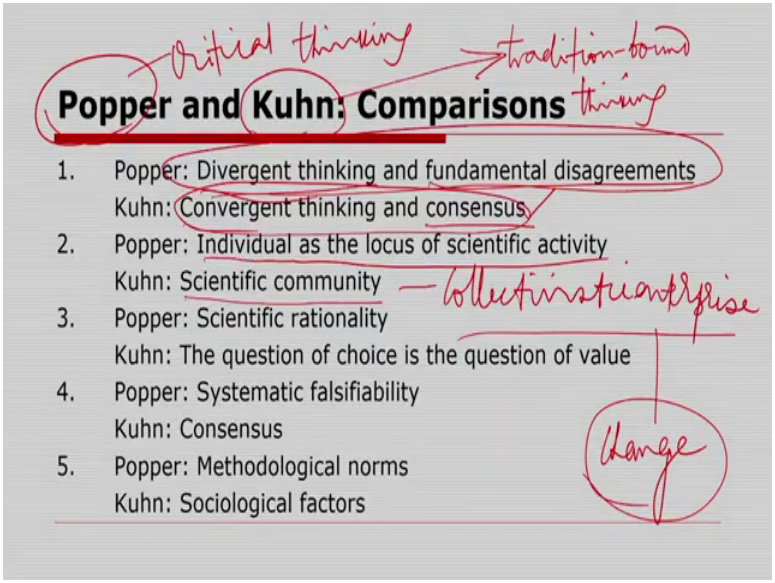


On the contrary, Thomas Kuhn suggests that the life of every major science passes through two important stages; namely the pre paradigmatic stage and the paradigmatic stage; and what constitutes a transition from the pre paradigmatic stage to the paradigmatic stage for Kuhn- it is the replacement of the plurality of practices to uniformity of practice; it is the transition from divergent thinking to convergent thinking, that enables science to mature, that enable science to make a transition from the pre paradigmatic stage to the paradigmatic stage. And within each paradigm, we tend to find normal science, norm bound science, puzzle solving activity, day to day research activity, and so on.

And within norm bound science, within normal scientific tradition, science encounters anomalies or unanticipated or unexpected occurrences or happenings. And once normal science encounters anomalies, it enters stage of crisis and once normal scientific tradition is crisis ridden, it tries to search for a new paradigm mediated by scientific revolutions mediated by revolutionary science. We have discussed this.

These are the steps that Popper tried to follow. Identification of a problem, suggestion of a tentative solution to a problem or hunch in terms of a hypothesis, systematic falsification and systematic falsification may lead to refutation or corroboration of that hypothesis.





Now, in this lecture, we are trying to examine the comparisons between Popper and Kuhn's views about scientific method. Some of the radical implications of Kuhn's position can be brought about by juxtaposing his views with those of Popper.

In fact, within philosophy of science, you will find that Popper-Kuhn debate, that constitutes one of the most intellectually stimulating debates within philosophy of science of the 20th century- that is why I said some of the radical implications of Kuhn's position in terms of paradigm shifts can be brought about by juxtaposing his views with those of Popper.

What is the hallmark of science for Popper? The hallmark of science according to Popper, is critical thinking. In fact, science exemplifies critical thinking at its best. Since critical thinking considers nothing to be settled and lying beyond all doubt, fundamental disagreements and divergent thinking must and in fact, do characterise science. As we have

seen according to Kuhn, what constitutes the essence of scientific practice is norm bound science, normal science, normal scientific tradition.

And we have also seen, why normal science is a highly tradition bound activity or puzzle solving activity or an activity made possible by a consensus among the practitioners who share a particular paradigm. And in this way, if Popper sees the essence of science in divergent thinking and fundamental disagreements, then Kuhn sees the essence of science in convergent thinking, and consensus. In other words, if the hallmark of science for Popper is critical thinking, then for Kuhn the hallmark of science is tradition bound thinking.

Indeed, according to Kuhn, what distinguishes science from the other areas of human activity or creativity or creative thinking is that whereas in science one finds institutional mechanisms of enforcing consensus, the other areas suffered from perpetual disagreements even on fundamentals. Then if we have to look at the first point of differences between Popper on the one hand and Kuhn on the other, according to Popper, the hallmark of science is critical thinking and on the contrary, for Kuhn the hallmark of science is tradition bound thinking.

And in this sense, if Popper sees the essence of science in divergent thinking and fundamental disagreements, then Kuhn sees the essence of science, in convergent thinking and consensus. That is why I gave you this example that whether India should go ahead with nuclear tests or not, it is not simply a scientific question or a political question, rather the kind of consensus that is being built, it cannot be left to only science.

