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Karl Popper and the production of scientific knowledge through the non-recognition of the sacred

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Abstract

Africa is a geographical space where the "impossibilities" are given sacred status. Some occurrences are attributed to one or more sacred or spiritual entities whose intervention or presence can never be questioned. Whoever interrogates such a force is often seen as either abnormal or irresponsible. More often than not, one is bound to ask: Where are the intellectuals whose ideas should be able to remove these biases or veils from the minds of people? But the unfortunate thing is that they too are involved in this despondency. The fundamental problem here is that there is underdevelopment everywhere especially as it relates to science. But Popper had a different idea in mind. His idea is that science flourishes more where nothing is sacred. So, what has Popper done to ensure that sacred entities are overlooked while espousing scientific ideals? Leveraging on the critical method, which is an exercise of careful judgment or evaluation, this work demonstrates that scientific progress is a product of deconstruction of the spiritual aspect of reality. This work will be of benefit for humanity because it will, with instances, show that progress is a product of falsification of the products/processes of the sacred.

Key Words: Science, Knowledge, Sacred, Induction, Deduction, Falsificationism

Introduction

Several factors led to the choice of this topic. The first one is that in almost all parts of Africa, the spiritual is always given high premium. The second factor derives from the first one, and it is the fact that whatever happens is always given spiritual or religious interpretation, hence Platvoet and van Rinsum (2003) asked: Is Africa incurably religious? This has led the writers to place the ideas of Popper and some notions that hinder scientific development in Igbo-African society side by side to determine where the Igbo-African got it wrong. This comparison can be seen by some as being harmful as well as Eurocentric. But the answer that can be proffered here is that if employing the ideas of Popper can help in alleviating the African condition, then it is worth it. Popper was of the view that science flourishes more where nothing is sacred. Popper's idea that science flourishes more where nothing is sacred runs against the Igbo-African conception of reality. From the standpoint of the Igbo, Popper's notion is a blind project.

This is because the Igbo-African believes that there are spirits in everything (Nwala, 2010:51). These spirits are so sacred that people hardly go against their wishes. The problem is located in how the Igbo can reverse this long-held view of not trespassing the spiritual boundaries. This is necessary as it will help in reengaging the psyche of the Igbo in making him understand that too much belief in the spirits is a harbinger for foreclosure of knowledge. Belief in the spirits leads to despondency where one surrenders his will-power and literally begins to wait on the spirits to do everything for him/her. The thesis asserted by this study is that Igbo-Africans should find a way of adjusting their belief in the spirits to align with Popper's view or look for a better indigenous approach which they will use to guide their scientific discourse. The critical method as used here will lay bare Popper's ideas, juxtapose it with the Igbo ontological belief in the spirits and through the lenses of Popper find out the reasons for the retrogressive nature if Igbo-African science. Data for this work was obtained from books, journals, periodicals, and the internet.

Literature Review

This review of literature begins with the extraordinary revolution of Thales. This revolutionary process was not even initiated by Thales but by Antief of Egypt who defined the philosopher as one whose heart is informed about things which could otherwise be ignored (Nwala, 2010:5). But our reference to Thales was informed by the way he abandoned the idea of the gods and held that the basic stuff of reality was water.

Before Thales, Milesians accepted without questions the answers they have been given by religious authorities. Milesians trusted religious authorities the way young children trust their parents (Kolak, 1997:8). It was not only that they merely believed what the priests said, it never occurred to them to question their authority (Kolak, 1997:8). As far as they were concerned, the knowledge of the priests came directly from God. Then someday, a priest, famous throughout the whole of Asia Minor for his wisdom and great deeds announced that he would reveal the ultimate truth about all things. People came to listen to him and Thales appeared. There and then, he told them that everything was made of water. Aristotle (1991a) called Thales the "initiator of philosophy". Writing on Thales, Aristotle said that;

> Thales, the founder of this school of philosophy, says that the principle is water (for which reason he declared that the earth rests on water), getting the notion perhaps from seeing that the nutriment of all things is moist and that heat itself is generated from the moist and kept alive by it (and that from which they come to be is a principle of all things). He got this notion from this fact, and from the fact that the seeds of all things have moist nature, and that water is the origin of the nature of moist things.

