Philosophical Foundations of Social Research
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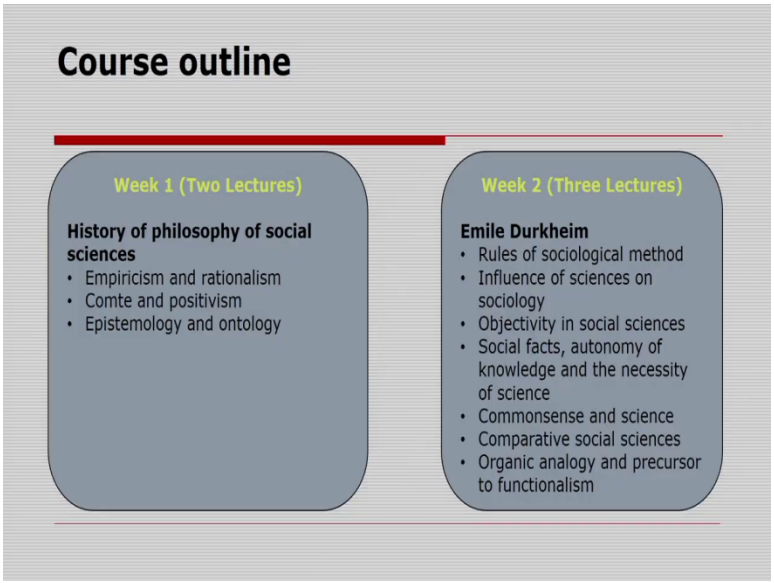
Week 1 (History of Philosophy of Social Sciences): Lecture No. 01
Empiricism and Rationalism

Hello everyone. Welcome to the massive open online courses and this particular course is titled Philosophical Foundations of Social Research. My name is Sambit Mallick. I teach sociology at the Department of humanities and social sciences, Indian Institute of Technology, Guwahati. This course -philosophical foundations of social research- is almost a mandatory course across social sciences and humanities, not only in India, but also abroad; whether it is a master's level course or a PhD level course or an undergraduate level course, almost all universities, IITs, IISC Bangalore have kept this course as a compulsory course. Now before starting the modules within this course, before starting the lectures, I would like to provide a brief course outline of this course.



This is an 8 week course consisting of 20-21 hours of lectures and each lecture will have 55 minutes to 1 hour. In these 8 weeks, you will find that we will cover history of philosophy of social sciences, Emile Durkheim, Max Weber, Karl Marx, Karl Popper, Thomas Kuhn, and the conflicting traditions between positivism and hermeneutics.

Course outline

Week 5 (Three Lectures)

Karl Marx
- Idealism versus materialism
- Materialist conception of history
- Principles of dialectic
- Understanding nature
- Ideology and science: methodological implications

Week 6 (Four Lectures)

Karl Popper
- Principle of falsification
- Context of discovery and justification
- Hypothetico-deductive model

Thomas Kuhn
- Consensus-driven paradigm
- Normal science
- Anomalies
- Crisis
- Revolutionary science
- A new paradigm

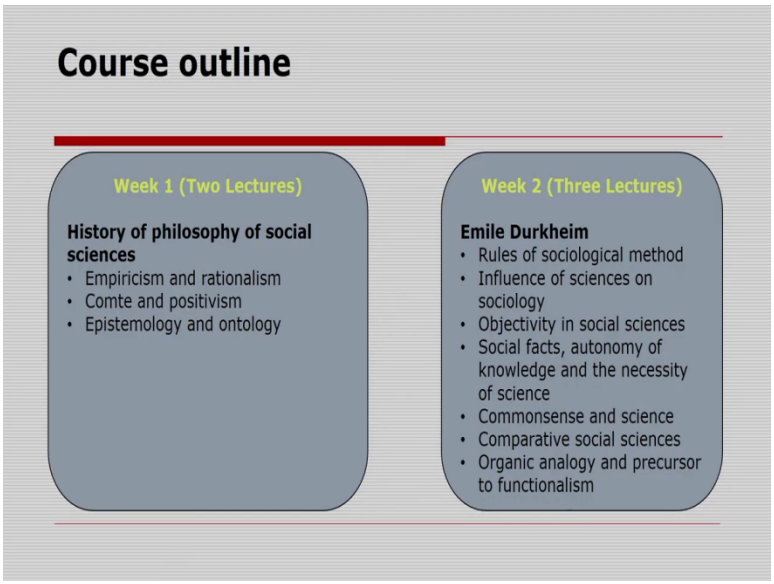
Course outline

Week 7 (2 Lectures)

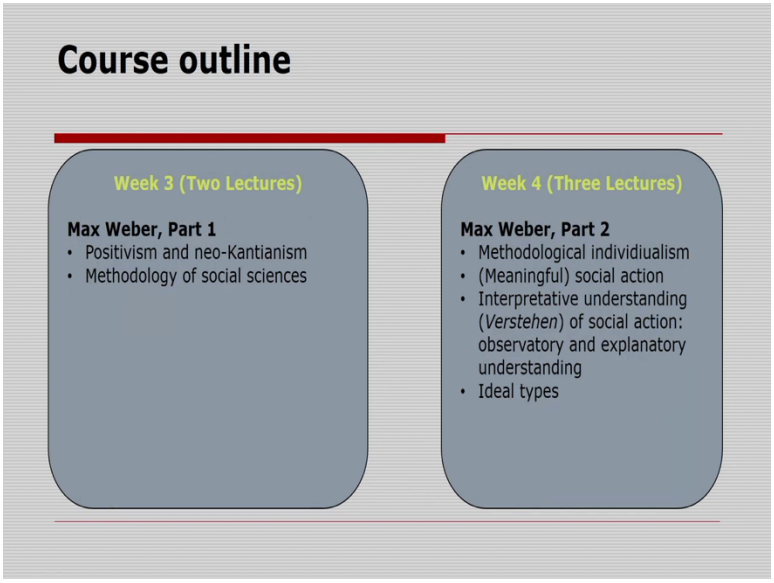
Positivism versus hermeneutics
- Natural sciences versus social sciences
- Objectivity and subjectivity in social sciences
- Quantitative and qualitative research traditions

Week 8 (2 Lectures)

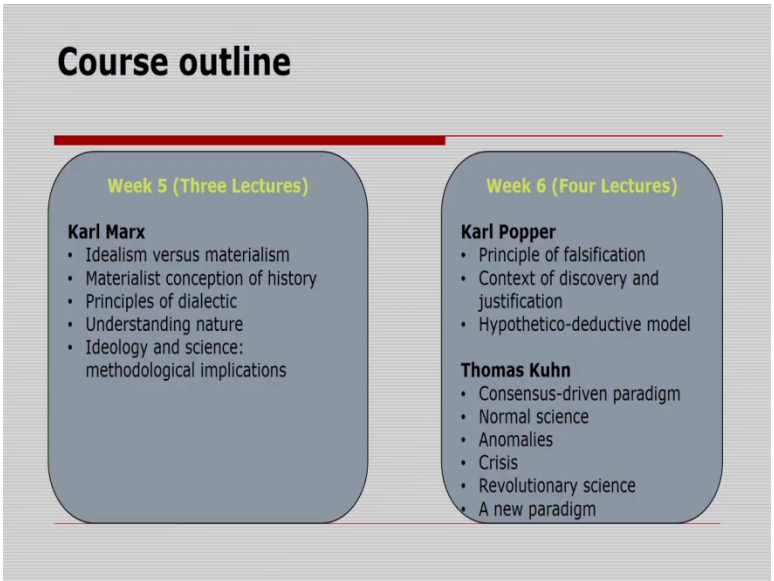
Conclusion
- Beginning of the end of philosophy of social sciences
- Overview of the course



In the first week, you will find 2 lectures on history of philosophy of social sciences covering empiricism and rationalism and Auguste Comte and positivism, and epistemology and ontology. In the second week, we will discuss 3 lectures on Emil Durkheim: The rules of sociological method, influence of sciences on sociology, objectivity in social sciences, social facts, autonomy of knowledge, and the necessity of science, the relationship between common sense and science, comparative social sciences, organic analogy and precursor to functionalism.



