FEYERABENDCRITIQUE OF FALSIFICATION PRINCIPLE OF KARL POPPER: WITH SPECIAL REFERENCE TO "AGAINST METHOD" A PHILOSOPHICAL ANALYSIS

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Premkumar

Abstract

Karl Popper is known for his celebrated theory,Falsificationism. For Popper, the falsification is a successful logical formula which would help scientists to discover new laws and to make inventions. This principle is ultimately based on observation and sense experience and he argues that this formula is more valid than inductive form because of its deductive nature. For Popper, Falsifiability and predictability are the main features of a scientific theory. Popper considers that this is the successful mantra chanted in the great revolutions and advancements in history of science. With the help of this formula, he explains Copernican revolution occurs by refuting Ptolemaic theory in astronomy. Popper reduces every scientific theory into the status of conjecture and hypothesis as it solely depends on observation for its successful survival. Popper believes that his principle solves the problem of induction raised by Hume. Having done a deep analysis of history of science especially Copernican revolution, Feyerabend comes to conclusion that the falsification principle is inadequate to explain great revolution such as Copernican revolutions and he argues that as this revolution is a complex process, it cannot be explained by the simple logical formula, the falsification principle. For his argument, he shows many supporting evidences from history of natural as well as social sciences. His entire goal is to show inadequacy of the falsification principle. This paper is to analyze the arguments and evidences presented by Feyerabend against the falsification principle of Popper.

Introduction

Paul KarlFeyerabend(1924-1994), Austrian ï Born philosopher of science is best known for his idea of theoretical and methodological anarchism of science. His Magnum opus, *Against Method* (1975) primarily deals with this problem. He argues that there are no prescriptive methods and theoretical positions always used by scientists to solve scientific problems and he also contends that if we accept prescriptive methods in science, it will actually bring demerits to science, i.e., diminishing and limiting the advancement of science. Feyerabendfinds negative correlation between the established cum theoretical positions and scientific progress (scientific revolution).For greater advancement in science, he argues that a scientist must be freed from fixed theoretical as well as methodological aspects of science and he called this as ñtheoretical and methodological anarchism. He believes that this position of scientists is actually conducive to scientific climate par excellence.He tries to prove his argument is not wrong by analyzing history of science and by showing

many instances taken from the history of science. He contends that a great invention or a revolutionary turning point in scientific enterprises is to occur when there is theoretical or methodological violation of already existing rules in theories and methodologies. This violation can be calledòparadigm shiftingò in terms of Thomas Kuhnôs version.

Feyera bend criticizes severely Popper and Kuhnôs view of revolution in science, even though he is considered as a Popperian and he opines that the progress of science viewed by Popper and Kuhn is defective and imperfect. Feyerabend view on revolution of science questions the established truths or known facts existing in practice of a particular time. For him, the matter that a scientist conducts his research on the basis of known facts or established facts is not conducive to advancement of sciences.Feyerabend questions consistency criterion, i.e., results of a research of scientists should not contradict to known facts or established truths and he considers this as anti humanitarian rule. Feyerabend criticizes that falsificationism is not a fruitful to advancement of science. According to falsificanism of Popper if any scientific theory does not agree with known facts or established truths, then the theory should have been rejected. This protocol would not bring merit to science. Feyera bend highlightsthat any revolutionary theory of science would be inconsistent with known facts or established truths (Copernican theory is inconsistent with Ptolemaic theory in astronomy) .

Materials and Methods

This research paper was based on primary sources and secondary sources concerning Paul Feyerabend and especially his work, *Against Method* (1975) is the main source of this research paper. Articles in journals and Books were mainly used for collecting ideas and views on this topic. Philosophical methods such as clarification concepts and critical evaluation of beliefs were also used for this research paper.

