A PHILOSOPHICAL INQUIRY INTO THE BEHAVIOUR OF THE TRUTH IN SCIENCE

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Abstract

This paper examined the behaviour of truth in science with a discussion on the nature of truth which was followed by an analysis of science as an enterprise. It discussed the major characteristics of science alongside the adoption of induction as the hallmark of science. In achieving its purpose the paper focused on the behaviour of since with a considerable discussion on the theory of chaos as illustrated by some scientists. The paper, however, used Karl Popper's notion of verisimilitude as basis for its conclusion which upheld the Popperian position that science can only provide us with near true or true liking.

Keywords: Inquiry, Behaviour, Truth, Science

Introduction

Truth is a universal phenomenon. Its universality makes it a subject for philosophical discourse as philosophers seeks to validate the reality of any claim to truth. Philosophy as a second order discipline cut across all other disciplines. It is in this sense, that, we often talk of philosophy of history, philosophy of language, philosophy of law, philosophy of science among others. Each of this disciplines have their domain in which they operates and what they tend to address. Philosophy of science is one of the paramount enterprise in which the tools of philosophy is often adopted to validate the claims and fallacies of sciences. Science by it very nature is a search for the truth and scientists are at the forefront that universal truth and objective truth can be achieved via their method of inquiry and they often posit that truth and certain remain crucial in science.

This paper in it philosophical outlook therefore tend to examine the behaviour of truth in science to establish the nature of truth in science. In doing this, the paper try as much as possible to shed light on the meaning of truth using the major theories of truth, the nature and meaning of science. The paper shall also consider the concept of science as the epitome of truth through the analysis of the characteristics of science to see how viable the position of Alan Baker that the principal goal of science is to develop an understanding of the natural world by uncovering the laws presumed to govern its behaviour.[1] and its method which is

induction. This shall be followed with an assessment of the behaviour of truth in science from which the paper in its *Neo-Popperianistic* approach use the notion of verisimilitude as expressed by Karl Popper. Hence, the paper shall conclude that, truth as claimed by scientists is untenable but rather all that sciences can offer us is "truth liking" or "near true".

Conceptualizing Truth

For a better understanding of the concept of truth, there is a need to understand the word "true" from which truth is derived. True according to Advanced Learners Dictionary correspond to known facts, in other words true means agreeing with correct principles or accepted standards.[2] From this understanding of true, truth will be meaningful when define as "quality or state of being true."[3] In the view of Aristotle truth is "what is, is and what is not is false."[4] To wit the above definition of truth is to consider some theories via which the concept of truth has been elucidated such as correspondence theory of truth, coherence theory of truth and pragmatic theory of truth.

Correspondence theory of truth defines truth as correspondence between human judgment and facts. To this theory, truth refers to the relation between belief and facts.[5] Coherence theory on the other hand defines truth as a relation between judgment and the system it belongs. A statement or proposition is considered true or false by coherence theory depending on its consistency with the other group of positions that it shares the system with.[6] While pragmatic theory of truth view truth to be an affair of practical experience. It considers the truth of a proposition to be determined by its practicality.[7]

Truth from the above definitions gives credence to empirical evidence that is for any claim to be adjudged true it must correspond, cohere or entail the tenability of being practicable. In a nutshell, a proposition is only true if and only if it can be experienced. This background analysis of what truth is gives us an insight to consider what science is and see how probable or certain is the claim of scientific activities can provide us with truth as defined *ipso facto*. In lieu of this, we shall in the next moment consider what science is?

An Analysis of Science

The word science according to Aigbodioh generally means any "systematized", "organized", or "classified" body of knowledge which has been critically tested and is beyond reasonable doubt. Simply stated science means knowledge.[8] The English word science is derived originally from the Latin noun *scientia* which has its root in Latin verb *Scire* meaning "to know."[9] Great value is attached to science by Copi when he states that,

"science may be said to have great value both as practical resources and as an intellectual satisfaction."[10] Robert Morgan as cited by Aigbodioh defines science as "any activity resulting in knowledge and understanding about the world around us."[11]

Science as an enterprise has some distinct and unique characteristics that make it differ from other discipline. These characteristics as identified by Aigbodioh includes; specific, public, impersonal and objective. This paper in the next moment shall briefly discuss these characteristics one after the other.