We have divided Max Weber into 2 parts. In the third week, we will have 2 lectures on positivism and neo-Kantianism, how Weberian theoretical positions are a reconciliation between positivism and neo-Kantianism and his methodology of social sciences. And in the fourth week, the second part of Weber will be discussed in terms of 3 lectures: methodological individualism, meaningful social action, interpretative understanding (Verstehen) of social action; Verstehen in German means understanding. There are 2 types of understanding we will see in Weberian works, observatory understanding and explanatory understanding. And then we will discuss ideal types of Weber.

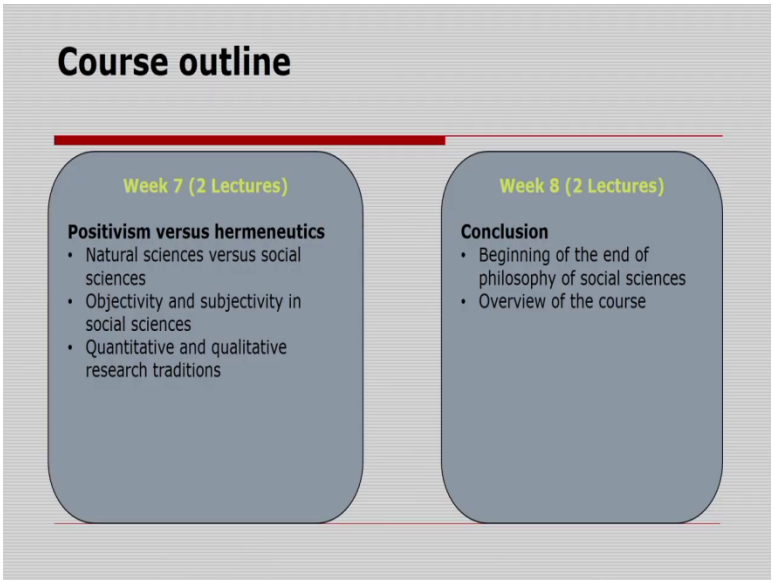


In the fifth week, we are going to touch upon one of the greatest thinkers of the twentieth century, Marx. Marx's theoretical and methodological writings include idealism versus materialism. How Marx tried to interrogate and reject Hegelian and Feuerbachian idealist positions and propounded for a more materialist world outlook in bringing about a proletarian revolution. Methods are very important. Materialist conception of history, principles of dialectic, understanding nature - the relationship between human beings and nature. And what are the methodological implications for the relationship between ideology and science: Whether assuming Marx as an ideologue of the Communist Party, or Marx as a theoretician, they have significant implications for the ways we deploy methods in social sciences.

And the sixth week we will have 4 lectures. It will cover Karl Popper and Thomas Kuhn. Popper and Kuhn debate perhaps constitutes the most intellectually stimulating debates on scientific

method of the twentieth century. If you look at Popper's way of looking at method, we will discuss principle of falsification, context of discovery and context of justification, hypothetico-deductive model.

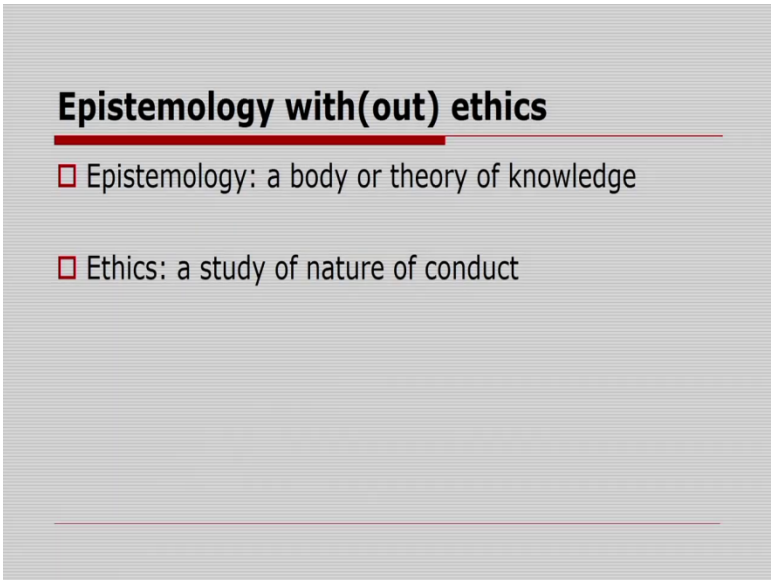
And in Kuhn, we are going to discuss how we witness a change in paradigm or a model. We start with pre paradigmatic stage, then paradigm, then normal science - normal sciences forged by some sort of consensus within the paradigm. Then normal science is often confronted with anomalies. Anomalies referred to unanticipated or unexpected occurrences or happenings. Then, because of anomalies how science enters the crisis, and from crisis, we try to arrive at a new paradigm mediated by revolutionary science. If normal science is a tradition bound activity, then revolutionary science is a tradition shattering activity.



In the seventh week, we will have 2 lectures. We will try to look at the conflicting traditions of research between positivism on the one hand and hermeneutics tradition on the other. Within that we will discuss natural sciences versus social sciences, objectivity and subjectivity in social sciences, and quantitative and qualitative research traditions.

And in the last week, i.e. the eighth week, we will have 2 lectures in concluding this course. It will be beginning of the end of philosophy of social sciences. And then we will have an overview of the course at the end of this course. But now, what we are going to do?

We are going to start with the first topic: we will have 2 lectures. Today we are going to have the first lecture of the first topic. Within history and philosophy of social sciences, we are going to discuss empiricism and rationalism and in the second lecture, we are going to discuss Auguste Comte: His laws of 3 stages of theological stage, metaphysical stage and positivistic or scientific stage and epistemology and ontology. We will start with empiricism and rationalism today.



Before moving on to empiricism and rationalism, I will try to give you a brief prefatory remark on this. Philosophy in its pre-nineteenth century incarnation was divided into 2 parts, namely natural philosophy and the other social and moral philosophy. Natural philosophy is nothing but science in the present sense of the term. In fact, the term science was coined by William Whewell in the nineteenth century, prior to this science was known as natural philosophy.

Natural philosophers: when I say the practitioners of natural philosophy, I mean scientists in the present sense of the term. Natural philosophers were engaged in epistemological questions whereas the proponents of social and moral philosophy were engaged in ethical questions. In this sense, there was a great divide between, between the practices within natural philosophy on the one hand and the practices within social and moral philosophy on the other.

When we try to integrate natural philosophy with social and moral philosophy or to put it differently, when we try to integrate epistemology with ethics, we tend to arrive at modern

philosophy of science. In this sense, science is an inquiry into the nature and limits of a particular knowledge not all sorts of knowledge, but a particular type of knowledge.

When I say nature of a particular knowledge, I mean the scope and ambit of a particular knowledge, subject matter of a particular knowledge, but when I say limits of a particular knowledge, by limits I do not mean limitations; by limits, I mean, under what limiting conditions science is practiced or pursued.