Composta (2008:17) quoted Theodore Gomperz, who after having affirmed Thales' detachment from myth, salutes him as "a happy precursor of Lavoisier." Aristotle (1991b) wrote, in one of his treatises, that "all teaching and all intellectual learning come from already existing knowledge." It is worthwhile to note that most existing knowledge traditionally stemmed from culture with religious bias. The Aristotelian conception of knowledge (or *scientia*) restricts the domain of what is knowable to what is necessary and cannot be otherwise. This is deductive and such knowledge is always strict in arriving at a conclusion.

Generally, for Composta (2008:15) the Greeks attached more importance to deduction as a source of knowledge than modern philosophers do. Aristotle believed that the only way a person could understand anything was through deduction. He went further to say that one can also understand through demonstration. Aristotle (1991b) wrote, "By demonstration I mean a scientific deduction; and by scientific deduction I mean one in virtue of which, by having it, we understand something." By implication, for one to have any demonstrable scientific knowledge, such knowledge must come by way of deduction. This is because it is necessary for demonstrative understanding in particular to depend on things which are, "true and primitive and immediate and more familiar than and prior to and explanatory of the conclusion"(Aristotle, 1991b).

Francis Bacon (2003), argued that Aristotle's logic was unsuitable for the pursuit of knowledge in modern age. Accordingly, he propounded a system of reasoning to supersede Aristotle's and is suitable for the pursuit of knowledge in the age of science. Where Aristotle's inferential system based on syllogisms could reliably derive conclusions which were logically consistent with an argument's premises, Bacon's system was designed to investigate the fundamental premises themselves. Aristotle's logic proposed certainty, based on incontrovertible premises accepted unquestioningly as true; Bacon proposed an inductive inference, based upon a return to the raw evidence of the natural world. From painstakingly collected assemblages of data, the scientific investigator would use *The New Organon* or new instrument to nudge his way gradually towards higher probability. The process of induction would finally allow mankind unlimited powers to control the natural world not by coercion but by complete understanding:

> For man is nature's agent and interpreter; he does and understands only as much as he has observed of the order of Nature in work or by inference; he does not know and cannot do more. No strength exists that can interrupt or break the chain of causes; and nature is conquered by obedience (Bacon, 2003:xiv).

What distinguishes the New Baconian view of science from that of his predecessors is, indeed, his clear commitment to the role of observation and experiment as a prerequisite for the construction of scientific theory itself.

Like Bacon who said that a new beginning (to learning) has to be made from the lowest foundation, Descartes (1968) like many of his contemporaries said that as soon as he finished the whole course of studies at the end of which he was admitted among the ranks of the learned, he found himself embarrassed by so many doubts and errors. Having been inspired by Bacon that the entire work of the understanding must be begun afresh, he said that the right method must be used in the search of truth. According to Descartes (1968:21), for certain and indubitable knowledge to occur, a number of steps must be taken to enable men establish this.

These steps include:

1. Never to accept anything as true if one does not have evident knowledge of its being so.
2. Divide each problem into as many parts as possible as that is the basis of its solution.
3. Directing ones thought in orderly way beginning from the simplest ideas to the complex ideas.
4. Making complete enumerations and general surveys that nothing will be left out.

For Descartes, his kind of philosophy is one that allows no mistake. Once the steps are followed, it means that certain and indubitable knowledge is assured.

Another change in the scientific universe came in one of the writings of Leibniz. Leibniz (1973) made an improvement over the Cartesian system. He began with a marriage between the Cartesian concept of extended, continuous substance and the atomists' concept of reality in terms of simple, indivisible, eternal units – atoms – but according to their essentially materialist conception, the atoms are lifeless lumps of matter. Leibniz (1973:5) started by saying that the principles of science are dogmatic and historical. He said that science, "also includes ontology or the science of something and nothing, being and not being, the thing and its mode, and substance and accident" (Leibniz, 1973:6). The departmentalization of the science does not matter because all the sciences are continuous body, like the ocean. In this world of science, there is a certain

Unity which is dominant. That which is dominant is the monad. For Leibniz, there is nothing real in the world save the monads and their representations which are ideas and perceptions. *Monas* is a Greek word which signifies unity or that which is one. According to Leibniz, "The *monad,* of which we shall speak here, is nothing but a simple substance which enters into compounds; *simple,* that is to say, without parts." Leibniz (1973: 179).