Suppose, in the context of Northeast, we want to build, the government tried to build dams and you will find that whether the dam will be constructed, is contingent upon the kind of consensus that is being built, not simply within the scientific community, but also beyond the scientific community.

Secondly, if Popper considers the individual to be the locus of scientific activity, Kuhn bestows upon that status of a scientific community. For Popper, individual is the locus of scientific activity precisely because of the methodological norms that he tried to devise.

And on the contrary, Kuhn suggests that scientific community to be the locus of scientific activity precisely because of the kind of consensus that has to be built by the collective. If Popper's view on science are an individualistic enterprise, then Kuhn's views on scientific method are a collectivistic enterprise.

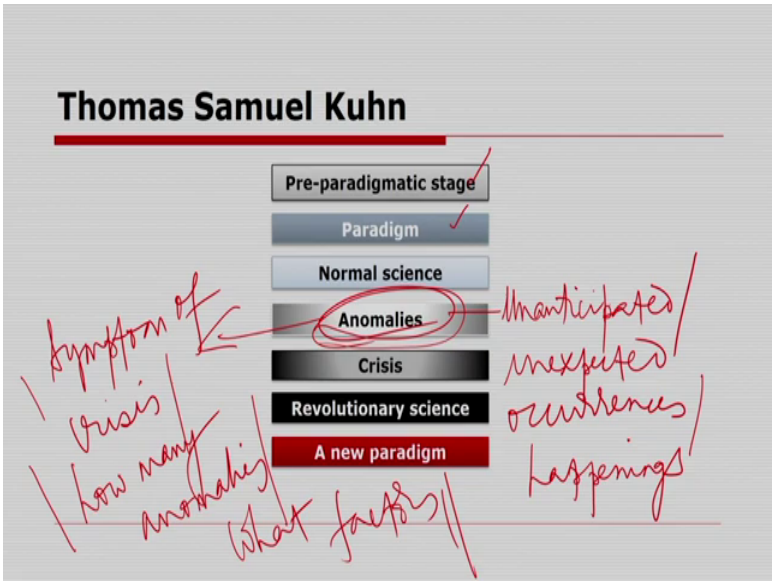
If you slightly recall, Weberian account of methods in social sciences is more attuned towards individual, Durkheim's examination of methods in social sciences are more collectivistic in nature.

Both positivists and Popper looked upon science as the sum total of the work of individual scientists working in accordance with the method, though positivists and Popper fundamentally differed in the characterization of that specific method. Because for positivists, the method of science is a method of induction and on the contrary, for Popper the method of science is the method of hypothetico-deduction.

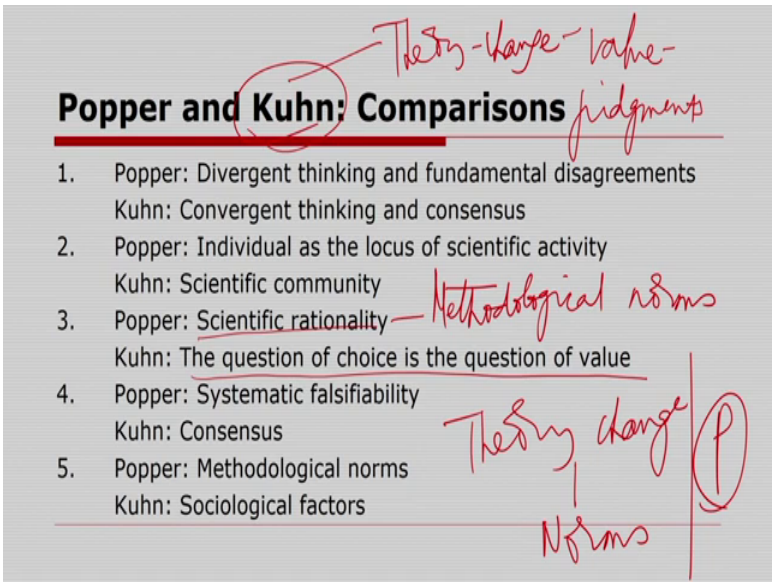
Positivists always argued that science must start with observations and Popper suggests that Science must start with, science must always start with a problem, by identifying the problem. As opposed to this individualistic account of scientific enterprise, Kuhn propounds a collectivistic account of scientific activity. In Thomas Kuhn's schema it is the scientific community which constitutes the theory change.

This is borne out by the fact that according to Kuhn, the scientific community has institutional mechanisms like the peer review system in journals and books. Whenever we send articles, whenever we send book proposals, chapters and so on, we all have peer review systems, referee system, and whatever disputes which appear, these disputes we try to settle through some kind of consensus and that is why it is the scientific community, which constitutes the change, which makes a decision. It is a through consensus. Because this is a collectivistic account of scientific activity, what is science? Science is a social creation for Kuhn, for Marx, for Durkheim.

