

## The Epic Saga of the Scientific Method (from the Paradigmatic Revolution of Thomas Kuhn to the Noetic Intuitions of the New Millennium and Beyond)

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### Abstract

Having in my earlier paper (Chinwah, 2001) traced the early beginnings of philosophy, science and scientific method from the PRESOCRATICS through the articulate intuitions of Francis Bacon to the 'cogito' of the venerable Rene Descartes and the Logical Positivism of the Vienna Circle School of thought, we now turn our rather unrelenting searchlight on the PARADIGMATIC REVOLUTIONS of Thomas S. Kuhn (of Harvard University fame), as he conclusively *shatters* the rather frail and naive logic of Logical Positivism..., and conclude with the NOETIC INTUITIONS AND EFFULGENCES of EMERITUS Professor Willis Harman (of Stanford University's Institute of NOETIC STUDIES), as we attempt to gain a privileged glimpse of the barest outlines of *the Emergent Shape of things to come* - the very beginnings of the Greater Science (albeit, a 'SUPERSCIENCE'?...) of the 21st century and beyond..., certainly an all-inclusive New-Age science embracing and mastering even the World of Being, Life and Consciousness, and thus empowered to grapple meaningfully and effectively with the problems, mysteries and challenges of the New Millennium and the stimulating ages that lie *just ahead of us...*!

**Key Words:** Thomas Kuhn - paradigmatic revolutions - Noetic intuitions - New Millenium - Scientific Method

### 1.0 INTRODUCTION: KUHN SHATTERS "LOGICAL POSITIVISM" AND ITS ASSOCIATED WELTANSCHAUUNGEN

One of the major by-products of the philosophy of Science was a more serious scholarly interest in the history of science itself. Thus a close study of the major turning points in the history of science, led to the unexpected result of challenging the positivist theory of the structure of scientific explanation, a theory which many of us, if we are to be open and frank, had smugly or tacitly accepted as being more or less the way in which science progresses.

The challenge was thrown by a young Harvard physicist and historian of science and philosopher by the name of Thomas S. Kuhn in the now famous little book entitled *The Structure of Scientific Revolutions*. Thus, since Kuhn's revolutionary arguments open the way as it were for the concluding philosophical commentaries on the possibilities for further philosophical and scientific growth and progress of a dynamic and significant nature, we shall examine the salient features of this challenge also in some detail, if even rather briefly, in order again to properly prepare the ground for the concluding philosophical possibilities which follow.....

It was clear that the positivist picture was in part the result of a logical analysis of the epistemological status of Scientific theories, taking into consideration the *actual* historical development of science since the times of Descartes, Leibniz and Hume to the present, (that is, from the seventeenth to the twentieth-first century). Thus, in

summary, the positivists had posited three major uses of the data base (or Scientific observations in general), in the development and application of Scientific knowledge. First the data reports serve as the basis for the inductions which give rise to the generalized laws and theories of science. Secondly, they are used as a Statement of "initial conditions", which, taken together with the general laws, imply the occurrence of the events being explained or predicted; and finally, as these Scientific data are received, they either confirm or "disconfirm" the predictions of Scientists. These Scientific data are then added to the data - base and serve as elements for new inductions and new predictions or explanations... In this way, the positivists give a rather rosy picture of Science and the scientific activity as cumulative, progressive, always growing and forever expanding into a limitless future of unending possibilities: in short, the positivists analysis of the structure of scientific knowledge directly implies the optimistic *Weltanschauung* or *world view* that science is the only necessarily progressive activity in an otherwise strife-torn and chaotic world.

