WHAT DOES PHILOSOPHY DO?

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One of the impacts of 'scientific revolution'[1] and the industrial revolution that followed is that the way humans seek, generate, evaluate and consume knowledge was reshaped. Scientific modernity thus generated a new 'philosophy of knowledge'. The initial indications of the new trend were exhibited through a tendency to experiment[2], by new insights into the limitations of human senses and by a stress on the need for consistency in explanations. The arrival of scientific modernity is marked by Copernicus (1473-1543) and Galileo Galilee (1564-1642). In course of time, equipments were made which revealed to us new worlds, both at the grand scale of the universe and at the micro level of existence. With the advent of technology, the work of epistemic exploration seems to have been taken over by Large Hydron Colliders, Artificial satellites and Electron microscopes thereby dethroning philosophy from its aristocratic armchair. The changing trend was very much visible in the 18th Century itself and Kant remarked in the introduction to The Critique of Pure reason that 'there was a time when Metaphysics held a royal place among all the sciences, and……. At present it is the fashion to despise Metaphysics'[3].

The priorities of academic research also underwent a corresponding change. Technology has been placed at the most favored (or most funded) end followed by science and social science, with humanities at the opposite end. We live in a discourse where technology is construed to be factual, objective and practical whereas humanities is construed to be speculative, subjective and idealistic. While technology is understood to be the need of the hour, philosophical tradition is often showcased to remind ourselves about the past glory, like the portrait of a departed patriarch.

Though invariably associated with renaissance, science and technology is not the product of renaissance. If by science what we mean is the study of nature and untangling

its mysteries, it is surely pre-historic. Primitive technology existed prior to the origin of *homo sapiens*. Evidence is mounting, which indicates that *homo erectus* had control over fire and also used stone implements. Coming to recorded history, Thales predicted a solar eclipse in 585 BC and Eratosthenes measured the circumference of the earth with a minor error of 0.16% in 3rd century BC. Susruthasamhitha, the ancient Indian text of medicine, definitely indicates surgical treatment. Musing on the wonders of nature can never be a 20th century phenomenon. Take for example the idea of Gravity. Gravity was observed by Aristotle who explained it as follows-

> 'How can we account for the motion of light things and heavy things to their proper places? The reason for it is that they have a natural tendency towards a certain position; and this is what it is to be light or heavy, the former being determined by an upward, the latter by a downward, tendency'[4].

Likewise, the structure of matter, classification of living things, internal organs of the body etc. were studied in the ancient period as well. Hence inquisitiveness in to principles of nature is not a feature of modernity. But then, in what way is renaissance associated with Science? The contribution of renaissance lay in altering the methodology of study and not in altering the subject of study. The method of studying natural phenomenon underwent a sea change with renaissance.

How did our ancestors, prior to scientific modernity, observe and study nature? Let us examine the study of matter. Democritus (460-370 BC) in Greece and Kanada (second century BC) in India speculated about atoms. In saying so, they were just speculating that anything could be divided till a point is reached where the thing becomes so small that further division becomes impossible. Any actual attempt at division might have been limited by the limits of human vision. They called this smallest possible thing an 'atom' or 'anu'. Can such a speculation be called science, or is it philosophy? Interestingly, we find that till the days of scientific modernity, what we now call 'science' was called 'natural philosophy'. The concept was so well imprinted among the elite psyche of the times that even Sir Issac Newton (1643-1727) titled his book '*Philosophiæ Naturalis Principia Mathematica'* i.e. 'Mathematical Principles of Natural

Philosophy'. Students of the history of Philosophy as well as history of Science study the same thinkers while studying pre-renaissance developments. What this generally indicates is that the same method was used, whether it is the study of natural phenomenon, mathematics or metaphysics. With scientific modernity, this method was abandoned in favor of the scientific method. We have to have a glance of the difference in these methods. But prior to venturing into the methods of philosophy, let us track the origin, growth and separation of modern science from the clutches of philosophy.