But for Weber for example, for Popper for example, for positivists for example, individual should be the locus of scientific activity.



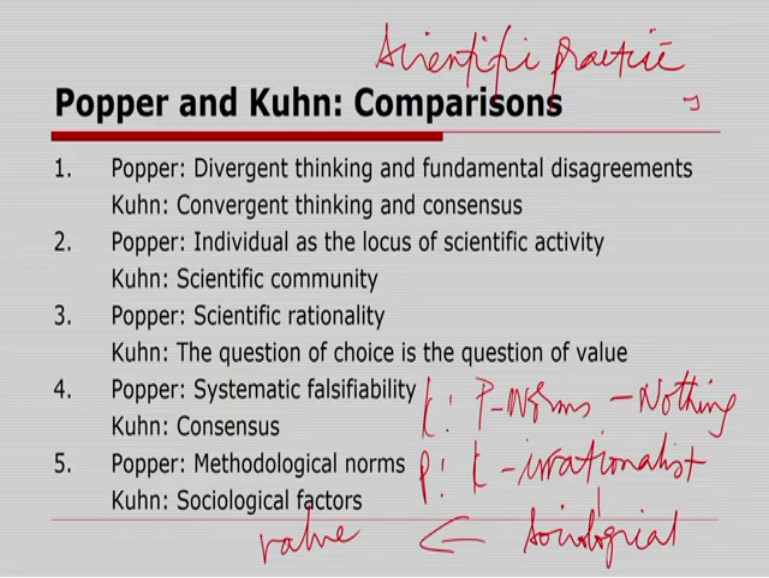
In Kuhn's schema, it is the scientific community which constitutes the change. And this is borne out by the fact that according to Kuhn, the scientific community has institutional mechanisms like peer review system by which it can settle all these, such as whether an anomaly is a symptom of a crisis, or how many anomalies are required or how many anomalies are adequate or how many anomalies are sufficient to warrant the search for an alternative paradigm? Or what factors are to be considered or what factors are to be considered in choosing a new theory for the status of a new paradigm and so on.



Thus Popper and Kuhn, they differ fundamentally in their attitude towards their transition from one theory to another.

According to Popper, we can explain every case of a theory change in terms of certain methodological norms, which science always adopts and follows meticulously. In fact, for

Popper scientific rationality consists in following these methodological norms. On the contrary, Kuhn contents that an adequate explanation of theory change must be in terms of the value judgments made by a community while making the choice; that is why the question of choice is the question of value for Kuhn. Then for Kuhn, such theory change has happened because of certain value commitments, value judgments made by a community while making the choice because for Kuhn the question of choice is a question of value. That is how it is more collectivistic enterprise and so on. According to Kuhn, recourse to the so called methodological norms explains nothing.



For Popper, Kuhn is an irrationalist. How? As I said from the point of view of Popper Kuhn is an irrationalist because he sets aside methodological norms and seeks to explain theory change exclusively in terms of certain non-rational or sociological factors like value commitments or value judgments of a profession.

According to Kuhn, Popper's methodological norms explain nothing or recourse to the so called methodological norms explains nothing. And from the point of view of Popper, Kuhn is an irrationalist because he sets aside methodological norms and seeks to explain theory change exclusively in terms of non-rational or sociological factors like value commitments of a professional group. Whatever be the merit of Popper's attack on Kuhn as an irrationalist, we can say that Kuhn's construal of scientific practice is obviously sociological in nature. That is to say, according to Kuhn, scientific activity cannot be understood by trying to find out the absolute standards which have guided the scientific activity in all ages. It can only be understood in terms of the specific judgments, which a community makes at a particular juncture regarding what it considers to be its value commitments of a professional group.

And in this sense, Kuhn suggests that science is historically conditioned, and science must be examined in terms of its historical integrity.

Such juxtaposition between Popper and Kuhn whether in terms of divergent thinking and fundamental disagreements versus convergent thinking and consensus, or individual as the locus of scientific activity versus scientific community as the locus of scientific activity because of the kind of consensus that they are trying to forge or scientific rationality versus the question of choice is the question of value, Such juxtaposition between Popper and Kuhn brings out the radical implications of Kuhn's views regarding the nature of scientific practice.

Nevertheless, in one respect, Kuhn is very close to Popper. In what sense? Now both Popper as well as Kuhn, like positivists contend that there is something unique to science, though they differ in their explanation of what constitutes the uniqueness of science.