On his part Nicolaus Copernicus (1543) offered an explanation of the possibility that the sun, not the earth, is at the centre of the solar system. The public was shocked as when Thales said that everything was made of water. Before Copernicus, almost everyone believed that the earth did not move and that the sun, the moon, the stars, all revolved round the earth. It is true that most people believed in geocentric universe. This belief was not held because of religion or superstition. They believed it because that was what their senses told them. Their reason also confirmed it. Copernicus said he was compelled to a different system of deducing the motion of the universe's spheres for no other reason than the realization that astronomers do not agree among themselves in their investigations of the subject. It was based on this that he undertook the task of rereading the works of past philosophers to find out whether anyone had ever proposed other motions of the universe's spheres than those expounded by the teachers of astronomy in the schools.

In Cicero, Copernicus (1543:Preface) found that Hicetas supposed the earth to move. Plutarch also held that the earth moved. According to Copernicus, Plutarch wrote that while some thought that the earth remained at rest, Philolaus, the Pythagorean believes that, like the sun and moon, the earth revolves around the fire in an oblique circle. Also, Heraclitus of Pontus and Ecphantus the Pythagorean made the earth move, not in a progressive motion, but like a wheel in a rotation from West to East about its own centre. It was when he had read these sources that he began to consider the mobility of the earth. The point we are focusing on is that what Copernicus did under the employ of the Church was to generate alternative hypotheses and theories. This Copernican revolution really influenced many ideas and many changes started occurring in the scientific world. Such influence had serious effect on Charles Darwin who moved from the long held view of creationism to evolutionism. It should be recalled that the pre-Socratics like Thales, who has been examined, looked for natural explanations of the processes of nature. They distanced themselves from ancient mythological explanation.

Charles Darwin (1958) had to distance himself from the Church's view of creation of man and beast. Darwin was a biologist and a natural scientist. He was the scientist of recent time who has most openly challenged the Biblical view of creation. Darwin advanced two theories. First, he proposed that all existing vegetable and animal forms were descended from earlier, more primitive forms by way of biological evolution. Secondly, he said that evolution was the result of natural selection. This he did when he saw the actual mechanism behind the evolution of species in his theory of artificial selection.

> Can it, then, be thought improbable, seeing that variations useful to man have undoubtedly occurred, that other variations useful in some way to each being in the great and complex battle of life, should occur in the course of many successive generations. If such do occur, can we doubt (remembering that many more individuals are born than can possibly survive) that individuals having any advantage, however slight, over others, would have the best chance of surviving and of procreating their kind? (Darwin, 1956:87&88)

One can say that the 'raw material' behind the evolution of life on earth was the continual variation of individuals within the same species, plus the *large number* of progeny, which meant that only a fraction of them survived. The actual 'mechanism' or driving force behind evolution was thus the natural selection in the struggle for survival. This selection ensured that the strongest, or the 'fittest', survived. Darwin's ideas were received amidst controversies. The church protested vehemently and the scientific world was sharply divided. That was not surprising; after all, he had distanced God a good way from the act of creation.

The disagreement among these philosophers led to a dead-end in this discourse. Hence Popper's ideal in scientific discourse was brought in to interface with the Igbo scientific culture so as to probably understand the reason(s) for the failure of the later.

Popper's Philosophy of Science

Karl Popper had a considerable influence in philosophy of science during the 20th century and many scientists took up his ideas. His interest in philosophy of science began with the search for a demarcation between science and pseudo-science. He tried to work out what the difference was between theories he greatly admired in physics, and theories he thought were unscientific in psychology and sociology, and came to the conclusion that part of the reason people erroneously thought that mere pseudo-sciences were scientific was that they had a mistaken view about what made physics scientific. This was because scientists still strongly believed in induction and had not realized what falsificationism was.

His Dethronement of Induction and Enthronement of Falsificationism

Popper (1969a) argues that his solution to the problem of induction is simply that induction does not show that scientific knowledge is justified. This is because for him science does not depend on induction at all. Popper pointed out that there is a logical asymmetry between confirmation and falsification of a universal generalisation. The problem of induction arises because no matter how many positive instances of generalisation that are observed, it is possible that one instance can falsify it. He argued that science is fundamentally about falsifying rather than confirming theories, and so he thought science could proceed without induction because the inference from a falsifying instance to the falsity of a theory is purely deductive. Hence, his theory of scientific method is called falsificationism. He argued that a theory that was, in principle, unfalsifiable by experience was unscientific.