One of the major characteristics of science is specific. By a specific we meant that science deal with particular observable or identifiable objects of this terrestrial world rather than with some abstract general ideas or beings in our world or in some ethered world. For instance, science study the properties, components and behaviour of such natural (physical) objects as water, air, space, animals all of which we can perceive with our sense of sight, smell, taste, touch or hearing. The object of science are said not to pertain to the imperceptible worlds of god and His angels, witches and wizards or platonic form. Science is said to provide us with the knowledge of our world as actually is,[12] this to some extent perhaps explain one of the distinction between science and pseudo science which is exactness of finding.

The second characteristic of science is premised on the fact that science is public. It is public because it is affirmed that their techniques and methods as well as their finding and products, rather than being esoteric, that is understandable only to a select few (who are initiated as though into a cult), are indeed exoteric, that is they are capable of being communicated and taught to the generality of persons.[13] this is more reason why it is believed that conclusion and knowledge claims in sciences are interpersonally verifiable. It is open to scrutiny. This public characteristic of science is corroborated by F. N. Ndubuisi who states that;

> Scientific knowledge and knowledge in general should in actual fact have feature of generalization. This will at least make it possible for members of the world community to have access to it. It is in line with this reasoning that it has often been said that a good experiment must be repeatable when viewed from another perspective; one will discover that there is very little that makes knowledge in science and any other specialized enterprise to be general. In terms of public accessibility.[14]

Objectivity is also one of the characteristic of science. The sciences are said to be objective insofar as their conclusios (concepts, laws and theories) are drawn directly from the hard and naked facts about the world of everyday perceptual experience.[15] Science is argued to be objective in its finding which is derivable from the fact that pure facts form the bedrock of scientific theories and discoveries. This might have informed Paul Fayerabend claims that a procedure or a point of view is "valid irrespective of human expectations, ideas, attitudes, wishes" and is mostly associated with today's scientists and intellectuals.[16]

All these characteristics of sciences confer on them the amazing power to uncover the truth about the world as it actually seem, constitutes them into knowledge par excellence. Perceived therefore as indubitable and perhaps infallible knowledge, scientific claims are said to be contrast with ideologies, strong conjectures, beliefs, opinions, metaphysics and religious articles of faith;[17] as articulated by Aigbodioh. From the definition and characteristics of science, one can be tempted to argue that it is not the case that we have truth in science all we have is relative truth, conjectures and true liking. To clarify this position, this paper in the next moment shall examine the method of science which is induction.

Method of Science

Though there is a pending debate about the method of science as regards the methodology of carrying out scientific verification, nevertheless, induction to some extent has been considered by some philosophers as the hallmark of scientific enterprise. To these set of philosophers' induction is the foundation (rock-mass) upon which science is built. It is quite obvious in our everyday life that we are indulged by inductive principle for justification. This has been for we often use inductive inferences for practice and to execute every activity we embark upon. For instance the risen of the sun from East has never been given a second thought that it may rise from North. This has been because we are over indulged by induction.

Induction as a method of science is always under probability but we assume it to be certain. For instance probability the sun will rise from the East tomorrow. In deed every assumption base on induction is non-cervitude, they are probabilistic, unlike deductive assumption which is cervitude (Certain) always e.g. 4+4=8, that is we cannot falsified deductive assumption, all deductive proposition are trivial in nature and lack information, they are empty in contents. Let consider some inductive propositions before going further on the reliance of induction as the hallmark of science.

(a) The sun rises from the East each day.

(b) All unsupported bodies fall

(c) Pure water boils at 100^0c etc.

