

## The Problem Of Demarcation Between Science And Non-Science

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### Abstract

Science can be defined as a systematic study of the knowledge of reality. This definition is all embracing that any body of knowledge could qualify as science. This emanates from the fact that every discipline claims that its subject matter is studied in a systematic order.

But this is not the sense that is employed today when we refer to science. What is designated as science nowadays are the disciplines which make effort at providing exact, testable, reliable, and objective information about the world. Accordingly, the non-science is almost a direct opposite of this, with this mind-set come the prevailing discrimination between what qualifies as science and what does not. The current attitude pervades the entire society, parents and students inclusive. And this perhaps to a great extent, shape the perception of the people including career choices.

One effect of this is obsession for the scientific enterprise which often times leads to dogmatism.

This, study is therefore set fort both as a rejection and protest against dogmatism in the science. To put forth its thesis the study argues that science did not begin in a void but could have emerged as a result of some form of response to problems. If this perspective is correct, the aims of the other bodies of study/knowledge cannot be any less as both the former and the latter have the value to promoting human need and well-being. After all, the cognitive process is not only a means of acquiring knowledge but that of gaining power.' The sciences and the non-sciences alike are both sources of this power gain. However, in all its expression, the study neither diminished the importance of the science nor disparaged the other areas of study which could be classified as non-science. It is the point of view of the study that the world especially humanity, would be better in a synergy between all bodies of knowledge.

### Introduction

The theme of this study is the specific domain of the philosophy of science, which studies the philosophical assumptions, foundations, and implications of science, including the formal science, natural science and social sciences<sup>1</sup>. In this respect the philosophy of science is closely related to epistemology and the philosophy of language<sup>2</sup>. The focus of the study, the problem of demarcation between science and non-science is usually a very knotty issue. This is so because it is fraught with controversy. The controversy emanates from the discordant

opinion on what constitute science and what it is not. However, the attempt here entails untying these knotty issues through a clarification scheme adopted in the analysis of the research.

This course of investigation is guided by the prevailing objective of the research which is located in offering a broad-based view of the characteristic features of science. With this comes an understanding that enables any person for that matter, to properly demarcate between science and non-science as well as identify places of overlap.

In doing this, we shall classify science and non-science, mode of their investigation, the nature of their result etc. Views of notable scholars on matters concerning the scientific enterprise shall also be entertained up to the point where they yield to the understanding of the on-going discuss. This aligns to the methodological approach of the research. And the method includes the three approaches to the examination of philosophical problems namely, the analytical, prescriptive and speculative.

The analytical method or philosophical analysis is concerned with the proper use of language in any discuss, hence, our understanding of philosophical issues as well as their intelligent examination depends largely on our ability to understand the proper use of language. In this vein, attempts are made to analyze and clarify the central concept of this study, i.e. the problem of demarcation between science and non-science and its implication for society.

The prescriptive method seeks to establish standards for assessing values, judging conducts and appraising situations. This method enabled this study to appraise the method of the sciences vis-à-vis the method of non-sciences. With this, we were able to make a comparative analysis of the two fields of inquiry and identified their benefits to the society.

The speculative method according to Eresia-Eke<sup>3</sup> employs or dwells on the construction of coherent views on everything that humanity contemplates. It tends to see the world as a conglomeration of systems with the universe representing the largest system of which all others are a part. This method provides a systematic thinking which attempts to account for events that occur in or on systems that exist as part of a larger whole. It is not interested in probing the meanings of words or setting and making value judgments. Instead it tends to observe events or phenomena and recommend solutions to them and other societal problems. With the aid of this method, the study was able to suggest remedies that will help society overcome the pitfalls of an overtly attachment to one mode of the search for certainty of knowledge or truth. After all, philosophy generally, is the endeavour to systematize knowledge and behaviour into a coherent and logical structure, and this cannot be the function of anyone mode of inquiry.