The transition to scientific modernity was not a smooth and bloodless event. There were two major hurdles which scientific modernity had to overcome. One was the orthodoxy of religion. Second one was the epistemic dominance of Aristotle and his deductive method. In 'The Structure of Scientific Revolutions', Thomas Kuhn examines whether Copernican heliocentric model of universe would have been possible in the days of Aristarchus (BC 310-230) had the Greek science been less deductive and dogmatic[5]. Both Aristotle and religion upheld the same model of knowledge, i.e. deduction, which argues that 'truths' had to be deducted from larger truths or pre-existing truths. For religion, the 'pre existing truth' was the axiomatic holy text. Further, the deductive model of reasoning had already established itself in mathematics, the queen of sciences.

But science could not work that way. Kant knew this when he talked of the limitations of Pure Reason. Methodology of Science does not confine to deduction. Prior to reaching a conclusion, science has to collect independent titbits of facts and study them scientifically. But conclusions so reached by scientific modernity often went against religious dogma and Aristotelian world view. This was not taken lightly as a simple epistemic challenge, but was viewed as a challenge against socio-political authority. Science naturally had its martyrs.

Scientific method has many ingredients and is subject to change depending on the objective. The method involves collection of data either from nature or from pre-established theories, analysis and construction of preliminary hypothesis. Predictions are made based on such hypothesis and it is verified whether the predictions work. Take for

example the existence of different species of animals with their similarities and differences which was noticed by many including Aristotle[6] who had written in length about it. However, Aristotle attributed the differences to design. But the topic was handled differently in the hands of modern science. From this observation of similarity, a hypothesis was formed that such differences are the result of evolution. The idea of evolution was very much in the air prior to Darwin but how exactly evolution took place was unknown. Jean Lamarck came up with the idea that evolution was caused by passing on the characters developed by a living organism during its lifetime to the next generation. But Darwin, in 1858, with Alfred Russell Wallace postulated that evolution is the result of 'natural selection'. In 1864, Herbert Spencer, in tune with his socio-economic view of *laissez-faire*, added the concept of 'survival of the fittest' which later provided ideological support for German Fascism and social Darwinism.

A hypothesis is strengthened by evidence and supporting facts and is weakened by lack of them. Further, it might be subjected to correction on the basis of new evidence gathered. Darwin's idea received support from studies in paleontology and genetics. Finding a fossil in the wrong strata, such as a human fossil in the Mesozoic era, would raise serious questions on the evolution hypothesis and the entire story would have to be retold. With regard to some other types of scientific conclusions, they should be reproducible in a laboratory. Hence broadly speaking, observation, formation of hypothesis, predictions based on hypothesis, verification of results, measurement, gathering of evidence, criticism, testing, modification, consistency of results etc. are at the base of scientific method. In case of inconsistency, the hypothesis is rejected or modified. This is how science progresses as a body of knowledge. It is opposed to acceptance without criticism (belief/faith) and principles laid down by authority as incontrovertibly true (dogma). What makes science attractive is its methodology which carries a semblance of democratic decision making process. It is not static and totalitarian, but is dynamic and open to scrutiny. It can be subjected to verification, debate, challenge, criticism, approval, rejection and correction.

The methods of science can be applied to the study of social phenomenon as well. Consider various topics under Sociology, Anthropology, Criminology, Archaeology, Education, Economics, Psychology, Political science etc which fall under the popular heading of 'Social Science'. They make hypothesis about human behavior at micro levels and macro levels, make predictions, test the hypothesis, makes use of scientific tools such as survey, sampling, statistical analysis, graphs and charts etc and make socio-economic and political predictions. They also correct the hypothesis based on new developments. However, unlike natural science, the focus of Social science is on improvement of the conditions of human existence. The topics classified under Social Science are akin to humanities but the method employed in the study and research of the Social sciences is scientific or quasi scientific.

Traditionally, philosophy is neither a science nor social science but is classed under the broad heading of Humanities. Like Philosophy, Humanities too lacks a universally accepted definition. Some define Humanities as the study of human conditions, some as the study of human culture and some define it as the way in which human experiences are processed and documented. Literature, Philosophy, History, Art etc are classed under humanities. There are certain aspects which demarcate Humanities from Social Science. They are

1. Social sciences employ the methodology of science where as such methods have little role to play in humanities.
2. Social Science is empirical and experimental but humanities is imaginative and creative.
3. Social Science focus on causes and quantitative explanation of the world but Humanities focus on analysis and exchange of ideas.
4. Social Science provides us with axioms, theorems and conclusions but Humanities provide us with concepts, ideas, speculations, arguments and stories.