Even a set theory has limits. What is a set theory- set theory is a philosophical branch of mathematical logic. Even a set theory has limits, it does not imply that it has limitations. I reiterate this point, that by limits, I do not mean limitations rather, I mean, by limits under what limiting conditions science is practiced, or pursued.

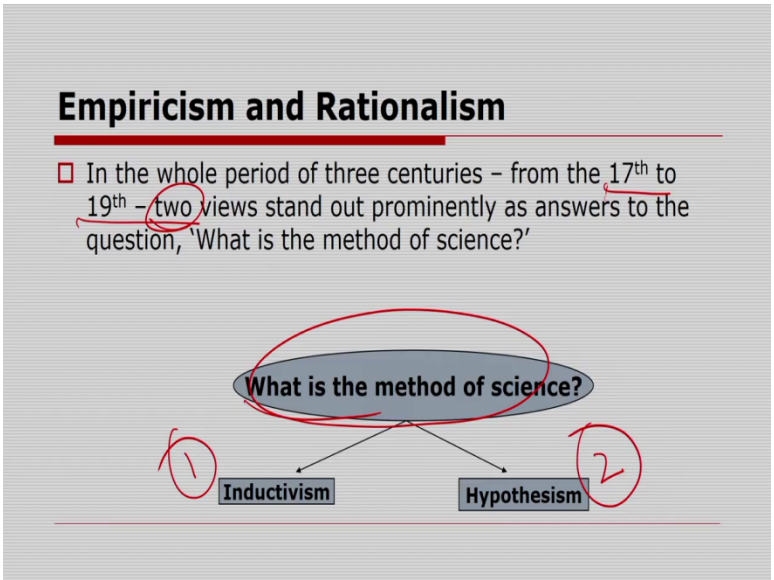
Now, if I say natural philosophers or scientists in the present sense of the term were engaged in epistemological questions, while social and moral philosophers were engaged in ethical questions. Then what is epistemology? Epistemology is a body of theory of knowledge. Why is it called a body or theory of knowledge? Precisely because of the central philosophical and political questions, that epistemology addresses, what are those central philosophical and political questions then: What is knowledge? What counts as knowledge? How is knowledge produced? How is knowledge generated? These are epistemological questions, perhaps for this reason, epistemology is known as a body or theory of knowledge.

Then, when I say social and moral philosophers are engaged in ethical questions, then what is ethics? Ethics is a study of nature of conduct, why is it called a study of nature of conduct? Now precisely because of the central philosophical and political questions that ethics addresses. What are those questions then? What is good? What is bad? What is right? What is wrong?

The proponents of epistemology try to address the questions, what is knowledge? What counts as knowledge? How is knowledge produced? How is knowledge generated? And they did not address the question: the kind of knowledge that we have produced, who has got the accessibility to that kind of knowledge? Whether the knowledge that we have produced, whether it has been popularized or not? The kind of knowledge that we have produced, whether it has been

democratized or not? Whether all sections of the population have the right to access that form of knowledge, that specific knowledge or not?

And that comes under the domain of social and moral philosophers or the proponents of ethics. That is why philosophers of science, historians of science, sociologists of science, they always try to grapple with how to integrate epistemology with ethics? How to integrate natural philosophy with social and moral philosophy? That is why epistemology without ethics, or ethics without epistemology cannot stand the litmus test of the twenty-first century. That is why epistemology must be integrated with ethics and ethics at the same time must be integrated with epistemology, there must be a 2 way process.

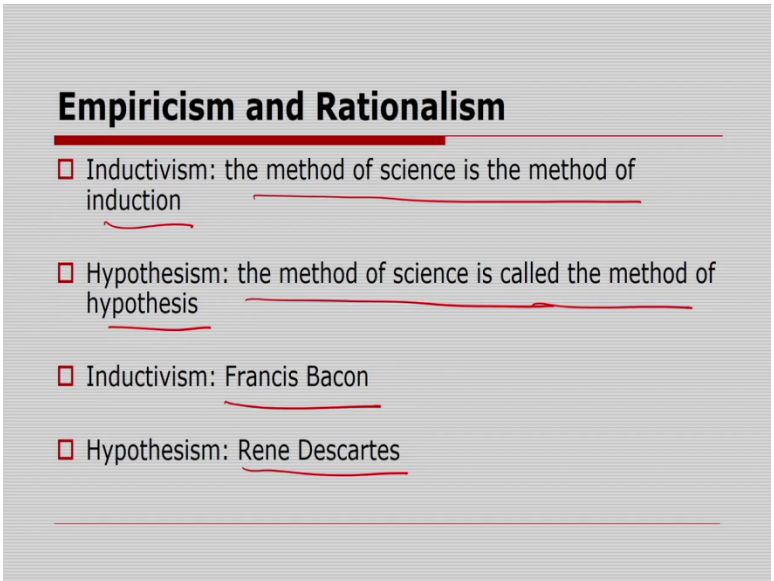


Now will directly go to our central agenda of today's lecture. That is we will start with empiricism and rationalism. The question what may be the possible philosophical foundations of research whether it is social research or scientific research, social sciences research or research in humanities, or research in sciences research in engineering and so on. The question what is the philosophical foundation of research? Or what is the method of research? What is the method of science? The question, what is the method of science is as old as science itself.

Aristotle tried to work out a detailed answer to this question, that what is the method of science? And when Aristotle worked out a detailed answer to this question and his theory of scientific method, like his scientific theories exercised tremendous influence till around sixteenth century.

However, with the emergence of modern science and modern philosophy in the seventeenth century, eighteenth century, you will find the Industrial Revolution, rise of critical thinking, rationality, reasoning capacity: on the whole modernity. What we find that the question that that was raised a long back that what is the method of science or progressively speaking today, if I say what may be the possible methods of science, this question was raised afresh. The very attempt to provide a new answer to the to the question amounted to a decisive break with the past, as it implies a dissatisfaction with the Aristotelian theory of scientific method. And what we have today, we thus have in the seventeenth century, the modern birth of philosophy of science by integrating epistemology with ethics.

In the whole period of 3 centuries, I mean, 300 years, from the seventeenth century to the nineteenth century, 2 views stand out prominently as answers to the question of 'what is the method of science?' What is the method of science? This question is very important. The first view is called inductivism and the second view is called hypothesism.

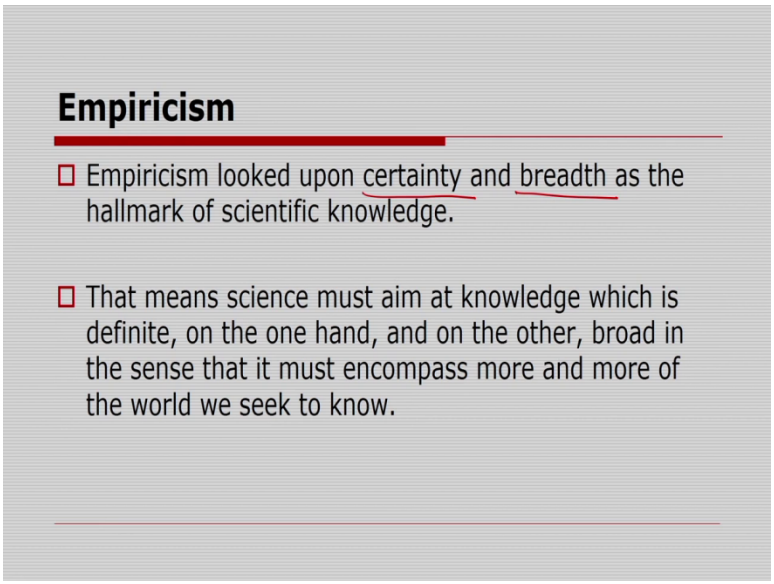


When I said the first view is called inductivism according to which the method of science is the method of induction. When I say the second view is called hypothesism, according to which the method of science is the method of hypothesis. We will discuss this a little while later. Inductivism is pioneered by Francis Bacon. Whereas hypothesism was pioneered by Rene Descartes and for this reason inductivism is known as the Baconian philosophy of science whereas hypothesism is known as Cartesian philosophy of science.