The materials used in this study were largely adopted from the works of scholars in the area of philosophy of science, bioethics and science studies, especially those with relevance to the theme of the study. On the reliability of the materials used, we state that no statistical procedure was employed in the study.

In this respect, the use of research instruments becomes irrelevant. The research materials and approaches used can be considered to the extent that they are analytically consistent with expressions of the philosophy of science.

### **Theory of Radical Interpretation**

This theory was made popular by an American philosopher, Donald Davidson. It is the interpretation of a speaker without relying on any specific prior knowledge of the mental

states of the speaker. It involves rather attributing beliefs, desires and meaning to the expressions of the speaker from the scratch without guide from translators and dictionaries.

The importance of this theory to the study is that the interpretation given to what science is, is not solely dependent on the popularly held view of its meanings. Rather than this, our point of departure is to offer a broad-based interpretation of what science is. To do this, we are attributing beliefs, desires, and meanings to the originally held view of science. The import of this approach is that instead of attempts to conform to an established method of “seeing”, of “doing” and of “stating” things, we have initiated a “paradigm shift” from the old and dogmatic order to a new progressive one thereby liberating science from all forms of limitations. It is important to do this because conforming to the old order means going through life imprisoned in the prejudices derived from common sense, from habitual beliefs of ones age or nation, and from convictions, which have grown up in ones mind without the cooperation or consent of ones deliberate reason. To such a person, the world tends to become definite, finite, obvious, common objects rouse no questions, and unfamiliar possibilities are contemptuously rejected.

Setting science free from all prejudices does not entail ridding it of its value or prominence rather what we seek for it is co-operation with other known bodies of knowledge for an enhanced development of human society. This is of great value because definitely, society is also in dire need of the truth that is embedded in the other bodies of knowledge.

In order to effectively promote and guide the understanding of the subject of discuss, we start with a list of some criteria that would enhance the recognition of the difference between what is science and what is not science. These criteria differentiate scientific statement from non-scientific ones and were developed by science educators in Iowa and found acceptable by several Midwestern high school biology teachers<sup>4</sup>.

### **Characteristics of Science**

The six criteria of science as put forth by the science educators include the following; Consistent, Observable, Natural, Predictable, Testable, and Tentative. The order of placement is not important, but the acronym “CONPTT” makes a good long term memory hook.

1. **Consistency:** The results of repeated observations and or experiments concerning a naturally occurring event (phenomenon) are reasonably the same when performed and repeated by competent investigators. The event is also free from self contradiction; it is consistent in its applications. The weight of the evidence is also compatible with well established observations and limits.

**Reality check 1:** Based on the idea of consistency above, which of the following is a scientific statement and which one is not?

- i. Green plants will grow towards the source of light.
- ii. Walking under a ladder will cause bad luck.

2. **Observability:** The event under study, or evidence of the occurrence of the event, can be observed and explained. The observations are limited to the basic human senses or to extensions of the senses by such things as electron microscopes, Geiger counters, etc. If the phenomenon cannot be reproduced through controlled conditions, natural evidence of the events occurrence must be available for investigation.

**Reality check 2:** From the sense of observability explained above, which of the two statements below is scientific and which one is not?