5. Humanities connect the present to past, decides the priorities in day today life and connects us to the world around us. But social science is the study of social phenomenon.

Having considered science, let us come back to the question 'what does philosophy do'. Philosophy, like science, studies the general and fundamental nature of reality. But in doing so, scientists, both natural and social scientists, makes use of the methodology of science. They collect data, analyze them, make predictions, do experiments and come up with answers. But philosophy does it differently. The focus of philosophy will not be on collection of data or experiment, but will be on analysis on the strength of imagination and creative ideas. We have learned the methods used by science to augment its knowledge base. But what were the methods traditionally used by philosophy and humanities? On examination of the history of philosophy, many methods can be discerned, some of which are detailed below.

Logical methods- Logic helps to differentiate a correct argument from an incorrect one. Logical methods like *reductio ad absurdum* and method of contradiction were often used to bring out the inconsistencies in philosophical arguments and in mathematics as well. Sankara and Nagarjuna are two Indian thinkers who made use of logic to win arguments and establish their philosophical positions.

Deduction – This is a technique ascribed to Aristotle. Deductive logic consists in deducting conclusions from a set of premises which are already accepted as true. An argument is accepted to be valid if the structure of the argument is valid without going into the material contents of the arguments. This is akin to the method of mathematics.

Dialectical Method- The method of dialectics is associated with many thinkers including Zeno, Socrates, Aristotle, Kant, Hegel and Karl Marx. However, dialectics does not mean the same thing for all. Socratic dialectic lies in examining a concept using opposing ideas. Socrates would pretend ignorance and put questions such as 'what is virtue' to his disciples. Through the opposing points of view that emerge, the concept of virtue is made clear to the disciples. This is Socratic dialectic which is also called

Socratic irony. Dialectics is basically the progress of arguments (in Socrates), ideas (in Hegel) or society (in Marx) through the inter play of opposites whereby cruder ones give way to refined ones.

Intuition- Intuition is accepted as a method by many schools of philosophy. French philosopher Henri Bergson was of the view that absolute knowledge of a thing is possible only through intuition and that analysis brings only relative knowledge. Rene Descartes, in his book Meditations on first philosophy, refers to an intuition as a preexisting knowledge gained through rational reasoning or discovering truth of a thing through thinking about it. Intuitive perception (Yogaja) is accepted as a pramana by many Indian schools as well.

Speculation- Speculation is forming a theory without firm evidence. The theory of atoms by Democritus and Kanada is a classic example of speculation. The method of speculation is based on reason but without proper evidence. It may be noted that all great scientific ideas had a speculative phase before they were 'proved'. Erasmus Darwin, the grandfather of Charles Darwin speculated on evolution. However, it could not then be called a scientific theory without subjecting it to the process of scientific analysis.

Method of Doubt- This is ascribed to Rene Descartes. Descartes wanted to place Philosophy and the ideas of God, World and Soul at par with mathematics. Mathematics begins with self evident axioms and proceeds to deduct conclusions from such axioms. In similar manner, Descartes wanted to begin with self evident axioms of Philosophy. To accomplish such 'certainty' Descartes used the method of doubt. He found that anything and everything could be doubted except the fact that 'I am doubting'. Hence, using this method, he came to the first self evident truth or axiom of his philosophy, i.e. cogito ergo sum which means 'I think therefore I exist'. This is a very significant development in the history of epistemology since it permitted 'doubting' even those dogmas which were uncritically accepted prior to modernity.

Skepticism- Skepticism is questioning self evident principles which are taken for granted. In this sense skepticism is a scientific method as well. The empiricism of David

Hume stands as the classic example of skepticism. Take the idea of 'Self' or the existence of 'ourselves' which everyone takes for granted. Hume argues that when we introspect, we stumble at one idea or the other but can never catch the 'Self'. For empiricism, all knowledge comes from experience and since we have no experience of 'Self', it is not proved. He used the same method to refute the existence of 'substance' and 'causality' as well.