Discussion

Falsification Principle of Popper

Karl RaimundPopper(1902-1994) is well-known for his theory of falsification. Since single instance has power to falsify the generalization made by induction, Popper prefers falsification rather than confirmation of the theory. We all believe that all swans are white till we find a black swan; when we find the black swan, the truth we believe in that all swan are white becomes false. Popper highlights that there prevails imbalanced proportion between confirmation and falsification of scientific theories. Many year belief of all swans are white are falsified when one findsa black swan in Africa. For Popper, the criterion for scientific or unscientific is based on sense experience through observation. It is very that Popperôs science is purely based on sense experience. It is important to note that Popper argues that his falsification formula is deductive in nature and he also argues that this is more valid than inductive generalization. Popper believes that If a theory is based on sense experience, it can be predictable as well as falsifiable. He shows a prediction of Einstein on theory of relativity in 1917 as a good instance for his principle. Einstein predicted that light passing close to sun ought to have its path bent by the sunôs gravitational field. Popper insists that scientists should have willingness to give up their theories if their predictions become unsuccessful. But this feature of science attributed by Popper has nor worked in the case of Copernicus and Galileo endeavors in connection to the revolution. Copernicus and Galieo had strongly believed that the truth is in their side, therefore, even though any

amount of observations, comments, ideas and opinions were against their hypothesis, they had not given up the same idea till end of the problem.

Popper strongly believe that science is not advanced by the confirmation procedures such as testing a theory and collecting positive instances supporting for it, by procedures of falsifying the theory. He avers this:

ñ é Iôve prefer this because we believe that this is the way in which we can learn from our mistakes ; and that in finding that our conjecture was false we shall have learnt much about the truth, and shall have got nearer to the truthò(Popper 2002: 231).

It is very clear that many scientists believe that their conjectures are not false even though initially they appear to be false or otherwise they cannot be given proper evidences substantiating them at present. Einsteinôs brave prediction of moving light (already mentioned) is the best example for a good scientific theory. Popper argues that conjures of scientists should always be ready to falsify the moment when they encounter negative instances through observation. As per Popper all scientific theories should undergo the procedures of Falsification because for him every scientific theory is hypothesis and not a permanent truth .Popper reduces a scientific theory into status of hypothesis and he never recognized it as a system of knowledge. For him science is a system of hypothesis. This type of thoughts are actually opposed to those of Copernicus and Galileo because they were very firm in the belief whatever observation or theory opposing to them. For advancement of science, for Popper, every scientific theory is reduces into the status of conjectures and he believes that today scientific theories have potentialities to falsify in the condition of encountering opposite observation in future. He insists that scientists should boldly state that what condition in which they give up their theories. Popper wants scientists to believe that their scientific theories may be falsifiable in future and they should always be ready to put their theories into experiment procedures if necessary. On the contrary, it is amazing that Popper believes some metaphysical theories in science which are not falsifiable but fruitful to science. For instance, beliefof God or belief of basic laws of physics. This position reveals that there are some defects in his falsificationism.

Popper considers that by falsification method he solves the problem of induction raised by Hume and he argues that this is a method of deductive logic and fruitful to advancement of science. He refers to this:

ñThe proposed criterion of demarcation also leads us to a solution of Humeôs problem induction-of the problem of the validity of natural laws. The root of this problem is the apparent contradiction between what may be called ôthe fundamental thesis of empiricismô- the thesis that experience alone can decide upon the truth or falsity of scientific statements- and Humeôs realization of the inadmissibility of inductive arguments. This contradiction arises only if it is assumed that all empirical scientific statements must be conclusively decidable, i.e., that verification and falsification must both in principle be possible. We renounce this requirement and admit as empirical also statements which are decidable in one sense only ï unilaterally decidable and , more especially , falsifiable ï and which may be tested by systematic attempts to falsify them, the contradiction disappears: the method of falsification presupposes no inductive inference , but only the tautological transformations of deductive logic whose validity is not disputeò (Popper,1959: 20).Thus , falsification principle assumes that there is no eternal truth

in the advancement of science and in body of science every theory is a conjecture or hypothesis.

The Logic of Falsificanism and Scientific Revolution

Feyerabend opines that falsification can be considered as a simple logical process occurring with scientific prediction within a ruling paradigm but applying this simple logical process, i.e., falsification principle to the great scientific revolutions such as Copernican revolution is inadequate and imperfect. Feyerabend argues that scientific revolution is a complex process and having many reasons behind it .Thus, reducing this type of enigmatic scientific event into a double -valued logic process is absurd and misguided.We all know that falsification is based on empirical test of prediction of particular hypothesis and the hypothesis will be rejected if the predictions of the hypo thesis are falsified. Thus, the falsification is based on observation of the predictions of the hypothesis. A hypothesis depends on observations for its survival. Popperian falsification principle can be symbolizedin deductive logical form as follows:

H ⟶ I H = Hypothesis

~II = True condition of the predictions

——————— ~H~I = Failure of the predictions

——————— ~H = Failure of the hypothesis

This formula is considered as deductively valid by falsificationists. As far as Feyerabend is concerned this falsification logic is inadequate to explain great scientific revolutions such as Copernicus revolution. Feyerabend opines that falsifying by refuting one observation by another is not feasible task in the case of Copernican revolution and the falsification logic fails to work against the great revolution change; why? Feyerabend tries to show that there are no different between observations of Ptolemy and Copernicus and also at the time of Copernicus the proof for the motion of the earthhas been discovered. In this back ground there is no possibility to falsify Ptolemaic system empirically. The following words of Feyerabend from his A*gainst Method reveal* the weakness and defects of Falsification logic of Popper:

ñé This certainly is not true for Copernicus and his followers in the 16th century. As we have seen, Copernicus thought the Ptolemaic system to be empirically adequate ï he criticized it for theoretical reasons. And his observations are essentially those of Ptolemy, as he says himself.

Modern comparisons of Copernican and Ptolemaic predictions ówith the factsô , i.e. with 19th and 20th century calculations, show, furthermore, that empirical predictions were not improved and actually become worse when the competing systems are restricted to same number of parameters.

The only new observations made were those of Tycho Brahe ï but they already led beyond Copernicus to Kepler. Galileoôs observations belong to cosmology, not to astronomy. They lend plausibility to some of Copernicus analogies. A compelling proof of the motion of the earth did not emerge, however, for the Galilean observations could also be accommodated by the Tychonian system.

Falsificationism- new observations refuted important assumptions of the old astronomy and led to the invention of new one. This is not correct for Copernicus and the domain of astronomy. The refutation of immutability of the heavens was neither compelling nor for the problem of the motion of the earth. Besides, the idea of the motion of the earth

was in big trouble or, if you will, refuted. It could survive only if it was treated with kindness. But if it could be treated with kindness, then so could the older system.

We see here very clearly how misguided it is to reducing the process óCopernicus Revolutionô to a single principle, such as the principle of falsification. Falsification played a role just as new observations played a role. But both were imbedded in a complex pattern of events which contained tendencies, attitudes, and considerations of an entirely different nature.ò (Feyerabend 1975:145)

According to Feyerabend falsification based on observation will not lead scientists to right directions in scientific enterprise. Feyerabend tries to prove this position by showing Copernicus and Galieoôs arguments and thoughts of the two systems and their related problems. For this purpose, Feyerabend takes many evidences and instances from works of Galileo and other astronomical works. All these reveal that falsification principle is inadequate to give a clear picture of the great revolution. The arguments and evidences produced by Feyerabend is to highlight that scientific revolution does not simply depend on the formula of the falsification principle and actually it is more complex and having many factors (political, intuitional, mythical, psychological,etc.). Feyerabend also tries to prove that science has not advanced by recognized methods accounted by historians of science. Feyerabend argues that the account of historians of science on science is to larger extent not a real picture of history of science but the most part of them is reel(not real). In this connection, Feyerabend does not agree with Popper and Kuhn on many ideas. The Copernican revolution proves that there is a need of something more than observation process to occur a revolution in science. Feyerabend argues that the something may be anything and it cannot be defined and limited.

There were plenty of theories and beliefs among the scholars and common men concerning the planetary system 15th and 16th centuries Europe those were brought from Greek in special and other ancient civilizations in general. In other words there was a lot of tension and confusion prevailed in the astronomy of this period. Galileo was in the position to give a verdict on more than thousand yearôs controversy of the planetary system.

When conflicting theories came to exist in the realm of astronomy, it is generally believed that Galileo made a crucial experiment on this sensational issue and Galileo was able to decide correct one of the two or more than two based on observation. The above account of the great scientific revolution is generally recognized by many historians and philosophers of science. Popper view on the logic of scientific revolution follows the same track and his falsification principle is based sense experience and refutation of sensation in the application of the principle. On the contrary, Feyerabendôs argument with Galileoôs owns explanations and other evidences from Galileoôs time challenged the idea of falsification formula promulgated by Popper. It is clear that Feyerabend has not been satisfied with the explanation of the revolution given by Popper and under him Feyerabend himself studied for a particular period.