- i. Some plants eat meat
- ii. Extraterrestrial beings have visited earth.
3. **Natural:** A natural cause (mechanism) must be used to explain why or how the naturally occurring event happens. Scientists may not use supernatural explanations as to why or how naturally occurring events happen because reference to the supernatural is outside the realm of science. Scientists cannot in this direction, conduct controlled experiments that are removed from nature but located in the metaphysical plane.  
**Reality check 3:** From the dimension of the natural criterion, which of the following is a scientific statement?
  - i. Green plants convert sunlight into energy
  - ii. With a rod, Moses parted the sea so his people could cross to the other side.
4. **Predictability:** The natural cause (mechanism) of the naturally occurring event can be used to make specific predictions. Each prediction can be tested to determine its veracity or falsehood.  
**Reality check 4:** Under the predictability criterion, identify which of these statements is a scientific one?
  - i. Without sunlight (or comparable artificial light), green plants will die.
  - ii. If you are a "Scorpio" your horoscope for today is "You will be saying" 'I feel rich!' Lunar position highlights back pay, "refunds, correction of accounting error"
5. **Testability:** The natural cause (mechanism) of the naturally occurring event must be testable through the processes of science, controlled experimentation being essential. Reference to supernatural events or causes are not relevant tests.  
**Reality check 5:** From the view of testability, determine which statement below is scientific?
  - i. Bermuda Triangle causes ships and planes to sink and disappear.
  - ii. Life comes from life and cannot from non-life.
6. **Tentativeness:** scientific theories are subject to revision and correction, even to the point of the theory being proven wrong. Scientific theories have been modified and will continue to be modified to consistently explain observations of naturally occurring events.  
**Reality check 6:** under the ambit of tentativeness, which of the listed statements is a scientific one?
  - i. The number of human chromosomes was once "known" to be 48, but is now considered to be 46.
  - ii. Living things were once grouped into 2 major groups, then 3, then 4, and now 5, because the criteria used for classifying living things have changed.
  - iii. We know that the world began about 6000 years ago, and nothing will change that.
  - iv. At one time, it was thought the heart pumped blood out of a large container as an "open system" but now it is known that blood "circulates" in a close system.

Thus far, we have tried to expose the characteristics of any scientific enterprise. With this effort, it becomes easier to identify what constitute science and what is not. This alone is not enough because the consideration of what is science and what is not carries the convergence of several factors. These factors will unfold in the course of our discussion. In any way, we commence the unfolding of the factors with some insights on other forms of science.

**What is “emerging science”?**

Emerging science (or protoscience”) could be defined as a “near science”. A protoscience tends to conform to most of the CONPTT criteria as already stated in the preceding heading, characteristics of science but typically falls short in one or more of the criteria. A protoscience differs from a science in that consistent observations and predictions may be limited by knowledge and/ or technology, for example, parapsychology. This area of study includes such phenomena as clairvoyance, precognition, and psychokinesis. Scientists generally consider parapsychology a pseudoscience because its phenomena conflict with known physical laws. However, at least one member of the parapsychology family, mental telepathy (thought transmission directly from one brain to another), might be worthy of scientific consideration. Mental telepathy then could be considered as a “protoscience”.<sup>5</sup>

**What is “false science”?**

False science (“pseudoscience”) may be defined as a non-science which is portrayed and advertised as a legitimate science by its proponents. Examples of this include, “astrology” (as presented by some of its followers and supporters), and “creation science”.<sup>6</sup>

**What is “science”?**

Science following the proceedings so far, would come to be a limited discipline that studies only naturally occurring events, while offering natural explanations for the phenomenon under study. The data must be consistent, observable, predictable, and testable. The resultant conclusions or theories reached must be tentative. There are equally other definitions of science put forward by various scholars, but what is offered here is the accepted one necessary for the pursuit of this study.

**What is “non- science”?**

Non-science is seen as an area of knowledge which does not meet the criteria of science (CONPTT). Non-science topic areas may be very logical and based on good reasoning but simply do not fall within the realm of science. These would include any belief system, e.g., religious beliefs, personal opinions or attitudes, a sense of aesthetics, or ethics and even philosophy generally.

So far, we have seen what constitute both science and non-science. In the rest of the discussion, we will attempt to identify the problems associated with the classification of what is science and what is not. But in doing this, the prevailing attitude must be one that looks at knowledge from a broad-based spectrum that searches for the facts of reality instead of conforming to some group’s fantasy.

Science, which in a wider application is knowledge cannot be pigeon-holed and given some restrictive connotations.