From the above examples it is apparent that inductive proposition are not trivial, they are informative, they are futuristic, and their truths are contained in them. The comparison above makes us to recognize the differences between inductive and deductive proposition, this we intend to use to further justify our stand on the behaviour of truth in science.[18]

Of paramount interest is to mention that hypothesis is use in scientific enterprise. Thus, hypothesis has been refers to as mere conjectures (assumptions) guesses etc. put in a simple language hypothesis in science is as good as mere conjectures and opinions.[19] thus science make use of hypothesis in drawing their inductive proposition. Isaac Newton according to Ogundare argues that "these hypotheses are not formed, they come on their own, you do not calculate them, and this he referred to as *Hypothesis-non-fingo.* Hence, hypothesis is explained as each trial toward attempt certainty.[20]From the above we can deduced that induction itself is a teacher as it help us to discover which has been the soul aim of science. While Newton uses hypothesis, Rudolf Carnap on his own opines that induction is as powerful as deduction, Max black, C. S. Salmon, J. S. Mill lend a supporting hand to Carnap and concluded that induction is as strong to ascertain validity as deductive. They all talk about confirmation after verification.[21]

Dialectically opposed to induction is deduction and the proponents of the hypothetical deduction is Karl Popper who opined that induction is a mirage, myth, which is not reliable. This he presented in his falsificationism (falsification) theory where he concluded that theories and hypothesis are mere conjecture. To him truth can never be attained via scientific method. This he devoted his notion of verisimilitude to. However, Popper position has been challenge by some inductionist philosophers by explaining some ways by which induction can be justified in order to solve the primary problem of induction which is the problem of explicating the very concept of inductive evidence, this, however is not our concern here we only mention it so as to clarify our earlier position and to further enhance our understanding of the concept of induction. Otherwise this paper may lose it focus if it fails to restrict itself to the main issue it tend to address, as a result of this we shall in the next moment examine the behaviour of truth in science with a background analysis of the theory of chaos.

Behaviour of Truth in Science

Science has been construed traditionally as a truth seeking enterprise, this position is what Cohen was trying to bring to logical conclusion when he writes that; "the sciences

appears to provide the most substantial part of whatever truth mankind can attain in the modern period"[22] Nevertheless, Cohen's position has been negated by some submission as it has been herculian to identify science wholly with the search for truth, even among those that are mostly devoted to science and this is why what is true to one is false to other as obtained in Kuhn and Popper on the nature of scientific hypothesis. To substantiate this, this paper will in the next moment explore the position of Newton, Hygens, Maxwell and Planck in relation to theories of chaos with the illustrations of the 'pendulum', 'weather', 'bifurcation' and the 'non-lineal' theory as explained by Ogundare in a lecture supplementary.

Newton according to Ogundare state that light is made up of particles. This position was not challenged for a long time until Hygen's theory challenged it. In Hygen's opinion, light is a wave, interestingly, Marxwell later gave four equation on wave in support of Hygen's theory. However, in 1910, Plank reviewed Newton's theory with the positions that light is a stream of particle (photons). This position marked the beginning of 'Quantum Mechanics'.[23] Newton considered his position to be absolutely true. He was prepared to violently attack any opposition to his theory. Hygen and Maxwell too were bent on the infallibility of their theory. The different assumption of these philosophers demonstrates the relevance of the discussion of the truth of scientific theory. Following from the foregoing therefore, we can deduce that what we have is a probable solution as new discovery tends to proof the absurdity of the former.

Above position can be furthered explain using Hans Reichenbach position who explained the nature of truth in science as follow;

> While these exceptions can be taken care of by a more precise wording of the law stating the conditions of its validity and the meanings of its terms more carefully, there usually remains a doubt whether the new formulation is free from exceptions whether we can be sure that later discoveries would not reveal some limitation of the improve formulation.[24]

Explaining the theory of chaos Micheal Berry argues that, "nowadays the idea that similar but not identical causes can produce very different effects has become central to the theory of chaos.[25]Thus his idea of chaology.[26] This position of Berry was challenged by Baker who argued that, the theory of chaos as construed by Berry is a mistaken assumption. This position he explained by stating that; "many actual physical systems can be found in which simple laws lead to behaviour that is chaotic and in practice is impossible to predict for

more than a small step into the future.[27]To him chaotic systems range from weather (about which forecasters, even armed with the latest supercomputers, have a notoriously poor track record) to the paths of three or more planets of similar size orbiting around one another. In mathematical language such systems are referred to as *non-linear*…. This aspect of chaos is often referred to as "sensitivity to initial conditions", but this is a misleading weak way of describing it, for there are many non-chaotic systems which exhibit sensitivity to initial conditions.[28]