Having distinguished between falsifiable and unfalisifiable hypotheses, Popper argued that science proceeds not by testing a theory and accumulating positive inductive support for it, but by trying to falsify theories. The true way to test a theory is not to try and show that it is true but to try and show that it is false. Once a hypothesis has been developed, predictions must be deduced from it so that it can be subjected to experimental testing. If it is falsified, then it is abandoned, but if it is not falsified, this just means it ought to be subjected to ever more stringent tests and ingenious attempts to falsify it. So what we call confirmation is, according to Popper, really just unsuccessful falsification.

> Falsificationists like myself much prefer an attempt to solve an interesting problem by a bold conjecture, even (and especially) if it soon turns out to be false, to any recital of a sequence of irrelevant truisms. We 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 truth. (Popper, 1997:320).

This is why Popper's methodology of science is often called the method of conjectures and refutations. 'Bold' conjectures are those from which we can deduce the sort of novel predictions discussed above. According to Popper, science proceeds by something like natural selection and scientists learn only from their mistakes. There is no positive support for the fittest theories, rather they are just those that repeatedly survive attempts to falsify them and so are ones that are retained by the scientific community. It is always possible that our best theories will be falsified tomorrow and so their status is that of conjectures that have not yet been refuted rather than that of confirmed theories.

Popper (1969b) demands of scientists that they specify in advance under what experimental conditions they would give up their most basic assumptions. For him, everything in science is provisional and subject to correction and replacement:

> We must not look upon science as a 'body of knowledge', but rather as a system of hypotheses which in principle cannot be justified, but with which we work as long as they stand up to tests, and of which we are never justified in saying that we know they are 'true' or 'more or less certain' or even 'probable' (Popper, 2002:318.

Like Descartes held, the view that knowledge must be certain, a matter of proof and not subject to error has a long history in philosophy. However, from Popper, we learnt that we should always have a critical attitude to our best scientific theories.

Popper and the Non-Recognition of the Sacred

Popper therefore, fully endorsed the philosophical position known as falliblism according to which all our knowledge of the world is provisional and subject to correction in the future. Whereas falliblism holds that no beliefs are so well justified by good evidence that they cannot be false, falsification proposes that for something to be scientific, it must be able to be proven false. His theory of knowledge is totally anti-authoritarian and this is linked to his critique of totalitarian systems of government. In his view, the project to create ideal societies proposed by the likes of Plato and Marx demanded rigid adherence to a single fixed ideology and the repressing of all dissenting views. Popper did not like this idea. This was because for him, this was authoritarian in nature. On the contrary, Popper thought that science flourished in an atmosphere where nothing is sacred and scientists can be extremely adventurous in the theories they propose. It was in the light of this that Lakatos (1969) explained that according to Popper, 'virtue lies not in caution in avoiding errors but in ruthlessness in eliminating them". This is in line with the familiar idea that scientists should be ready to challenge any dogma if experiment demands it.

It is important to note that, unlike logical positivists, Popper did not offer a way of distinguishing from meaningless statements and then argued that pseudo-science is meaningless. On the contrary, he thought that only what is falsifiable was helpful and productive even within science. Hence, he did not think that unfalsifiable metaphysical theories ought to be rejected altogether, for he recognised that sometimes, scientists might be inspired to make interesting body conjectures by beliefs that are themselves unscientific. So, for example, many scientists have been influenced by their belief in God, or by their belief in the simplicity of the basic of physics, but clearly neither the proposition that God exists nor that the fundamental structure of the world is simple, is falsifiable by experience. Popper's theory of the scientific method allows such beliefs to play a role in scientific life even though they are not themselves scientific hypotheses.

Popper agreed with Kant who he said used the word 'subjective' to refer to some internal dispositions of the scientist that affect his/her ideas (Popper, 1969:23). So, he emphasized that scientists may draw upon diverse sources of inspirations, such as metaphysical beliefs, dreams, religious teachings and so on, when they are trying to formulate a theory. But according to him, the kind of speculation and imagination that scientists need to employ cannot be formalized or reduced to a set of rules. In a way this makes the sciences closer to the arts than they might otherwise seem. On the other hand, the sciences differ from the arts in being subject to testing by experience and this must be the final arbiter of any scientific dispute. Popper thought that the task of philosophy of science was to undertake the logical analysis of the testing of scientific theories by observation and experiment rather than to explain how theories are developed.