**Issues in the demarcation of science and non-science**

The classification of what is science and what is not is an age long controversy. In order to resolve this, scholars have offered different opinions and suggestions. The effect of this is the division of these scholars into various camps/ groups, each with its preferred method of “doing science”. This is what led to the setting up of some criteria by the practitioners of science to identify what enterprise qualifies as science and which does not. The job of setting up these criteria for science was executed by scholars in the specialized area of philosophy of

science. This considers problems, raised by modern science for example, the meaning of scientific concepts like laws, theories, logical structures of scientific expressions, manner of the methodology for attaining its result etc. This raises the question of methods in doing science amongst the scholars. An offshoot of this is the methodological divide of induction and deduction.

The bifurcation of methods (reasoning pattern) in science into two has a history dating back to ancient philosophy. As early as the period of Aristotle, there had existed attempts to distinguish two broad classes of methods in science. The traditional distinction between deduction and induction is fundamental in philosophy and in fact, in the entire gamut of knowledge. Let us now examine the content of the two methods.

### **Deduction**

Deduction derives from the verb deduce, to deduce, semantically speaking is to derive from what precedes a certain outcome. Thus to deduce is to make an inference from the premises as given, to a conclusion as the logical outcome of its antecedents. Deduction is usually defined as the method of reasoning which proceeds from general statements to particular instance. This definition as expressed in many logic texts stresses too hard on a single characteristic of deductive arguments (method).

Deduction does not exclusively move from statements which are universal, as premises, to others which are particular, as conclusions. What is true however, is that deduction usually takes the form depicted by the above definition but is not confined to it. Deduction therefore is a method of reasoning in which the premises possess conclusive evidence for their conclusion”<sup>7</sup>

Reasoning in deductive method (argument) moves from statement describing a condition or state of affairs which is true in all instances to one describing a particular extension of that same generally true condition or state of affairs. Thus, in deduction the relationship between the statements is that of deductibility. There is a claim that the conclusion is deduced from the premises. If this claim is true it becomes impossible to accept the premises and deny the conclusion of a deductive argument without a formal contradiction. What this means is that if the premises of a deductive argument are true then the conclusion could not be false if it follows from the premises, since the conclusion is an entailment of the premises. “Accordingly, the conclusion of a deductive argument must be seen as the inevitable consequence of the premises once the conclusion follows from the premises”.<sup>8</sup> Deductive method draws out the implication of knowledge we already possess.

### **Induction**

Inductive method of scientific inquiry makes use of a set of (established) facts to arrive at some other facts. And the basis of these facts are not absolutely given by the established facts. Inductive reasoning to this direction, provides an additional knowledge than those already possessed. The pattern of reasoning available to inductive method is, given that a set of facts belong to a specific group possessing a particular set of qualities, and seen to exhibit a particular set of qualities, inductive inference would lead to an acceptable possibility that any further group of facts that have similar qualities, will (likely) exhibit same set of characteristics.

The general idea of inference is to proceed from known to unknown (or yet unestablished) facts. A distinguishing factor between deductive and inductive reasoning

is the degree of evidence or reason that actually lead to the known fact. While the former is absolute, the latter is possible. The level or degree of probability in the latter depends in the amount and weight of the known facts provided, and the range of possible conformity or non-conformity to facts of the subject under discussion.

Since the conclusion obtained from an inductive method goes beyond the information provided by the premises, the concept of deductive validity does not apply to inductive argument, rather, what counts is the degree of probability.

The proponents of this method hold that other sources of knowledge fall short in or one way or the other, As a result, experience with the aid of the sense has to be resorted to as a more direct source of information. According to them, the building blocks of knowledge are the direct report of sense experience. Following this view, we can say 'this man is mortal' and 'that man is mortal' and on the basis of this conclude that 'all men are mortal'.<sup>9</sup> We have made use of inductive reasoning from experience. Though there was no direct experience of the last statement, it is based on the earlier statements, which were sense experienced.