Nevertheless, Newton Smith in his relativist ideology presented to us a different picture of what truth or falsity in science should be, in establishing his position he argues;

> …what is true depends in part or entirely on something like the social perspective of the agent who entertains the hypothesis or on the theory of the agent. On this picture, as one passes from age to age, or from society to society or from theory to theory what is true changes.[29]

Following from Smith's position one can infer that the nature of scientific truth is relative. They perceive truth in terms of environment, in terms of period, and in terms of one orientation. To them there is objective criterion for ascribing truth. This view of the relativist's give credence to Popper's position who opined that evidence has no weight as against Kuhn and Lakatos who subscribed to confirmability thesis which make them argued for the necessity of the weight of evidence.

A critical examination of the theory of chaos as illustrate above to some extent proved the validity of the absurdity in the claims of scientist to truth. Truth as I have explained earlier in the part of this paper has no temporal specification. Talking of the correspondence, coherence and pragmatic theory of truth, it is absurd to say that a theory is true today, was true yesterday and will be true tomorrow. It is reasonable therefore to assert the position of Prof. Makindeas identified by Ogundare that true is 'fugitive'[30]The question that need be raise here is can verisimilitude rather than truth be the aim of science instead of discovery of truth? This shall be our next concern as we shall try to explain this using the Poperrian paradigm in his notion of verisimilitude.

Karl Popper's Notion of Verisimilitude

Karl Popper in his notion of verisimilitude which was developed from his falsificationism thesis argued vehemently that scientific statements cannot give us truth, they

can be said to be false, but they can be closer to it. He uses his verisimilitude thesis to explain the truth and falsity content of scientific knowledge is to provide us with the ways to determine which of rival theories is the best, hence recommend that our appraisal of scientific theories should be independent of factors as strength or belief, or subjective understanding and in particular, should be related in some ways to the questions of how close to the truth the theory is.[31]

By Popper analysis, it is possible to compare two or more competing theories, such as Newtonian and Einsteinian theories of gravitation, because each question to which Newton's theory has an answer, Einstein's theory also provides some answer. However, Einstein's theory may be said to have a greater content if he has an answer which Newton's does not have. In lieu of this, Einstein's theory may be said to have a greater verisimilitude. A theory with the greater content is the bolder and the riskier. Attempts are made to find it weak point in order to refute it, if it stands the test of refutation, then it is said to have a greater degree of verisimilitude not truth. He is of the opinion that to suggest that the aim of science is truth is to assume that the aim of science is reachable. If knowledge (objective knowledge) is evolutionary, then it will be preposterous to ascribe truth to any theory. In his consistency, Popper claims that "the search for verisimilitude is a clearer and more realistic aim than the search for truth, because according to him, we cannot have sufficiently good argument in the empirical sciences for claiming that we have actually reached the truth.[32]The history of science as explained in part of this paper while discussing the behaviour of truth in science depicts that, it is only by rational procedure that we move nearer to the truth, this is what Popper's verisimilitude is trying to explain.

Despite, the rigorous explanation of Popper and the plausibility adduced to his notion of verisimilitude, Jeremy Naydler in his article *The Poverty of Popperianism,* raised objection to Popper's thesis of verisimilitude. Naydler argued that the Popperian view in spite of the fact that it opens science to the impossibility of ever attaining the truth, he feel quite uncomfortable with Popper's bold assertion that truth as a goal of science is unreachable. He thinks that Popper's position against truth as the goal of science is dangerous and wrongheaded.[33]This position of Nadler was furthered buttressed by Paul Fayeraband who in his anarchism tradition opined that; "nothing is to be seen as capable of attaining final statement just as no view can ever be omitted from comprehensive account.[34]Hefurther said that, "all views are worth serious consideration. As a result, the views of the experts, laymen, professionals dilanttanti, truth freaks and even liars are all united for the enrichment of our culture.[35] Fayeraband in this view tends towards the confirmability thesis of kuhn and

Lakatos who had earlier posited that, we do not need to throw away any evidence as a result of falsifying instance as upheld by Popper. He abhors the view that the task of scientist is to search for truth as Popper advocates when he states that;

> 'or to praise god' or 'to systemize observation' or to improve production.' These are but side effects of an activity to which his attention is now mainly directed and which is to make the weaker case stronger' and thereby to sustain the notion of the whole. [36]

Nevertheless, Popper's claim in his verisimilitude thesis has demonstrates that induction which is claimed to be the hallmark of scientific enterprise does not rest upon solid rock and that through science via induction we could not get to the truth all will can attain probably is 'near true' or 'true liking'.