Context of Discovery and Context of Justification

In Popper's view, there are two contexts in which we might investigate the history of science and the story of how certain theories come to be developed and accepted. They are the context of discovery and the context of justification. The view accords with an intuition about the autonomy of ideas from the people that have them. In general, the evidence in favor of a hypothesis is independent of who believes it and who does not, and whether an idea is really a good one is not at all dependent on whether it is a genius or a fool who first thinks of it. It seems plausible to argue than evaluation of the evidence for a hypothesis ought to take no account of how, why and by whom the hypothesis was conceived. Some such distinction between the causal origins of scientific theories and their degree of confirmation is often thought to be important for the defense of the objectivity of scientific knowledge.

If we assume the distinction between the production of scientific theories and their subsequent testing, then we need not be troubled by the problems Bacon's theory of scientific method faced with the impossibility of freeing ourselves of all presuppositions when making observations, and the need for scientists to use background theories in the development of new ones. In fact, Bacon himself distinguished between 'blind' and 'designed' experiments and suggested that the later were more useful in science because they will allow us to choose between two rival hypotheses that equally account for the data we have so far. The idea is that scientists, faced with a choice between two seemingly equally good rival theories ought to construct an experimental situation about which the hypotheses will predict different outcomes. This is just the sort of thing Popper emphasised.

Conclusion

Philosophers like Plato and Marx in their attempts to create ideal societies demanded strict adherence to single fixed ideology. Their suppositions in this respect align with the deduction of Aristotle with fixed conclusion. But Popper, on the contrary, thought that science flourished in an atmosphere where nothing is sacred and scientists can be adventurous in the theories they propose. The Igbo-African predicament, the writers think, is a result of non-compliance with Popper's view.

The Igbo-African environment is full of spirits (Nwala, 2010:51). Spirits are noticed in every facet of their life: shops, work places, farms and so on. This idea of spirit-filled environment has so much influenced and beclouded some Africans. This was noticed early by Emeka Ojukwu in his description of the African man's God. His God is a God that is feared by His people. Accordingly, Ojukwu created a difference between the African man's God and the Whiteman's God:

> ... the Blackman's God is a God of retribution; awesome, unapproachable and merciless. The Whiteman's God is God of love, mercy and forgiveness. From there, it is not hard to see how the black became inhibited in his confrontation with natural phenomena, while the white felt encouraged to explore and conquer the natural phenomena that surround him. (Forsyth, 1982: 136).

From this, one can notice that the nature of the African man's God prohibits him from doing certain things because he thinks he might be punished along the line. But the Whiteman has a God who does not punish him when he explores nature. Consequently, there is a whole world of difference between the Black man and the Whiteman in terms of development. Ojukwu went further to drive his point home with an analogy:

> The Blackman faced with a strange mountain, quickly turns his back on this terrifying monster, seeks out a calf from his miserable herd and begins the regular sacrifice to the god of the mountain. Very soon the mountain has become sacred and therefore impenetrable. His white counterpart would be fascinated by the spectacle of the mountain, but his reaction would be to climb it, on its summit to domesticate the landscape, on its flank to sow his crops and in its entrails to mine for minerals. The Blackman in history, considering himself unworthy of God, has tended to leave creation as it stood, easily satisfied; the Whiteman, considering himself the favourite of God, has the ages continually questioned Creation, and never hesitated to bend it to his will and his advantage. (Forsyth, 1982:136-137).

Ojukwu (though some may see this as an appeal to the wrong authority, as most people know only about his military life, but he was a historian and also a popular Nigerian of Igbo extraction) concluded by saying that these two different attitudes led to the technological gap between the whites and the blacks. This is a demonstration of the fact that the sacred plays serious role in both the scientific and technological development of a country. But Africans can adopt what the Indians did. In India for example, a big wild animal of the antelope family known as the *Nehil Gae* was causing extensive damage to crops in the field. But the farmers would not harm it because *Nehil Gae* means *Blue Cow*, and the cow is sacred to the Hindu. So the Indian government changed the name to *Nehil Goa* which means *Blue Horse*. Horses are not sacred, and so now can be killed to protect the crops. (Christian, JL,1973).

So, the only option left for Africans is to, like the Indian, do away with certain impedimenta that come from the sacred sphere of life and that way they will have some improvement in the scientific sphere.

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