The importance of the inductive method is that it draws further knowledge from some direct observational knowledge.<sup>10</sup> To the inductivists; life is guided and given direction by inductive reasoning. For example, experience tells us that we cannot breath under water (except with the aid of some specialized equipment), having been burnt by fire once, a child carries on this experience in any future contact with fire or any hot object.

The above characterization is what constitute the two methods which scholars have posited as appropriate for engaging in the study of science. Proceeding from this, groups and individuals emerged, each with measures or criteria by which science and non-science could be identified. Let us now commence a consideration of these group or individual opinion.

### **Logical Positivists**

This group, also known as Neo-positivists are made up of members of the Vienna circle. In keeping with the tradition of English empiricism, the logical positivists are heavily influenced by empiricism. In their opinion, only the empirical sciences offer genuine knowledge. As a result of this, they insist on the verificatory criterion for distinguishing science from non-science. In this regard, they hold on tenaciously to scientific evidence, theory and explanation and the nature of scientific method. This attitude is further re-inforced with the view that "the success and growth of science was due largely to the restriction of the scientific endeavour to the sphere of experience or matters of fact".<sup>11</sup> As far as they are concerned, statements which are not empirically verifiable are meaningless and cannot be counted as a scientific statement. This emanates from the fact that the world is under the rule of physical laws, which when discovered add to the certitude of it through experience. Proceeding from this, it could be said that the empirical sciences grow in the nature of a lineal accumulation of knowledge. The advantage of this is that any programme in the science impacts an equal increase in the level of knowledge acquired.

Logical positivists were influenced by the father figure of empiricism- David Hume. David Hume initially seemed a supporter of the inductive method, which of course is the one endorsed by scientists as the right method of the science. Accordingly, Hume opined that it is only through the inductive method that the natural sciences can arrive at generalization, which is a follow-up of what had been observed. This is so because from what is observed, it becomes easy to predict its regularity (rate of occurrence). From this point, Hume changed position and raised some serious objection against inductive method. He says the inductive

method cannot be rationally justified because its statements merely lead to a logical circle. Its validity cannot be asserted, because its claims could in the future be invalidated. The essence of Hume's criticism is located in the truth that though the natural sciences use the inductive method, the approach is not rational owing to the fact that its basic foundation cannot be justified.

### **Rationalist School of Thought (Karl R. Popper)**

Karl Popper is usually classified as a logical positivist even though his views are not exactly as the positivists. He accepted the rationality of the sciences but rejected the inductive method as the method par excellence of the sciences. For the natural sciences to maintain their rationality, they must adopt what Popper calls 'the hypothetical deductive method'. According to him, in the search for knowledge, there is no distinctive feature between metaphysics and science. This however does not imply that there is no real difference between metaphysical speculation and scientific theory.<sup>12</sup> The difference between the two is that while the empirical sciences are subjected to empirical control, metaphysical speculations are not. There is however, the existence of some form of dogmatism in both ways of the search for truth. In any case, Popper says that the right approach to the search for truth is an attitude of open-mindedness.

The central theme in Popper's thesis is that truth is obtained only through a piecemeal manner, under this frame of mind; there is the retention of what is achieved. This promotes the maintenance of that which is achieved and a subjection of it to invalidation tests to confirm or contradict it. This is the bedrock of Popper's falsification theory. Other scholars associated with this school of thought include, Lakatos, Watkin and initially Feyerabend. For this school of thought, the progress so far achieved in science is a testimony of its rationality. This accounts for the increased level of knowledge we now have than we had previously.

The above assertion we must acknowledge but quickly add that we should not be carried away with the achievements in the science. We should also take a second look at the other side of science- the degradation of the environment and the consequent effects on humans. This is the only way to balance our judgment on the progress of science.