Critical Method- Critical method is nothing but critical analysis, i.e. examining the possibilities and limitations of an aspect under consideration. In philosophy, this method is most associated with Immanuel Kant. However, this is a scientific method as well. The modern method of putting forward a hypothesis and critically examining the same to validate it or to reject it is also called critical method.

The above list is neither exhaustive nor the only way to interpret the methodology of philosophy. Structuralism and post structuralism have contributed immensely to social criticism and literary criticism and are modern methods of philosophical analysis. Even in traditional methodology, some include pragmatic theory, logical positivism etc as methods. But how relevant are they as study tools in the days of 'science'. Is philosophy still relevant as a tool to study reality? Does philosophy still study atoms; does it still look into pineal gland to find out where the mind interacts with the body or does it attempt to explain the process of understanding as done by Kant? No. The task has been taken over by Physics, Chemistry, Neuroscience, Psychology etc. There was a paradigm shift in epistemology and the function of explaining natural phenomenon is no more with philosophy. Science has replaced philosophy in this aspect. It is in this sense that Stephan Hawking declared that 'philosophy is dead'[7]. But how far is this criticism true?

As mentioned earlier, the debacle of traditional philosophy began with renaissance (14^{th} to 17^{th} Century). The method of doubt upheld by Descartes (1556-1650) stated that anything could be doubted and even God need to be proved with the help of 'Reason'. This had a clear scientific tone. In the 18^{th} Century, Kant hinted that it is futile to investigate metaphysical problems like the world, soul and God since they

cannot be subjected to scientific study in the absence of sense perceptions. Hence science branched out as a special area to be investigated using special methods. But it was the Vienna circle which openly accepted the paradigm shift and assigned a new role to Philosophy. The circle stated that '*task of philosophy lies in the clarification—through the method of logical analysis—of problems and assertions*'. The circle further declared that the problems of metaphysics are pseudo problems, a position which is latent in the ideas of Kant. With the Vienna circle, the study of natural phenomenon *per se* went out of the purview of philosophy. Analysis and clarification became its new role. This is exactly what the philosophers of the current era are engaged in. Philosophy is any act of intellectual interference on the strength of logic, creative ideas and intelligent speculations aimed at clarification of problems and assertions. No area of human life, including science and technology, can be free from such creative entanglements, analysis and clarification.

Let us, for example, take the case of science itself. The term 'Philosophy of Science' might sound like an oxymoron to the ardent advocates of scientism. But philosophy has a say on the criterion, foundations, methods and implications of science. Let us come to the criterion of science. Consider two statements with the same structure-

1. 'Life on earth depends on Sun'.
2. 'Life on earth depends on God'.

Science will investigate the first proposition, but the second one is obviously outside the domain of science. But what is the criterion for such a distinction? A criterion offered by Karl Popper, known as 'falsifiability', has gained wide acceptance in philosophic and scientific circles. A falsifiable statement is one that offers an inherent possibility to be proved wrong. Statements that are not falsifiable are outside the domain of science. Consider the above statements. The first one can be experimented. Entire light and heat of sun can be removed from a controlled system and its impact on life can be verified. If life is still possible, as in hydrothermal vents, the first statement is proved false. But, if god exists, it is humanly impossible to insulate a system from the influence

of god. Hence the second statement does not provide a possibility to be proved false. Thus according to Poppers criterion, the first one is a scientific proposition but the second one is outside the domain of science.

Now consider the status of scientific truths. Are they infallible and eternal? Thomas Kuhn explains that the progress of science is somewhat similar to social progress. The existing models are challenged by anomalies and counter instances which ultimately lead to revolutions and overthrow of old paradigms whereby a paradigm shift is brought forth.

> 'One aspect of the parallelism must already be apparent. Political revolutions are inaugurated by a growing sense, often restricted to a segment of the political community, that existing institutions have ceased adequately to meet the problems posed by an environment that they have in part created. In much the same way, scientific revolutions are inaugurated by a growing sense, again often restricted to a narrow subdivision of the scientific community, that an existing paradigm has ceased to function adequately in the exploration of an aspect of nature to which that paradigm itself had previously led the way. In both political and scientific development, the sense of malfunction that can lead to crisis is prerequisite to revolution'[8].