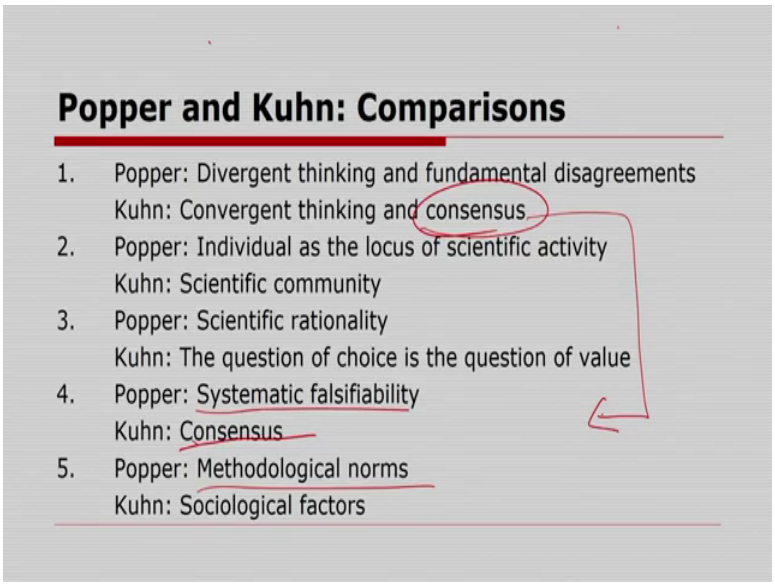
Like positivists both Popper and Kuhn, they are of the same opinion that science is unique, science is superior to other areas of human activity or creativity. Unlike Marx or Weber : For them Science is a social creation. Weber suggested that if science is based on positivistic accounts, then social sciences are based on Neo Kantian positions, that our knowledge of the social world is constructed, is constructive knowledge which involves selection and interpretation of multiple data systems.

But if you look at positivists or Popper or Kuhn, they contend that there is something unique to science, though they differ in their explanation of what that uniqueness, what that supremacy consists in. Positivists for example, maintain that the hallmark of science lies in the fact that all scientific statements are systematically verifiable. According to Popper, the hallmark of or the uniqueness of science consists in the systematic falsifiability of theories. According to Kuhn, it is consensus which marks out science from the other areas of human endeavour. That is to say, Kuhn like positivists and Popper does not question whether science is really unique or not. Kuhn assumes that to be so. Kuhn only wants to show or demonstrate how it is unique or how it is superior, how it is supreme. That is to say, instead of raising critical questions about the status of science, or about the status that science has acquired in the contemporary culture, Kuhn only seeks to provide an alternative account of how it has acquired that status.

And in that sense Kuhn’s position is quite conservative in nature, not simply because he questioned the methodological norms, but because of the kind of consensus that Kuhn is

speaking about in that sense. That is why I said, Kuhn's position is quite conservative, and this conservative character of Kuhn's views becomes evident if you read Paul Feyerabend and so on. Paul Feyerabend in his in his classic “against method: outline of an anarchistic theory of knowledge”, repudiates the very idea of scientific method, both on grounds of logic and history. Feyerabend calls into question, the time honoured belief that there is nothing called the method of science, which distinguished science from the rest of our cognitive activities.

And this traditional view, which is called by Feyerabend law and order philosophy of science maintains that there are certain unchanging norms which determine scientific practice. Anyway, Feyerabend is not a part of this course. But I am trying to suggest that if you want to go ahead, then please go ahead with Lakatos, Feyerabend, Steve fuller and so on.



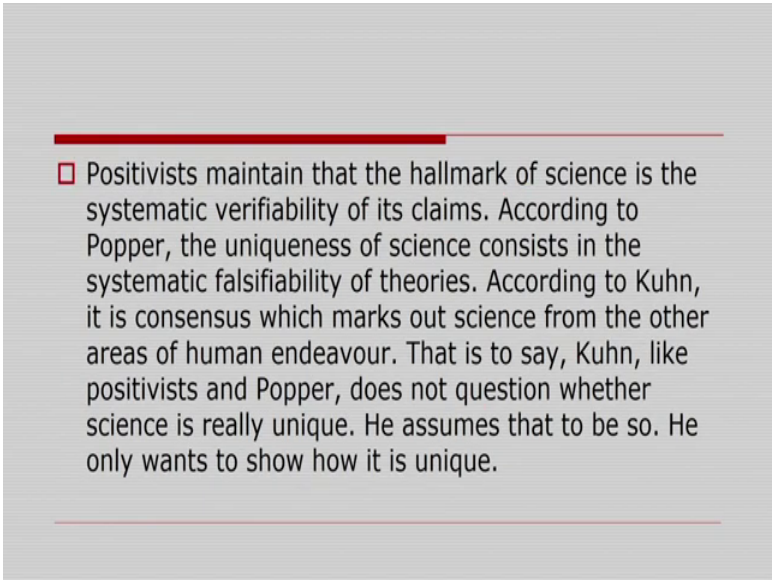
Why we raised this question that Kuhn's position is quite conservative in nature? Such conservative character of Kuhn's views must be examined, precisely because when we tend to build consensus, it is not a neutral activity. It is not an objective phenomenon. Consensus is often built based on the interests of different stakeholders, consensus is often manipulated manufactured, manoeuvred and hence much of the subjective dispositions are closely embedded while forging a consensus.