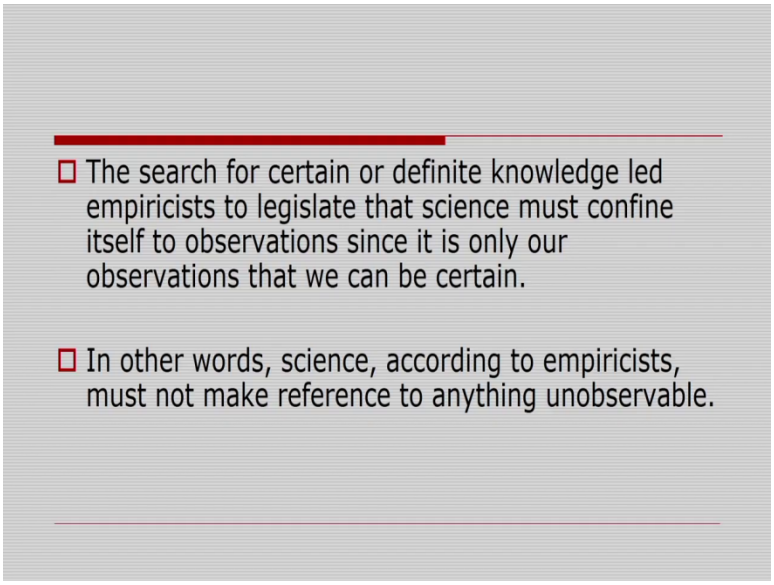
Both inductivism and hypothesism these 2 views sought to provide 2 models of scientific method. Hence, one can speak of the Baconian model and the Cartesian model of scientific method. Inductivism is rooted in empiricism. Whereas, hypothesism is grounded in rationalism. When I said inductivism which is rooted in empiricism, according to which only those ideas which are traceable to sense experience are legitimate. It always starts with sense experience I mean observation: observations are pure, observations are indisputable I mean observations cannot be doubted in the empiricist schema.

And when I say hypothesism is grounded in rationalism according to which a significant portion of human knowledge cannot be traced to and therefore is independent of sense experience. In other words, when empiricists suggest that science or knowledge always starts with observations, hypothesists or rationalists they always mention that no science or knowledge starts only when you go beyond observations.

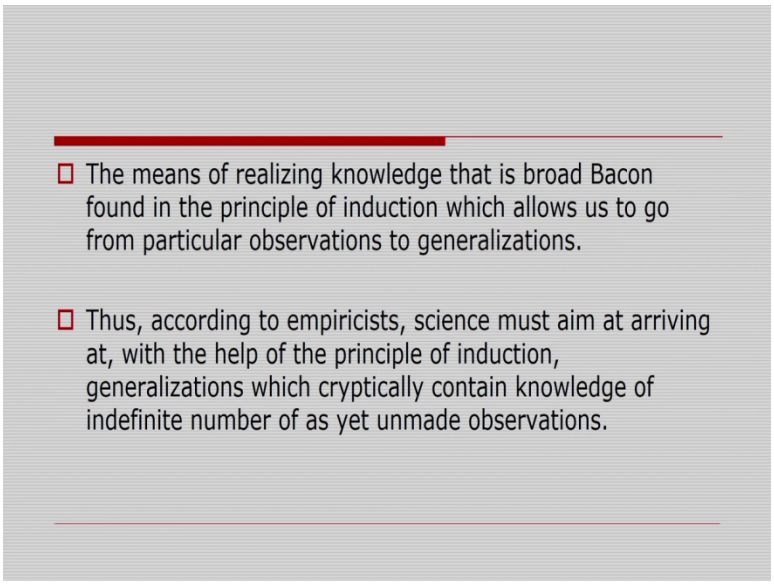
In the entire 3 centuries, from the seventeenth century to the nineteenth century, in these 3 centuries it has been projected to us this way that empiricism and rationalism are the 2 major sources of knowledge production. Empiricism is based on experience whereas rationalism is based on reason. And hence, experience and reason become the 2 sources of knowledge production in these 3 centuries. Even today, experience and reason are the major sources of knowledge production. Independent of experience & independent of reason, it is very difficult to point out any source of knowledge production, even in the twenty-first century.



Empiricism looked at certainty and breadth as the hallmarks of scientific knowledge. It implies that science must aim at knowledge, which is definitive on the one hand, and on the other broad in the sense that it must encompass more and more of the world that we seek to know.

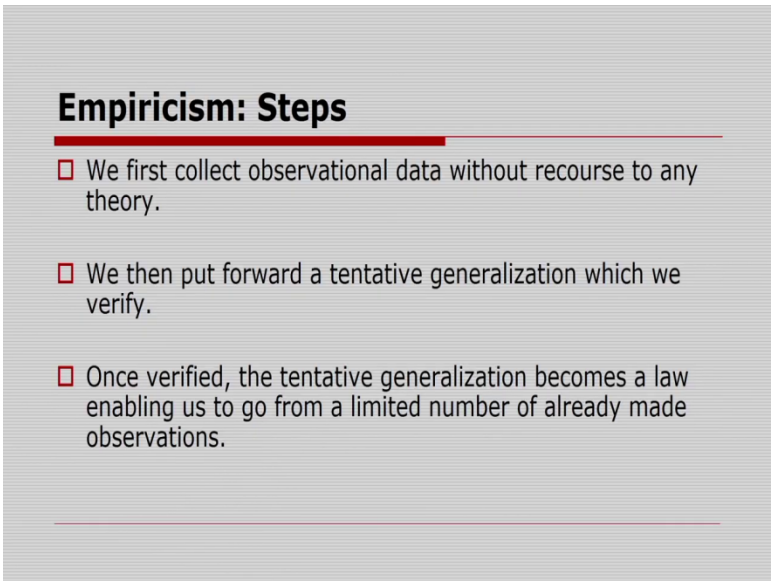


The search for certain or definite knowledge led empiricists to legislate that science must confine itself to observations, since it is only our observations that we can be certain of. In other words, science or knowledge, according to empiricists must not make reference to anything unobservable. If I cannot observe anything, according to the empiricists schema, then that cannot constitute science. It must be observable.