Conclusion

Having discuss the meaning of truth, science and its characteristics, the method of science and the identification of its primary problem, considering the nature of behaviour of truth in science and the theory of chaos which was used to substantiates the behaviour of truth in science as well as Popper's notion of verisimilitude, this paper pitch its tent with Popper that all we can have in science is true liking or near truth. There is no absolute truth in science rather the behaviour of truth in science is subjective, relative, erratic and perhaps probable. In the final analysis, we shall recommend that instead of accepting induction as the hallmark of scientific enterprise, refutability and falsification should be considered as argued by Popper. Hitherto the debate about the behaviour or nature of truth in science to us remain open-ended, therefore we do not stand to refute any objection to this position of ours. Hence, we have also agreed that the nature of scientific truth is open-ended; therefore our submission is also open to refutation.

Notes and References:

Alan Baker, "The New Science of Complexity", in Helen Lauer (ed.) *History and Philosophy of Science For African Undergraduates,* (Ibadan: Hope Publications), 373.

A. S. Hornby, *Oxford Advanced Learner's Dictionary of Current English, 6th ed.* (Oxford: Oxford University Press, 2000), p.1283.

A. S. Hornby, 1285.

I regret my inability to attribute this position to Aristotle properly.

Kolawole A. Owolabi (ed.), *Issues and Problems in Philosophy,* (Ibadan: Grovacs Network, 2000), 60.

Kolawole A. Owolabi (ed.), 61.

Kolawole A. Owolabi (ed.), 61.

Jack A. Aigbodioh, *Philosophy of Science: Issues and Problems,* (Ibadan:Hope Publications, 1997), 1.

Jack A. Aigbodioh, 8.

I. M. Copi, *Introduction to Logic,* (New York: Macmillan Publishing Co. Inc, 2001), 539.

Jack A. Aigbodioh, 1.

Jack A. Aigbodioh, 3-4.

Jack A. Aigbodioh, 4.

F. N. Ndubuisi, *Contextual Issues in Scientific Philosophy*, (Lagos: Panaf Press, 1997), 48.

F. N. Ndubuisi, 4.

Paul Fayerabend, *Farewell to Reason,* cf. Aigbodioh, 4-5.

See Jack A. Aigbodioh, 5.

This position is derived from Dr. Z. B. Ogundare Lecture Supplementary on Philosophy of Science, (Unpublished).

Jack A. Aigbodioh, 39.

This aspect was discussed by Ogundare in his Unpublished Lecture Supplementary on Philosophy of Science.

See Z. B. Ogundare (ed.), *Language of Philosophy and Logic,* (Ibadan: Ar-ridaa Graphics, 2005), 93-94.

R. S. Cohen, "Constraints in Science", in *Boston Studies in the Philosophy of Science Essay in Memory of Lakatos,* cf. F. N. Ndubuisi, 48.

This point was discussed by Ogundare in his Unpublished Lecture Supplementary on Philosophy of Science.

Hans Reichenbach, *The Rise of Scientific Philosophy*, (London: University of California Press, 1951), 28.

Micheal Berry, The Study of Empirical Laws that Determine Unpredictable Events", in Helen Lauer.

Micheal Berry.

Micheal Berry, 373.

Micheal Berry, 373.

Newton Smith, *The Rationality of Science*, (London: Routledge and Kegan Paul, 1981),

All point raised here has been discussed by Ogundare in his Unpublished Supplementary on Philosophy of Science.

Paul Fayeraband, *Against Method*, (Great Britain: The Thelford Press Ltd., 1984), 30.

Paul Fayeraband, 30.

Paul Fayeraband, 30.