Thomas Kuhn is one of the prominent figures of philosophy of science and contemporary of Feyerabendand his magnum opus *Structure of Scientific Revolution (1962*) had a great impact on the world of natural and social sciences and humanities. Feyerabendôs master piece, *Against Method*waspublished in 1975. It is important to note that Feyerabend had some discussions withKuhn on some

astronomical disputes.These events clearly indicate that Feyerabend has not expressed his all consensus with Kuhn, even though there are some arguments that both the philosophers have convergent points on the matters of dispute in history of science. However we all know that in many places of his works, Feyerabend have put severe criticisms against Kuhn and especially Kuhnôs the concept of óNormal scienceô which supports us to understand Feyerabendôs criticism of Falsification. Feyerabend more or less agrees with ideas of ImreLakatos and says he and Lakatos share same view on the significant matters of history of science.

It is obvious that conventional and logical accounts on history of science especially on the great scientific revolution have not satisfied Feyerabend in any way. He strongly believes that truthshave been concealed while illusions were revealed in connection with the revolution. It appears that Feyerabend is a revolutionary and unorthodox in his psychological features. If one goes through the work, *Against method,* it may be found those characteristics in more or less all the text. A pro-Marxist or an advocate of humanism also proves his revolutionary character. He uses many evidences from various sources and different periods to disprove Popperian criteria for science.Popper has strong dislike against Marxism and Psychological traditions of Freud and their followers. On the contrary, Feyerabendaccounts of science include all the activities and thoughts of human beings. Limited account of science appears to be misleading in the view of Feyerabend. Feyerabend argues that science is a mix product of mythology, psychology, religion, mysticism, etc. We know that a rebellion would like another rebellion. Feyerabendhimself a rebellion, therefore, it is not amazing that he likes Galileo and Feyerabend identifies Galileo as a revolutionary in his personality. Feyerabend celebrates him for his writing in Italian (vernacular) and not in Latin (Copernicus has written in Latin his book).

Popper is basically a logician and he tried to put the progress of science into certain formulas, equations and forms. One can find that Feyerabend has taken untiring effort to prove the existence of illogical and uncon ventional elements played vital role in the scientific advancements. One can realize that the entire attempts of Feyerabend are to question the validity of falsification principle of Popper. Every attempt of Feyerabend is to make impression that Galileo is not scientist who has indifferent mind for the truth, on the contrary, he (Galileo) is a rebellion led by emotions, intention and willing to prove the thesis of Copernicus. Feyerabend correctly argues that in the procedures of proving, Galileo was always not led by reason and Feyerabendraises the question ñwhyGalileo believes that telescopic view is more reliable than naked view? Even though Ptolemaic and Copernicus observations were more or less the same in nature.

Feyerabend considers that Galileo had provided reliable theoretical reason for believing telescopic observations are more correct than naked observation and Feyerabend had not accepted the explanation given by Galileo on the theory of refraction saying through which he built telescope.Bu Feyerabend finds incorrect on the reason given by Galileo and the former considers that the latter had not sufficient knowledge on optics in his time. To prove this position, many evidences are provided by Feyerabend. The following is one of them:

ñAnother meeting that became notorious all over makes the situation even clearer. About a year earlier, on 24 and 25 April 1610, Galileo had taken his telescope to the house of his opponent, Magini in Bologna to demonstrate it to twenty four professors of all faculties.

Horky, Keplerôs overly-excited pupil, wrote on this occasion. I never slept on 24th and 25th April, day or night, but I tested the instrument of Galileoôs in a thousand ways, both on things here below and on those above. Below it works wonderfully; in the heavens it deceives one, as some fixed stars (Spicavirgins, ismentioned, as well as a terrestrial flame) are seen double. I have as witnesses most excellent men and doctors... and all have admitted the instrument to deceive.... This silenced Galileo and on the 26th he sadly left quite early in the morning é not even thanking Magini for his splendid mealé .ò (Feyerabend 1975: 88)

The failure of Galileoôs telescopic exp eriment was informed for Kepler by Magini in the following words:

ñHe has achieved nothing, for more than twenty learned men were present, yet no body has seen the new planets distinctly (nemoperfectevidit); he will hardly be able to keep themò (Ibid : 88).