'Scientific truths' such as Aether, Phlogiston, Calloric etc. are examples of postulates that have failed to survive. These were used to explain natural phenomenon such as propagation of light, phenomenon of burning and conduction of heat. In their days, they were as true as the structure of atoms learned by high school students of today. But they were later found obsolete in the light of new models of explanation. The obsolescence of erstwhile scientific truths raises fundamental philosophical questions on the relation between science and 'truth'. Science does not provide absolute truths. Science is provisional. Even the structure of atoms studied in schools as final facts are just postulates of the current paradigm.

Accepting the existence of scientific paradigms leads to further questions on the truth of scientific statements. When can a scientific proposition be accepted as 'true'? Is it when such a proposition jells perfectly well with the accepted truths or is it when it

works? All new scientific ideas that lacked coherence with the dominant paradigm of the times were initially rubbed off as fraud by scientists themselves. When Rontgen first explained X-ray, Lord Kelvin considered it as an elaborate Hoax[9]. This is not a singled out example but exhibits the inherent nature of paradigms to resist its debacle, just as how societies resist change. The philosophical disputes on theories of truths equally apply to scientific truths. Pragmatic theory, utilitarian theory, coherence theory, consensus theory, correspondence theory etc. have their say in scientific matters as well.

The question of the pitfalls posed by the limits of knowledge is also relevant to truth of scientific propositions. It is quite possible for the conclusions of a scientific proceeding to go off the mark in the context of unknown facts. There is a classic case, an experiment believed to have been conducted by none other than Galileo. In order to measure the velocity of light, he covered and uncovered a lantern and measured the time by which its reflection came from a mirror in a nearby hill. Since the reflection was 'instantaneous' Galileo concluded that propagation of light was instantaneous. Now it is known that light is not instantaneous, but travels at a limited velocity. In an era with no idea of things operating at nano-meters and micro-seconds, this experiment was bound to fail in spite of the fact that the method used was scientific. Any scientific model is built on known facts. It is impossible to consider the role of unknown principles in determining the result of an experiment. 'Scientific truths' are relative and contingent on available information.

Now let us investigate the claim regarding objectivity of science and its methods. While analyzing the development of scientific theories and observational bias, Kuhn clearly states how scientific theories and scientific observations are limited by the historical context and the dominant epistemology[10]. Examining the context of scientific ideas, Kuhn stated that-

> 'Examining the record of past research from the vantage of contemporary historiography, the historian of science may be tempted to exclaim that when paradigms change, the world itself changes with them. 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'[11].

Thus, like humanities, science is also limited by its epoch. Now let us have a look at the purpose of science. Since science happens in the human world, Philosophy raises basic questions on the purpose of science as well. Take for example the ethics of scientific developments. How ethical is human cloning, how ethical is it to spend on searching for extra terrestrial life when a large portion of the population is still starving and how ethical is it to develop microbes that could potentially annihilate our species, if let out of test tubes. Hence philosophical analysis finds a place at every stage of scientific development, at the level of postulation, evaluation, objectivity, methodology and also on the normative aspect.

The philosophy of symbolic logic and philosophy of Mathematics are still in infancy. Let us have a look at the objectivity of Logic and Mathematics. Take for example the infallible method of deduction. The classic example of logical deduction is often epitomized in the below argument.

All men are Mortal
Socrates is a man
Therefore, Socrates is Mortal.

The logic of the above argument is that 'conclusion' follows most logically and certainly from the first two propositions called the 'premises'. If the premises are true, then conclusion is invariably true. But it fails to show from where the premises have drawn their validity. So even in a deductive argument, the starting point is an inductive proposition (or an axiom, in the case of mathematics). Hence in the field of knowledge, there is nothing that can be called a pure deduction. This criticism is apart from new theories which track the social origins of scientific and mathematical principles. The political alignment of mathematical ideas[12], which touch at the heart of objectivity and deductive purity, has begun to be discussed.