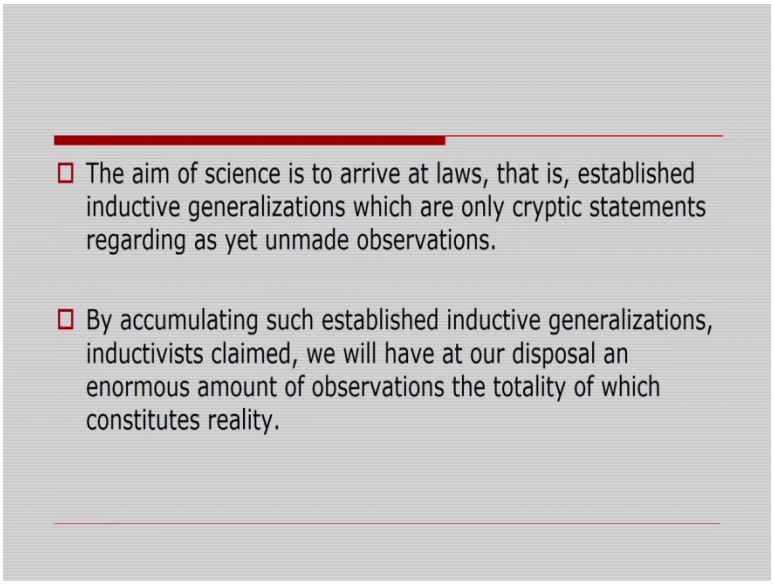


The means of realizing knowledge that is broad Francis Bacon found in the principle of induction. What is that principle of induction? The principle of induction is that which allows us to go from particular observations to arrive at generalizations, making generalizations. Then from particular observations to generalize is the empiricist model and from generalization to arrive at a particular instance is nothing but rationalist model or hypothesist model. We will see that in rationalism.

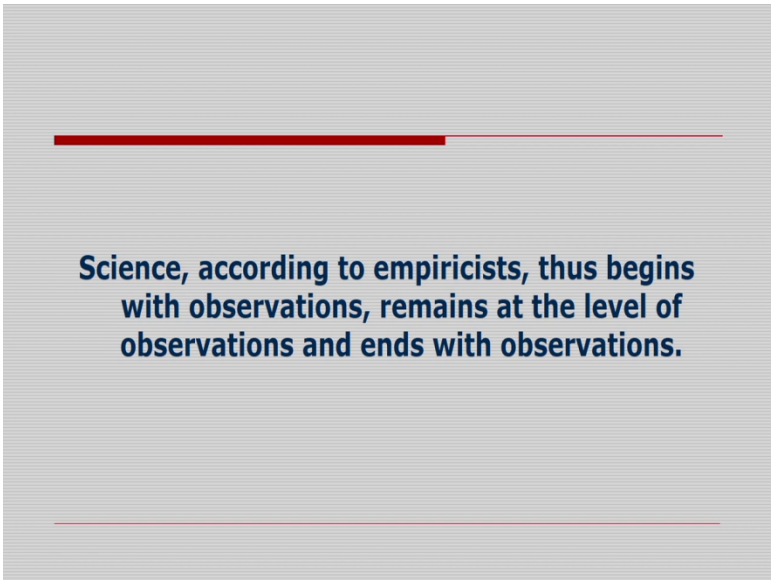
Thus, if I have to give you an example: if I say Socrates is mortal, this is a particular instance. Premise number 1, Socrates is mortal, premise number 2 Socrates is a man and the conclusion is that all men are mortal, this is an empiricist or inductive model. The hypothesis or rationalist model suggests that all men are mortal premise number 1, Socrates is a man premise number 2, conclusion is Socrates is mortal. From general statement, we are coming to a particular instance. That is why I said certainty and breadth are the hallmarks of scientific knowledge in the empiricist schema. The means of realizing knowledge that is broad Bacon found in the principle of induction, which allows us to go from particular observations to generalizations. Hence, according to empiricists, science must aim at arriving at with the help of the principle of induction generalizations which cryptically contains knowledge of indefinite number of as yet unmade observations.



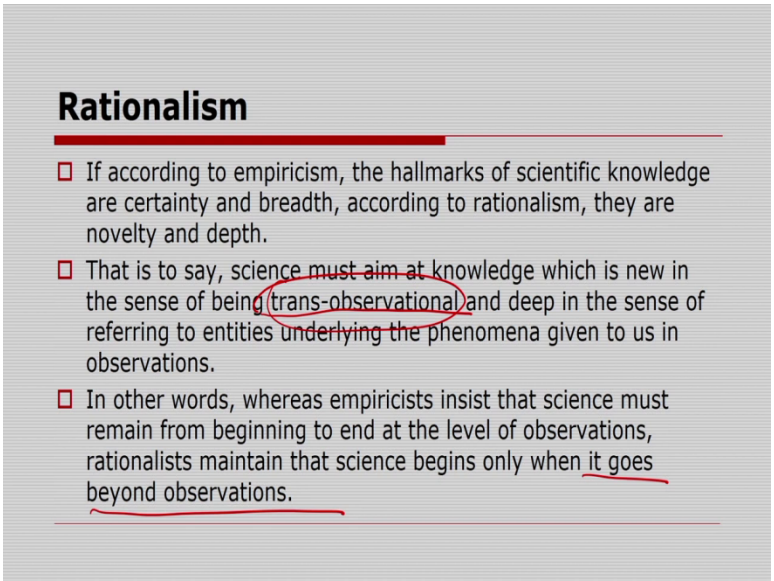
Then what are the steps in empiricism? Now, we must first collect observational data without recourse to any theory. We then put forward a tentative generalization which we verify. Once verified, that tentative generalization becomes a law enabling us to go from a limited number of already made observations. Then what are the steps in the empiricist's schema? First, we try to collect observational data without recourse to any theoretical commitment. Step number 2, we must put forward a tentative generalization which we must verify and step number 3 is that once if it is not verified, then it must be rejected and If it is verified, then the tentative generalization becomes a law. Thus, that law enables us to go from a limited number of already made observations.



The aim of science in the empiricist schema is to arrive at laws, that is, established inductive generalizations which are only cryptic statements regarding as yet unmade observations. And by accumulating such established empiricist generalizations or inductive generalizations, empiricists or inductivists claimed we will have at our disposal an enormous amount of observations, the totality of which constitutes reality.



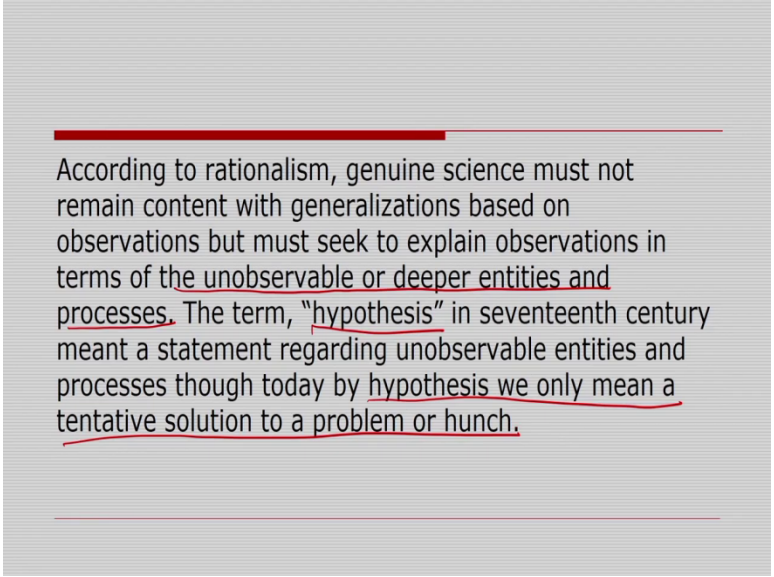
And thus, science according to empiricists, begins with observations remains at the level of observations and ends with observations. If, according to empiricists, the hallmark of scientific knowledge are certainty and breadth,



then According to rationalists, they are novelty and depth. That is to say, as we discussed in the empiricists schema, the hallmarks of science or the hallmarks of scientific knowledge are certainty and breadth, but in the rationalist schema, the hallmarks of scientific knowledge are novelty and depth. In other words in the rationalist schema, science must aim at knowledge, which is new in the sense of being trans-observational in nature. And it must be deep in the sense of referring to entities underlying the phenomena given to us in observations.