Due to the negative reports of the experiment of Galileo make much doubt about the thesis of Galileo in the mind of Kepler. Kepler wrote to Galileo as follows: ñI do not want to hide it from you that quite a few Italians have sent letters to Prague asserting that they could not see those stars (the moons of Jupiter) with your own telescope. I ask myself how it can be that so many deny the phenomenon, including those who use a telescope. Now if consider what occasionally happens to me , then I do not at all regard it as impossible that a single person may see what thousands are unable to seeé . Yet I regret that the confirmation by others should take so long in turning upé Therefore, I beseech you,Galileo, give me witnesses as soon as possible é .ò(Ibid: 88-89)

Galileo also has accepted the failure of his long waiting experiment. This condition is evidenced by following words :

ñé Galileo , in his reply of 19 August , refers to himself, to the Duke of Toscana, and Giuliano de Medici as well as many others in Pisa, Florence,Bologna,Venice and Padua, who, now, however remain silent and hesitate. Most of them areentirely unable to distinguishJupiter, Mars, or the Moon as a planet not very reassuring state of affairs, to say the leastò (Ibid: 89).

Feyerabendôsarguments imply that the idea of the great revolution may come from the bottom of the mind and the revolution may be a creation of intuitive part of the mind of a scientist. It may not be wrong to conceive that Feyerabend underrates the important role of sense experience and observation in the context of scientific discoveries. And he ultimately rejects the sense experience and observation which should lead us to the truth. In this connection, he remembers the features of Platonic forms or ideas. Feyerabend argues that at first the truth lies the mind of a resear cher and then the researcher seeks evidences to prove the truth whichlies hismind objectively whatever sense experience and observation may be against his truth. Feyerabend contends that this is the case of Copernicus and Galileo. The critical situation and tension of Galileo is described by Feyerabend in the followingwords :

ñé Galileo had believed for years in the truth of Copernicanism, but he had never been able to demonstrate it despite his exceedingly optimistic statements to friends and colleagues (he had not even been able to remove the refuting instances, as we have seen, and as he say himself)ò(Ibid: 104).

Feyerabend argues that as artists have no rules for their creating work and they work beyond the limitations and borders, great scientists do

the same as the artists perform. Here Feyerabend compares sciences with arts. Accordingly, it is very clear that scientists need freedom like artistswhich makes them great scientists. Feyerabend considers that falsification principle puts scientists into the trap of methodological and theoretical rules. Feyerabend considers that psychological aswell as methodological freedom of scientists are essential elements for advancement of science. He compares activities of a scientist with those of an artist in the following words :

ñInventing theories and contemplating them in a relaxed and óartistic fashionô, scientists often make moves that are forbidden by methodological rules. For example, they interpret the evidence so that it fits their fanciful ideas , eliminate difficulties by ad hoc procedures , push them aside , or simply refuse to take them seriouslyò(Ibid:148)

Feyerabend argues by citing many revolutionary theories from atomism in antiquity to modern quantum theory that those theories have emerged due to the methodological violations of their established rules.Thus,he shows many evidences from his *Against Method*and other works of him.

Conclusion

As far as Feyerabend is concerned, Falsification principle of Popper is not sufficient formula for the advancement of science. His evidences throughout this treatise, to larger extent, substantiate his thesis. For this purpose, he takes instances from vast area of knowledge. His verdict on scientific discoveries is nothing but óanythinggoesô (no rules, break the rules). His suggestions for scientists as :

ñThis is shown both by an examination of historical episodes and by an abstract analysis of the relation between idea and action. The only principle that does not inhibit progress is:óanything goesô (Ibid: 1975:14). He also insists that the right method should not depend on falsification. This idea of him is also proved by Michel Foucault on the idea of madness in history. He says:òOur idea of madness had undergone discontinuities that were essentially contingent, i.e., such changes were in no way logical or necessary, they themselves were on reasonableò (Paul Strathern 2002: 16-17). All his ideas prove that there is no definite logic or methodology toscience is the logic or methodology of science. Thus, the scope of falsification principle of Popper is too narrow to explain the great logic of science.

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