And in this sense, we said that, Kuhn's views about scientific method is conservative in nature. If it is not a neutral activity, if it is not an objective activity, if the consensus is built around manipulation manufacturing of consent and so on, then perhaps this is very important to understand. That is why STS scholars very often say that Kuhn's reflections on methods of

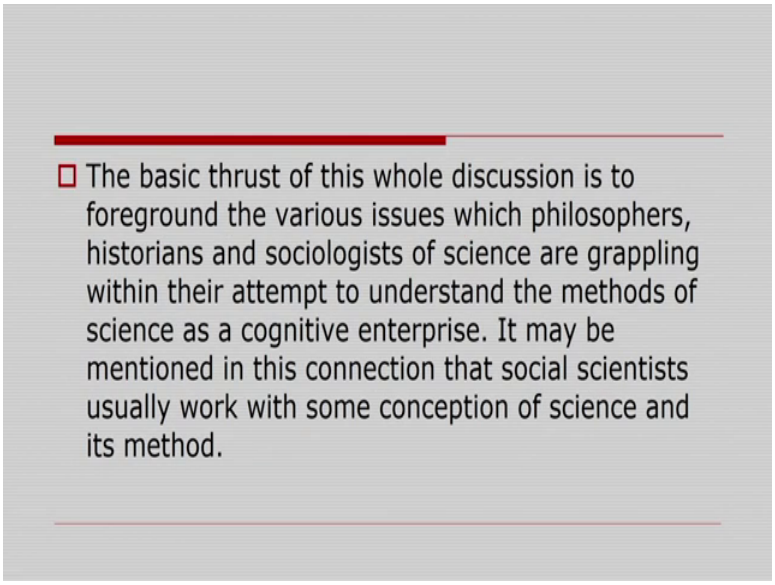
science are conservative in nature, are irrational in nature and at times at best, they are sociological in nature.

On the contrary, Popper's reflections on the methods of science are radical in nature precisely because of his rationalist association; because of the kind of divergent thinking and fundamental disagreements that he spoke about. Popper also said, what is the hallmark of science? The hallmark of science is not simply critical thinking but also radical thinking. If the hallmark of science according to Popper is radical thinking, critical thinking and so on. Then for Kuhn the hallmark of science is tradition bound thinking, in a normal scientific tradition.

And Popper goes beyond norm-bound science to reflect upon falsification of the existing scientific theories. And if it is falsified, then it must be that our scientific theories or hypotheses must be refuted. And if our hypothesis is not falsified, then it must be corroborated, it must be kept permanently tentative. And in this sense, we have tried to dwell upon the comparisons between Popper and Kuhn.