Like deduction, induction too has its limits. The limitation is that it is not so good at providing conclusive proofs. One may count every swan in the world and come to a conclusion that 'all swans are white'. But the birth of a black swan the next day might topple the conclusion. The earlier statement will then have to be corrected as 'all swans are white except for one black swan'. However, when it comes to disproving, there is no tool to match induction. The statement that 'all swans are white' is easily disproved by inductively pointing at a black swan. The sharpness of induction lies not in proving but in disproving. This character of induction applies to scientific methods as well. Science often fails to 'prove' conclusively. Scientific explanations are not perfect explanations but should be considered as the 'best possible explanation' in the given situation. But Scientific method is an excellent tool to bring out counter instances and anomalies. Hence science does not progress by offering proofs. It progresses by postulating and negating, a sort of dialectical progress.

The question of definitions, which is central to philosophy of language, has a bearing on science as well. Take for example gravity. The features of Gravity were observed by many thinkers including Aristotle, Newton and Einstein. The former described it as a natural tendency of heavier objects to go into the earth (i.e. to the centre of the universe as it stood then). Newton described it as a property of mass. In Einstein, gravity is the curving of space-time continuum near massive objects (whatever that is!). Here, as it is clear, gravity is defined through its properties. Gravity does not get defined but it is the attributes of gravity that is being explained. Gravity still remains obscure without an ostensive definition. It is not even known whether gravity is a principle that can be subjected to ostensive definition. This is the very same problem of language which Yajnavalkya faced when asked by Ushasta to explain Brahman as 'that is immediately present and directly perceived'[13]. Like Brahman, Gravity and quantum scale particles defy ostensive definition. Here, scientific or metaphysical clarity rather becomes a problem of language than a problem in the domain of science proper.

Apart from Science, such philosophical insights also apply to branches of knowledge such as Logic, Epistemology, Ethics and Morality, Aesthetics, Language,

research methodology, Education, Politics, Economics, Sociology etc. Whenever science or any branch of knowledge comes up with questions relating to purpose, norms, methodology, aims or interpretations, parameters outside the field are brought to help. Take for example the philosophical problems of education. What is to be taught, how to be taught, whether it is right to teach science dogmatically as religion was taught in the past, the aim of education etc are topics of philosophic discussion. So philosophy has attached itself to all domains of knowledge. Without philosophy, i.e., the intervention of creative human ideas, speculation, insight, evaluation and criticism, any branch of knowledge could end up as finished example of learned error. Thus philosophy is engaged in clarification of the obscure. This is perhaps why Bertrand Russell said that 'Science is what you know. Philosophy is what you don't know'. With its critical, creative and speculative insights, philosophy throws light into grey areas of knowledge.

1. Age of Scientific revolution corresponds with the age of enlightenment, i.e. the days of renaissance. One major event that marks the beginning of scientific revolution is the publication of 'On the Revolutions of the Heavenly Spheres' by Copernicus in 1543.
2. Galilean experiment at tower of Pisa is a classic example.
3. Preface- Critique of Pure Reason. Translation F Maxmuller- Mc Millan Company.
4. Physics: Book VIII- Aristotle Complete works- Edited by WD Ross- pp-814 (PDF Version).
5. The Structure of Scientific Revolutions (2nd Edition-1970)- Thomas S Kuhn. Ch VII. Crisis and the Emergence of Scientific Theories. (But Kuhn concludes that there were other historical reasons which would have prevented such a discovery by Aristarchus).
6. Collected works of Aristotle has five lengthy chapters on Animals including history, parts, movements, progression and generation of animals.
7. Speaking to Google's Zeitgeist Conference in Hertfordshire- May-2011.
8. The Structure of Scientific Revolutions- Thomas S Kuhn. pp 92.
9. Silvanus P. Thompson, The Life of Sir William Thomson Baron Kelvin of Largs

   (London, 1910), II, 1125.
10. Thomas S Kuhn, ibid2- Ch VII and IX.
11. Ibid- pp 111

12. 'Are Science and mathematics socially constructed? A mathematician encounters post modern interpretations of Science'- Richard C Brown- World Scientific Publishing Co. 2009- Ch 10.

13. Brihadaranyaka Upanishad III-4-1&2