In the in the empiricists schema, science must begin with observations, remain at the level of observations, and it must end with observations. But in the rationalist schema, science begins only when we go beyond observations. This is very important in the rationalist schema. When we go beyond observations. Well let us examine this statement, how we will go beyond observations in the rationalist schema.

In other words, whereas, empiricists insist that science must remain from beginning to end at the level of observations, rationalists maintain that science begins only when science goes beyond observations. This is important. You will find in the empiricist schema, science always deals with observations. But in the rationalist schema, you will find that rationalists suggest that science begins only when it goes beyond observations.

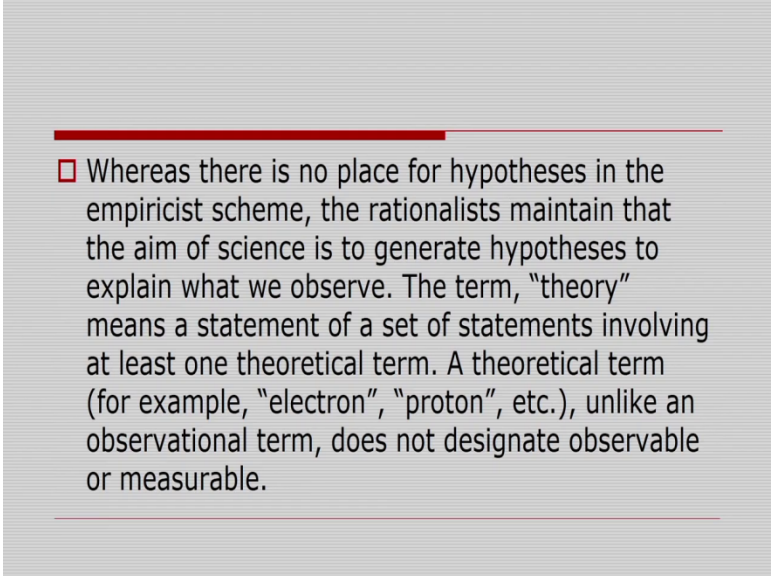


Let us examine how it works in the rationalist schema? How science is operational in the rationalist schema? According to rationalism, genuine science must not remain content with

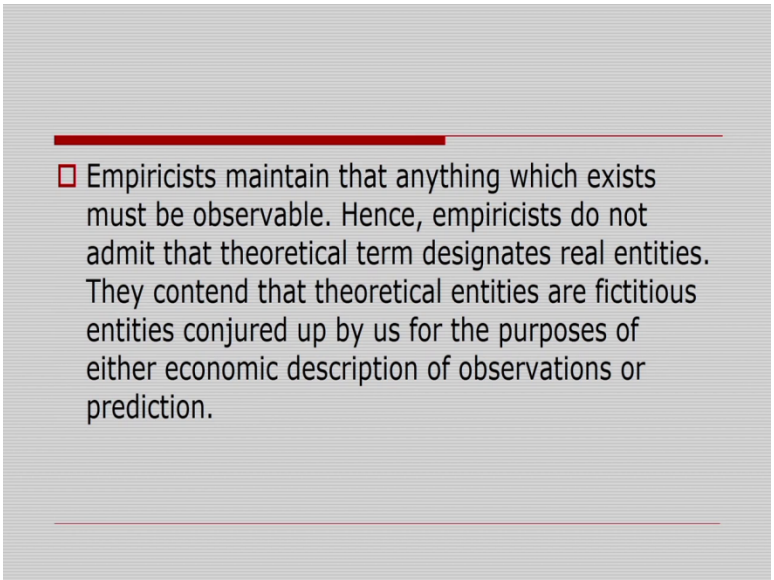
generalizations based on observations, but must seek to explain observations in terms of the unobservable or deeper entities or/and processes. Rationalists or hypothesists, they always start with a hypothesis. The term hypothesis in the seventeenth century meant a statement regarding unobservable entities and processes. Though today, by hypothesis, we only mean a tentative solution to a program or hunch. Then what is your hypothesis? Today, a hypothesis is nothing but a tentative solution to a problem or hunch. It is just tentative, we need to test a hypothesis. If I say my consumption depends on my income, then this is a hypothetical statement that I am making. Here consumption is a dependent variable whereas income is an independent variable.

I try to make a hypothesis that C is a function of I: consumption is a function of income. Then I will test it whether it is right or wrong. It may be tested right, it may be tested wrong. People may say that he is absolutely right that consumption is a function of income. But maybe my income is not adequate. That is why I bank on loans, then my consumption is not simply a function of income, but my consumption is a function of income plus something else. Loans, borrowings and so on.

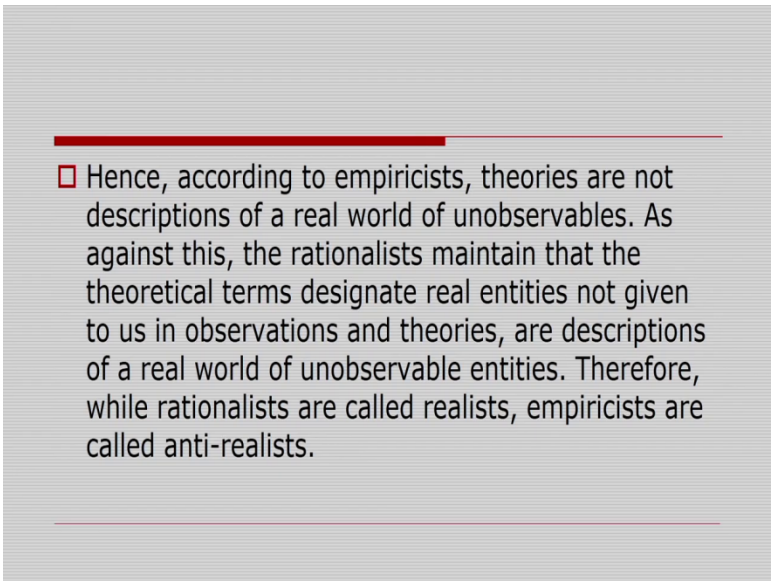
For a nation, income is a function of consumption, that is why the government always tries to go ahead with foreign debts and so on. That is why a hypothesis is nothing but a tentative solution to a problem or hunch.



Whereas there is no place for hypothesis in the empiricist schema, the rationalists maintain that the aim of science is to generate hypotheses to explain what we observe. The term theory, what is theory? Now it implies statement offers a set of statements involving at least one theoretical term. A theoretical term for example, electron, proton etcetera, unlike an observational term does not designate observable or measurable.