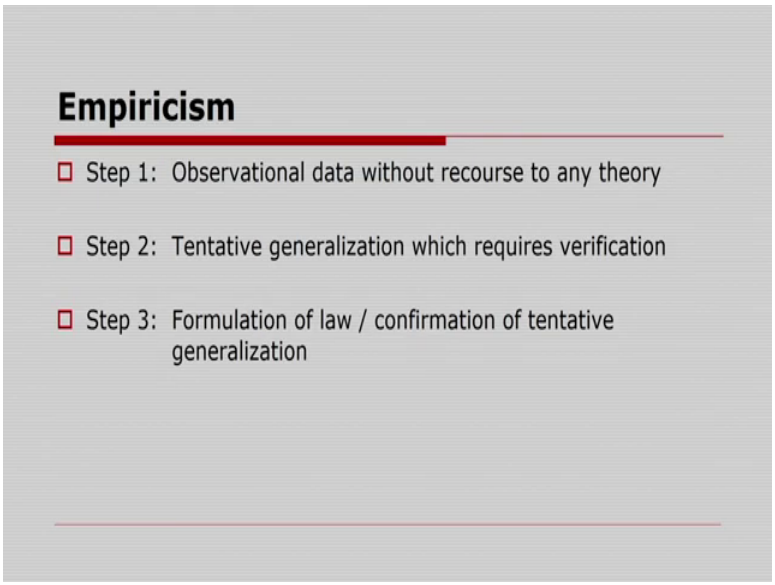


Then, to sum up the sixth week of four lectures, what we have discussed: positivists maintain that the hallmark of science is the systematic verifiability of its claims. According to Popper, the uniqueness of science consists in the systematic falsifiability of theories. For Popper, if it is the systematic falsifiability of theories, then for Kuhn it is the consensus which marks out science from the other areas of human endeavour, that is to say Kuhn like positivists, and Popper does not question whether science is really unique, he assumes that to be so, he only wants to demonstrate how it is unique.

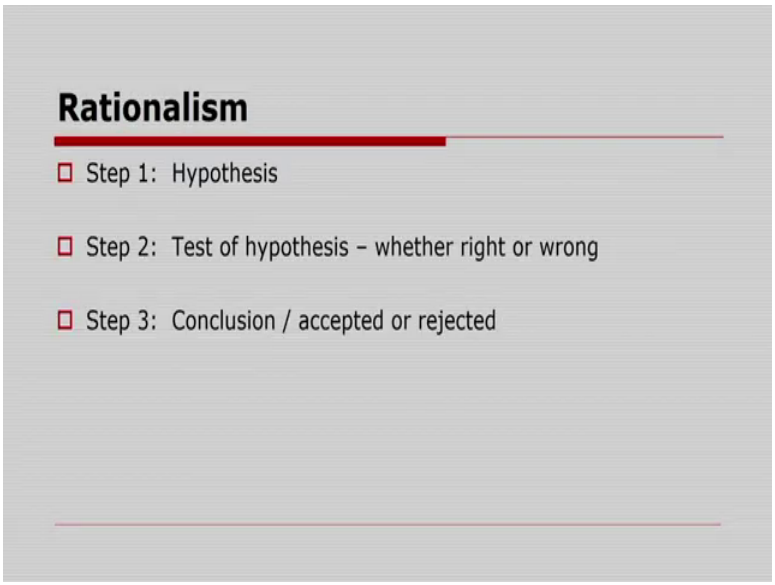


The basic thrust of this whole discussion is to foreground the various issues which philosophers, historians and sociologists of science are grappling within their attempt to understand the methods of science as a cognitive enterprise. It may be mentioned that in this connection, that social scientists usually work with some conception of science and its method. And since such a conception very much informs their work, it is necessary that they should free themselves from received notions and naive ideas about science presented by textbooks, and deeply entrenched in popular psyche.

All that this discussion has sought to achieve is to hammer the point, that the pattern of scientific thinking is too complex to be captured by a catalogue of thumb rules, pompously presented as the principles of scientific method.

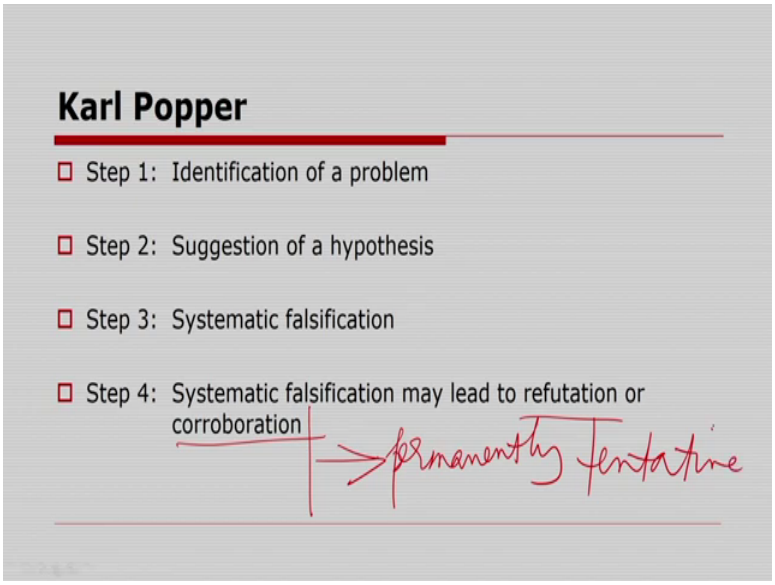


And in this sense, we have to recapitulate the entire sixth week. To go back a little in empiricism what are the steps of scientific method? Science must start with observational data without recourse to any theory. The second step suggests that we must suggest a tentative generalization which requires verification and this third step suggests that once the tentative generalization is verified, then we must confirm that tentative generalization and formulate the law.