**Imre Lakatos** is also one scholar who has contributed to issues around the demarcation of science and non-science but we choose not to treat him separately. Instead he is located within the rationalist school of thought which he belongs as also Popper. This notwithstanding, we put forth his *methodology of scientific research programme* which is new to the position of his group. He agrees with the falsification of theories as a group opinion but adds that no falsified theory should be abandoned. It should rather be preserved with the hope that in future, a new theory could be formulated to accommodate it. Where this happens, it brings about the corroboration of scientists which Lakatos very much subscribes to. With this, he felt he has developed a model for scientific progress achieved through science research programme.

### **Thomas S. Kuhn**

Kuhn in his contribution to the demarcation between science and non-science came heavily against the position of the logical empiricists. He holds that scientific knowledge is not a body of truth that grows by way of lineal accumulation. What this portend is that at no time can we claim to have total and certain knowledge of things. As a result, Kuhn dismisses



science and its inductive method as irrational. In his book, *The Structure of Scientific Revolution*, Kuhn declares that there is no use rationalizing knowledge under the ambit of methods (inductive or deductive). Methods cannot in any way confer empirical rationality to knowledge. Against this background he rejected any clear-cut distinction between science and non-science. This is due to the discovered facts of historians of science which contradict the traditionally held view that science is all there is. The reason for this is the certainty which follows the discovery that the once ruling views of nature were not less scientific or were not the fall-out of particular human interests than those in vogue now. The implication of this in the way of Kuhn is that each generation in human history had what constituted for their age knowledge, which served the needs of their development. It will be wrong therefore to measure the utility or importance of such knowledge with those that are current today. The two were not products of one age and did not serve same utility. What matters is that the two served some useful purposes in different ways at different times.

The actual difference between these two is not one of method or its failure as both were scientific, but their “incommensurable ways of seeing the world and of practicing science”.<sup>13</sup>

In relation to the matters of current discuss, demarcation between science and non-science, the above view of Kuhn has some far reaching implications. What we today discuss as metaphysics and non-science could have been seen as science and so served the needs of the age in which it reigned. It will be wrong for the current age to tag it irrelevant, irrational, and metaphysical or non-science as this trend will continue with all generational change. It is along this proceeding that Kuhn sees as irrational the method of the natural science as well as its conclusion. He therefore advocated for progress in science which comes only through the phenomenon of “paradigm- shift”<sup>14</sup> not method. What is paradigm-shift?

A normal science is characterized by a paradigm? And Kuhn distinguishes between two connotations of paradigm:

- (i) paradigm as achievement
- (ii) paradigm as set of shared values.

The former paradigm (achievement) is the accepted way of solving a problem which then, serves as a model for future reference. The latter paradigm- as set of shared values, means methods, standards, and generalizations shared by those trained to carry on the work that models itself on the paradigm- as achievement. It is this for him that brings about “tradition of scientific research”. And this tradition of scientific research emerges when a group of persons come together and are convinced that the interpretation given to some phenomenon is correct. From this interpretation, models for further solution to problems are possible. A scientific revolution therefore takes place when an old system is suppressed by a new one.

Next in the list of contributors to the problem of demarcation between science and non-science is Feyerabend.

### **Paul Feyerabend**

As part of his contribution to the matter, Feyerabend quarried the quality of observation in scientific researches. According to him, there is no neutral observation that could be described as ideationally free. With this understanding, it applies that all observations are products of personal biases and idiosyncrasies. Again, observation in his view is over laid with natural interpretations where origin could be rooted in myth.

As a result, the meaning we give to our documentary evidence or observation is often coloured by the historico- physiological elements that constitute it. All observations

following this trend are theory laden and there are no 'bare- facts'. What therefore establishes one theory and drops the other is simply choice, not method, science and non-science.

For Feyerabend, objectivity of knowledge cannot come to depend on the screening out of all other theories to get at the true one. What should count instead is a series of an ever increasing ocean of mutually incompatible alternatives. A mark of objectivity of knowledge is theoretical pluralism where craft are given as much opportunity in the competition as the theory of relativity.