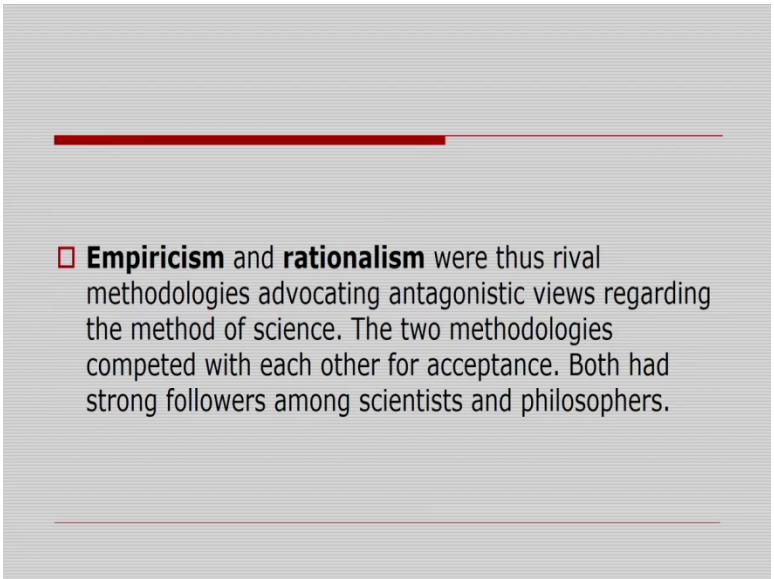
Empiricists maintained that anything which exists must be observable. Hence, empiricists do not admit that theoretical term designates real entity: the content that theoretical entities or fictitious entities conjured up by us for the purposes of either economic description of observations or prediction.



This notion of observational data in the empiricist's schema that according to empiricists, theories are not descriptions of real world of unobservables. If you cannot observe something then that is not real for empiricists. As against this, the rationalists maintained that the theoretical terms designate real entities not given to us in observations and theories or descriptions of a real world of unobservable entities. Let us take this example you will find proton electron everywhere. But we cannot observe them in our naked eye. Does it imply that they do not exist? Rationalists challenge this this kind of nonexistence of theoretical terms- non-existence of unobservable entities of the empiricists. That is, something can, is not observable in our naked eye to our naked eye, but they are very much real. Therefore, while rationalists are called realists, empiricists are called anti-realists.

Then what are the steps in in rationalism? As we have we have seen in the case of empiricism, the steps were like this, when we must first collect observational data without recourse to any theory. We then put forward a tentative generalization which we must verify and once verified, that tentative generalization becomes a law enabling us to go from a limited number of already made observations.

On the contrary, what are the steps of a rationalism? Rationalists suggest that we must start with a hypothesis that is a tentative solution to a problem or hunch and this, this hypothesis must be tested. Please remember one thing that in research or in certain cases, we try to prove or disprove our hypothesis, but actually it is wrong. We should not try to prove or disprove our hypothesis. If one is diehard in proving or disproving his or her hypothesis, then it hinders the tradition of cumulative knowledge production; a hypothesis must be tested right or wrong. If it is tested right, then it is subject to acceptance. If it is tested wrong, then it is subject to rejection. If a hypothesis is tested right, then we tend to accept this it is accepted. If a hypothesis is tested wrong, then then it is rejected. We tend to reject that.



Thus, inductivism and hypothesism were arrival methodologies, advocating antagonistic views regarding the method of science. The 2 methodologies competed with each other for acceptance, and both had strong followers among scientists, as well as philosophers, social scientists, and so on. For example, it had among its champions, for example, hypothesism had an upper hand a hand in the beginning. It was among its champions, not only Descartes – "I think therefore I am" , "Cogito ergo sum", "I doubt therefore, I am" the rationalist statement- but also Boyle, Hook, Huygens and other eminent scientists.

But empiricism emerged as the dominant theory of scientific method in the early eighteenth century. The setback suffered by rationalism or hypothesism and the consequent domination of the same by empiricism, or to be traded to the fact that method of induction or the method of empiricism, experience is the source of knowledge or observation is the source of all knowledge had its adherent, Sir Isaac Newton. Newton was an empiricist, whose eminence as a scientist lent empiricism a remarkable scientific respectability.

Indeed, the classic statement of the empiricist's position came from Newton himself. Epitomizing this position in the general scholium of his principia Newton says, let me quote Newton here that, "what is not deduced from phenomena or observations is to be called a hypothesis and a hypothesis whether metaphysical or physical, whether on occult qualities or mechanical, have no place in experimental philosophy. And in this philosophy, particular propositions are inferred from phenomena and afterwards rendered general by induction."

Of course, Newton's own scientific practice was at variance with his empiricist convictions, inductivist convictions. And he entertained many metaphysical ideas, if you look at history of science that played an active role in his theorizing. Nevertheless, the followers of Newton went by what Newton said than what he did. In order to continue the success story of Newton, they believed that it was necessary to practice literally Newton's inductivist empiricist message : the message I just quoted, “what is not deduced from phenomena or observations is to be called a hypothesis have and hypothesis whether metaphysical or physical, whether occult qualities or mechanical, have no place in experimental philosophy. In this philosophy, particular propositions are inferred from phenomenon and afterwards rendered general by induction.” And since empiricism was cult of observations, the followers of Newton like Boerhaave, Coates attempted to construct purely observational physics, observational chemistry and observational biology to further the cause of the master.

The purpose of this is to situate the history of philosophy of Social Sciences from a larger theoretical vantage point; larger historical vantage points must be created to locate history of philosophy of Social Sciences. What we generally find that inductivism very soon began to face serious challenges as early as 1740s, in the first half of the eighteenth century, 1740s and 1750s, and so on, there began to dawn the realization that many areas of scientific inquiry could not be forced into the empiricist framework.

For example, Franklin's fluid theory of electricity, the vibratory theory of heat, the theory of organic molecules, Phlogiston chemistry and so on, that developed in the middle of the nineteenth century, went against the spirit of the empiricist cult of observations, as they involved reference to entities and processes. The scientific grounds against the empiricist position were cleared with the appearance of Lesage’s chemical and gravitational theories of neurophysiological theories of Hartley and general matter theory of Boscovich.

These scientists accurately realized that their theories would face stiff opposition, not so much on scientific considerations, but due to the methodological implications considered absolutely undesirable by the prevailing methodological orthodoxy namely empiricism. Hence, they felt the need for methodological legitimization in terms of an alternative model. It is this need which motivated them to reselect the method of hypothesis the method of rationalism.

In their attempt to develop the method of hypothesis, these thinkers produced works of immense significance. Their works were followed by Senebier best known for his work on photosynthesis, Provost the founder of the theory of heat exchange, and many others. These scientists challenged the canons of scientific method as envisaged by empiricism, and in doing so, they had their professional interests at stake.

Now apart from such challenges that empiricists faced, the method of induction or the method of empiricism faced an internal crisis too. For example, David Hume, an eminent twentieth eighteenth century empiricist undermined it from within. He showed that the very principle of induction that from particular instances to arriving at generalizations and so on, which allowed us to proceed from observed to as yet an observed phenomena itself stood unjustified.

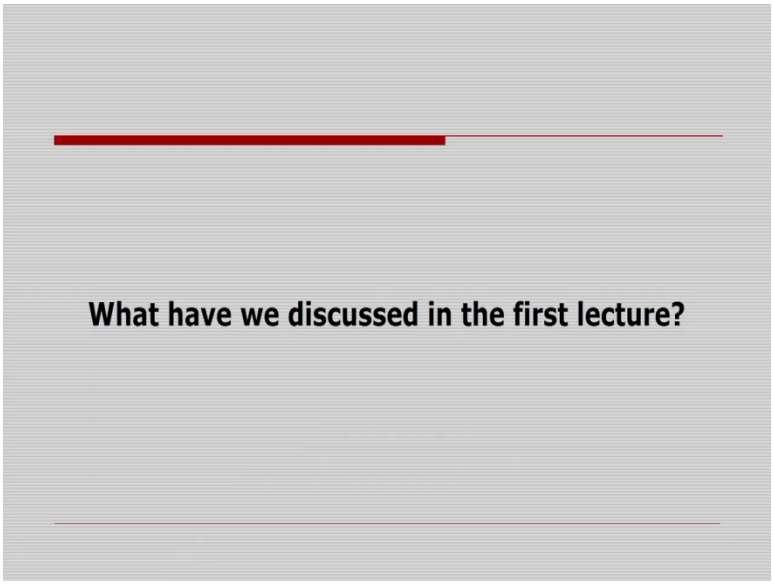
Any attempt to justify the principle of induction, Hume conclusively shows results in an circularity, or infinite regress. Hume was himself an empiricist. He did not accept the method of rationalism or hypothesis because of his commitment to empiricism. Hume concludes that, since we have no alternative to the principle of induction, our belief is irrational. We have to boldly accept that the whole of our knowledge including science, the paragon of knowledge, rests on an irrational belief and animal faith. That is what Hume suggested.