In the case of rationalism, science must start with hypothesis, then the second step suggests that the hypothesis must be tested right or wrong, and if the hypothesis is tested wrong, then it must be rejected. And if the hypothesis is tested right, then it must be accepted, that is how we must arrive at a concrete conclusion in the context of rationalism. In the context of positivism, we must start with observational data, then a set of laws, then a set of statements describing initial conditions. And the last one, the fourth step, a statement describing the phenomenon to be explained.

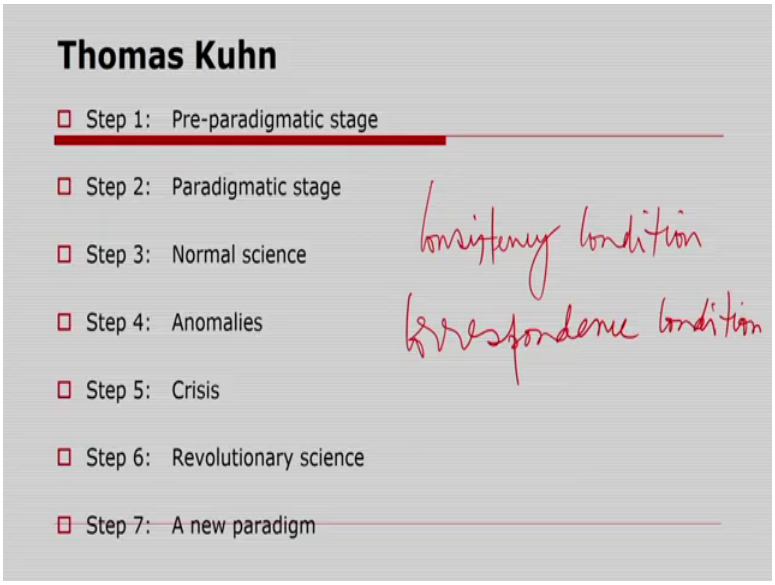
Observational data, a set of laws, premises number one. Premise number two, a set of statements describing the initial conditions through some examples or so on, and the statement and the conclusion or explanation that we tend to provide that a statement describing the phenomenon to be explained.



And the sixth week started with Popper. What are the steps, the first step suggests that we must try to identify a problem, then we must suggest a tentative solution to a problem or hunch in terms of a hypothesis, which must undergo the process of systematic falsification. And such systematic falsification may lead to a refutation of that hypothesis or corroboration of that hypothesis.

In quest of truth, in quest of knowledge, one should not be a diehard in proving her or his hypothesis. If one is diehard in proving or disproving her or his hypothesis, then it hinders the tradition of cumulative knowledge production.

And in this sense if a hypothesis is tested wrong or rather, if a hypothesis is falsified, then it must be refuted and if it is not falsified or if it is tested right, then it must be corroborated. What is this corroboration? That is you have to keep your hypothesis permanently tentative.



We have already discussed that how Kuhn suggested that Kuhn suggested that the life of every major science passes through two important stages, namely the pre paradigmatic stage and the paradigmatic stage, then within the paradigm or within the paradigmatic stage, we tend to follow the norm-bound science, normal science, normal scientific tradition, which is a puzzle solving activity. And within the normal scientific tradition, science encounters anomalies, unanticipated unexpected occurrences. And once science encounters anomalies, then science enters the phase of crisis.

And once science becomes crisis ridden, then it tends to hunt for a new paradigm within science. How can it arrive at a new paradigm- it is only through a revolutionary science, scientific revolutions. Then it has to go beyond norm-bound science that is why if normal science is a tradition bound activity, then revolutionary science is a tradition shattering activity.

The philosophers of science, the historians of science, socialists of science, you look at the case starting from empiricists, rationalists, positivists, Auguste Comte, Émile Durkheim, Max Weber, Karl Marx, Karl Popper, Thomas Kuhn or so on we have seen that they differ in their account of what they consider to be the methods of knowledge, methods of knowledge production, methods of science, which have significant implications for Humanities and Social Sciences. All of them -especially empiricists, rationalist, positivists, Popper and Kuhn- they maintain that there are at least two conditions, which ought to be met with by any theory that is proposed for acceptance. And these conditions are called consistency condition and correspondence condition. And I am taking the cue from Paul Feyerabend here. Though this

is not a part of this course but if somebody wants to go beyond Popper and Kuhn, then they must grapple with Feyerabend, Lakatos, Steve fuller and so on.

What Feyerabend suggests that each philosopher of science, especially empiricists, rationalists, positivists, Popper and Kuhn, they have committed this mistake that as they maintain that there are at least two conditions which ought to be met by any theory that is proposed for acceptance and these conditions are called consistency condition and correspondence condition.