With this opinion, Feyerabend brings into question the objectivity of the inductive method. It is this attack on the reliance of method for knowledge whether science or otherwise that he is synonymous with the terms "anything goes" "anarchist method" and "no method criterion". Quite frankly, if we take a serious consideration of the perspective of Feyerabend, there would be no point looking out for any distinguishing feature between science and non-science. They do not exist as science, myth, religion and others are the same.

### **Conclusion**

Science derives its origin from a Latin word **Scientia**- meaning knowledge. In spite of the various dimensions in the definition of the concept, science as knowledge remains central to all. We can at this juncture ask a very simple question, is science the only source of knowledge? The response is a definite no! This implies that the other areas of study (the non-science) are also sources of knowledge. This is one problem which any attempt to distinguish the two areas of study would have to contend with. The difficulty is further compounded by the congruence between scientific and metaphysical reasoning. At least both of them begin with speculation. Karl Popper reinforces this thought when he said that both areas of study apply the deductive method which he calls 'hypothetical deductive method.' From this understanding, the dispute over method becomes a need less one.

There is no gainsaying the fact that science has come with a considerable impact on human society. However, it is also a common truth that it did not do so with a commensurate progress. Think of the various weapons of war with the consequent moral issues it engenders, the degradation of the environment and related health implications etc, could these still pass as part of the considerable impacts?. The talk of objectivity in the sciences as presented by proponents should we suggest, be based on all round assessment- from its method to the derivative products. In this specific regard, Kuhn says that scientific investigations are influenced by the interest and goal the scientist wishes to achieve. If nothing circumvents this view, the whole issue of objectivity is brought under serious question. How can by this understanding, the speculations, the peculiarities and the preferences of a scientist or group of scientists constitute what knowledge and reality is?

We think that the whole talk of objectivity is more of power of persuasion and propaganda. This view cannot be wrong more so when it finds support in the position of some scientists and historians of science, like Kuhn and Feyerabend that what is usually referred to as scientific knowledge embodies much of indoctrination and value judgment. To support Kuhn's position further, Feyerabend posits that the sciences leave out several aspects of the nature and meaning of reality, and dwell on certain narrow and limited part of it.

In his work, *The Structure of Scientific Revolution*, Kuhn successfully established with historical examples that every observation is interest-laden. The meaning of this is that there is no observation that is not oriented towards a particular end thereby jeopardizing all matters of neutrality. With this, the empiricists' criterion of verifiability collapses. A corollary of this

to empiricism, philosophical approaches and indeed any world view, is the need for them to appreciate that they contain not only some form of dogmatism, but also narrow mindedness for believing that knowledge and truth could be encapsulated and possessed in a system of thought.<sup>15</sup>

In the discussion so far, a discernible pattern of proceeding is that there is usually a reflexive period which every theory, science and non-science alike require justifying itself. This is the whole essence of the argument on science and non-science, method and no method. The criterion of verifiability is not even removed from the above expression. Excluding it would mean subjecting every process of the acquisition of knowledge to the laboratory. Whatever is not a product of the laboratory should be disregarded. What this amounts to is a recreation of the nature of reality, not as it is. After all, scientific method lacks the capacity to be purely empirical. How do we verify such phenomenon as atoms, inertia, molecules, models etc. Even if we concede to scientific methods, the ability to verify every entity either naturally or through some artificial designs, in what medium is the documentation presented? It is through the aid of language and more so, formalized scientific language. By its nature, scientific language (meta- language) does not allow reality to be fully expressed. What it does is to compress it into dimensions of symbols. The ordinary language with all its inhibitions remains the most appropriate medium for explaining reality. Again, the fact of the limitation even in the ordinary language implies that there is an extent to human knowledge since all we can know depends on what language can offer.

What we have so far stated in our discussions applies both to the sciences and the non-science alike. The reason being the similarities between the two areas of study. The manner to address the issue is not searching for distinguishing features that divide the two but through a cinergy of the two. This way, the two would be engaged adequately in the art of understanding reality as it is and deploying such knowledge to ending human misery.

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