After Hume, every inductivist every empiricist attempted to so that Hume was wrong in his contention that the principle of induction could not be justified. And the most important attempt in this connection was made by John Stuart Mill, who realized that the main plant of the attack on induction or empiricism was its inability to lend the claims based on its degree of certainty, comparable to deductive or hypothetical inferences.

Now, the purpose of all these historical details is to set the stage for the discussion on twentieth century deliberations on the methods of science. For the various views that have been developed in the twentieth century are to be understood not only as reactions to each other, but also as reactions to a whole historical tradition, philosophical inquiry, theoretical and empirical investigations.

Now, what we have learned in this lecture, that how empiricism, and rationalism became rival methodologies advocating antagonistic views regarding the method of science and the 2

methodologies competed with each other for acceptance. Both had strong followers among scientists, social scientists, philosophers and so on.



Very quickly we will recapitulate what we have discussed in the first lecture. If we have to look at this in the first lecture, we have discussed the history of philosophy of Social Sciences in terms of empiricism and rationalism. How philosophy in its pre-nineteenth century incarnation was divided into 2 parts namely natural philosophy and social and moral philosophy. Natural philosophy is nothing but science in the present sense of the term and social and moral philosophy is nothing but ethics in the present sense of term.

Natural philosophers or scientists were engaged in epistemological questions, whereas social and moral philosophers were engaged in ethical questions. When we try to integrate epistemology with ethics or natural philosophy with social and moral philosophy, we tend to arrive at modern philosophy of science.

Then we then we tried to discuss what may be the possible methods of science in the history of philosophy of Social Sciences, namely, that how Aristotle tried to work out a detailed answer to this question, what is the method of science? And his theory of scientific method. This question elicits 2 responses: One is inductivism and the other hypothesism. For inductivists the method of science is the method of induction.

For hypothesists, the method of science is the method of hypothesis. Inductivism is based on empiricism and empiricism is based on experience, observational data. On the contrary, hypothesism is grounded in rationalism, and rationalism is based on reason. That is why what we tend to see, experience and reason became the 2 sources of knowledge production. How empiricists try to look at certainty and breadth is the hallmarks of scientific knowledge. And then we have discussed that, that science must aim at knowledge which is definite, which is certain on the one hand, and broad on the other in the sense that it must encompass more and more of the world we seek to know.

How empiricists try to follow these steps. We must first collect observational data without recourse to any theory. We then put forward or tentative generalization which we must verify. And once verified, the tentative generalization becomes a law enabling us to go from a limited number of already made observations. Science, according to empiricists, begins with observations remains at the level of observations and ends with observations.

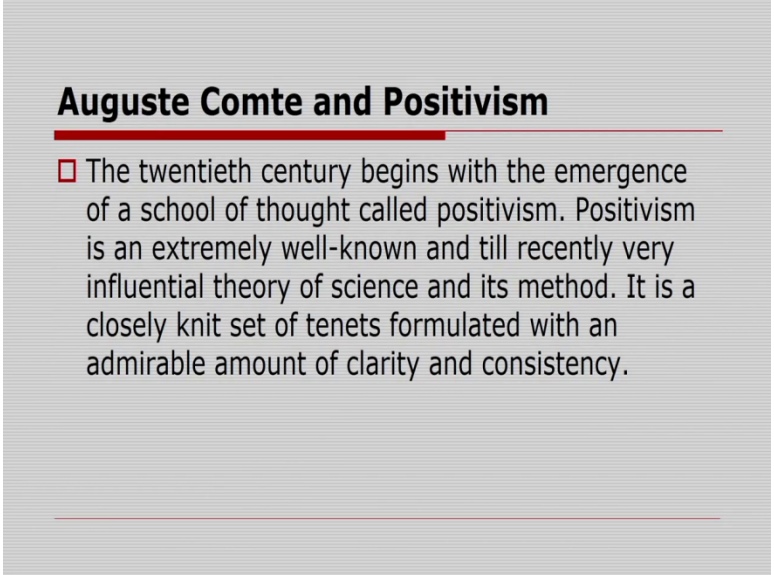
If the hallmarks of scientific knowledge in the empiricist's schema are certainty and breadth, then in the rationalist schema, the hallmarks of scientific knowledge are novelty and depth. That is to say, science must aim at knowledge which is new in the sense of being trans-observational in nature and deep, depth, I mean, the sense it must be deep in the sense of referring to entities underlying the phenomenon given to us in observations. Whereas, empiricists insist that science must remain from beginning to end at the level of observations, rationalists maintained that science begins only when it goes beyond observations.

And as we said, in the empiricist's schema, the steps include, we must first try to collect observational data, then we must put forward a tentative generalization, which requires verification. And once it is verified, it becomes a law; that tentative generalization becomes the law.

And in the rationalist schema, we must science must start with a hypothesis that is a tentative solution to a problem or hunch. Then we must try to test our hypothesis. As I reiterate this point, that hypothesis should not be proved or disproved. If one is diehard, in proving or disproving his or her hypothesis, then it hinders the tradition of cumulative knowledge production. And

hypotheses must be tested right or wrong if a hypothesis is tested wrong, then it must be rejected and if it is tested right then it must be accepted.

And empiricism and rationalism where does rival methodologies advocating antagonistic views regarding the method of science. And the 2 methodologies competed with each other for acceptance and so on. This is what we have discussed in today's lecture.



In the second lecture, we are going to discuss Auguste Comte and positivism, epistemology and ontology. We are going to discuss Auguste Comte and the law of 3 stages: the theological stage, the metaphysical stage and the positivistic or scientific stage. Even how the theological stage had 3 sub stages and namely fetishism, polytheism and monotheism. And how it made the transition to metaphysical stage and how we have made it made the transition to from metaphysical stage to the positivistic or scientific stage.

And what are the central tenets or characteristics or features of positivism? I mean, methodological, methodological monism, inductivism, systematic verifiability, how observations are pure and indubitable, fact-value dichotomy, how the unilateral relationship between observation and theory and so on.

And then we will try to compare and contrast. We will try to look at the differences between empiricism, rationalism and positivism. And then with Auguste Comte law of 3 stages, we will and then we will move on to epistemology and ontology. I mean, the way epistemology

addresses the central philosophical and political questions namely what is knowledge? What counts as knowledge? How is knowledge produced? How is knowledge generated. Ontology addresses certain central philosophical and political questions? What is being? What is existing?

Perhaps for this reason ontology also known as study of existence, nature of existence. Then we will try to interrogate the epistemology or the science. And how we have witnessed no epistemologies in its plurality, or sciences in its plurality. We will see how we will make a transition from methodological monism to methodological dualism to methodological pluralism. Subsequently, we will see in the lectures to follow. Thank you.