According to consistency condition the new theory must be consistent with the already well established theories. On the contrary correspondence condition suggests that the new theory must correspond to already well established facts.

According to Feyerabend, both these conditions are illegitimate in the sense that their acceptance hinders the progress of science. By insisting upon the consistency condition, the traditional philosophers of science, both positivists as well as Popperian, overlook the fact that the so called well established theories may themselves be faulty.

And their faulty character might come to surface only if we allow acceptance of the new theory provisionally. In other words, if a new theory is inconsistent with the existing theories, which we believe to be extremely well supported, the fault may not necessarily be with the new theory, but with serious limitations may become obvious to us only by adopting an alternative theory.

That is to say, by insisting upon the consistency condition, we may be thwarting the chances of a very good theory and remain blind to the serious lacunae of the existing theories, which we might miss only because we remain confined to these theories.

Nevertheless, we may never become aware of these new facts unless we transcend these theories and adopt an alternative just as we cannot become aware of all the defects of our society, unless we look at it from the point of view of another society. Similarly, the correspondence conditions too cannot be sustained.

By insisting upon the correspondence condition the traditional philosophers of science overlook the fact that the new theory might fail to correspond to facts, because facts themselves may degenerate to the sense that they are interpreted consciously or otherwise in

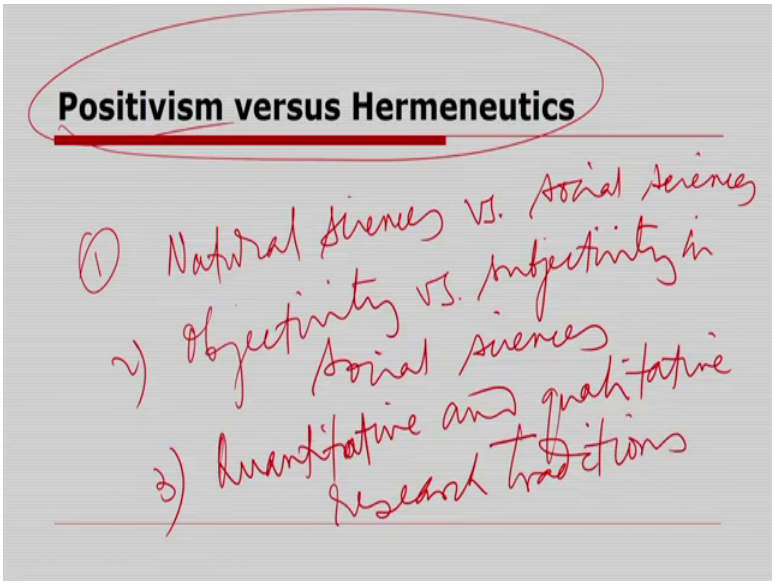
terms of a theory of which is itself questionable and whose questionability we have not realized, since our thinking has been constrained by it.

Given the fact that all observations are theory laden in the Popperian schema, it may be that what we consider to be observationally obvious, might be absolutely wrong, due to the incorrectness of the theory. Hence, Feyerabend suggests that a new theory must be allowed to grow, even if it goes against well known facts. That is why it may be mentioned that here that of the two conditions, the correspondence condition is more primary, because the consistency condition can be reduced to it.

For the consistency condition suggests that a new theory must be consistent with existing theories if the latter are supported by facts. In other words, the consistency condition seeks to guarantee that new theory corresponds with known facts by being consistent with existing theories.

And by rejecting both the conditions, Feyerabend advocates that a new theory should not be constrained by the rule that it should first correspond with facts, which we already know. In fact, Feyerabend suggests that we must make deliberate attempts to develop theories, which go counter to the so called known facts.

And in this sense we have tried to try to locate different philosophical foundations of social research, and wwe have come to the closure of the sixth week, we have come to the closure of 17 lectures. What we have discussed till now then, we have discussed history of philosophy of Social Sciences, Emile Durkheim, Max Weber in two parts in two weeks; Marx, Popper and Kuhn, we have already discussed and we have come to the closure of the sixth week.



In seventh week, in terms of two lectures, we are going to discuss positivism versus hermeneutics. In positivism versus hermeneutics in the next in terms of two lectures what we are going to do, we are going to discuss natural sciences versus social sciences. This is important when we discuss positivism versus hermeneutics.

Secondly, we will discuss objectivity versus subjectivity in social sciences. And we will also reflect on the methodological implications for quantitative and qualitative research methods or research traditions. We will discuss these in terms of two lectures in the seventh week , that is positivism versus hermeneutics. Thank you.