Kuhn however shatters this positivists view or illusion by claiming, after a careful study of *major turning points* in the history of Science (for example, the Copernican revolution), that science *did not at all progress slowly, incrementally, logically and 'step-by-step'...* as the positivists would have us believe; rather the picture was wildly different. As Kuhn expounds in his *structure of Scientific Revolutions*, (Kuhn,1962), the situation was more like *the history of a*

1. Willis Harman, President of the Institute of Noetic Science, is a futurist of world renown. He is Emeritus Professor of Engineering - Economic Systems at Stanford University, Stanford, California, in the United State of America and his Writings appears in a wide range of Journals around the world. Some of his major books and contributions are as listed in the references. The Institute of Noetic Sciences has won world-wide recognition for its pioneering work in the field of Consciousness studies. Noetic comes from the Greek "nous" therefore mind, intelligence, understanding. Noetic Sciences therefore encompass the diverse ways of knowing; the reasoning processes of the intellect, the perception of our physical senses, the emotions and the intuitive and spiritual or inner ways of knowing...; the Institute supports research and education on human consciousness...

country which went through periodic political upheavals, hence the key to Kuhn's innovative description of Science was *the notion of a revolution in Scientific thinking and practice*. Thus, briefly put, Kuhn's historic and innovative account went as follows: At most times in the development of Science like physics, Scientists, as a rule, share A RULING CONCEPTION of *how the Universe Works*, what the SIGNIFICANT experimental data are, what the well established theories are, and how to go about their business of Scientific research. Thus, this SHARED CONCEPTION or *Weltanschauung* is dominated by, and derived from, *some very striking and powerful experiment or theory* (e.g. the Michelson-Morley experiment and Einstein's postulates of Special Relativity), which thus serves as a model, as it were, for the Scientific activity of other researchers. Kuhn calls this model A PARADIGM. Thus during the time that a paradigm rules in a branch of Science, Scientists are engaged in what Kuhn calls *NORMAL SCIENCE*. What he means is simply that Scientists conduct their experiments and research, collect data, check predictions all in the service of supporting, developing, and checking the dominant theory. Such peaceful periods of normal science are however, from time to time, *interrupted by a situation of INTERNAL THEORETICAL CONFLICT: deviant data are received which fail to confirm the predictions associated with the dominant theory*. Now, it is crucial to note, in passing, that deviant data are always turning up even in periods of so-called normal Science; there is indeed nothing unusual about that. But for some (unknown) reason (and Kuhn cannot tell us precisely *why*, as we shall have cause to recollect shortly hereafter), at certain specific points in time, these deviant data finally come to be regarded as *COUNTERINSTANCES* to the ruling or dominant theory and thus as *DISCONFIRMATIONS* of it, and not simply as *irksome observations* to be tidied up by ad-hoc variations on the ruling theory. Thus, for lack of anything better as an adequate substitute, Scientists plug on, as it were, with the old theory until some brilliant and innovative mind comes up with *a crucial experiment*, formulates a totally new theory which makes the deviant data fall into place, like a jig - saw puzzle. Thus, by a *revolutionary leap*, as it were, this theoretical (Scientific) *rebel* puts forward *a totally new and different account of the realm that all the other scientists have been exploring in vain*. A period of theoretical conflict ensues..., hot debates follow over which data are the truly significant observational reports, with each side, as one can easily imagine, accusing the other of placing the greatest *emphasis* on the data that its theory can explain the best... Such indeed was the emergence of the Copernican heliocentric theory in its triumph over the ptolemaic geocentric Universe that had previously dominated the

scientific scene for centuries, and also the emergence of Special Relativity theory from the welter of ad-hoc ether and absolute motion theories of the classical type. Ultimately, the end hoves into sight; either the new theory fails to win adherents, and is rejected, or it *conquers* the older theory and thus itself becomes *the ruling paradigm*. Thus students and disciples of the revolutionaries settle into a new routine, and once, again, *normal science* becomes the order of the day... until the next revolution comes along...

## 2.0 Critically Profound Philosophical and Scientific Implications of Kuhn's revolutionary Contribution(s)

It would appear, at first blush, that Kuhn's philosophical account has indeed undermined the positivists belief in the "objective", *rational, progressive, humanitarian and world-unifying mission of science* in the modern world. What profoundly new insights has Kuhn given us?. First the *FOUNDATION STONE* of the positivists' theory, the so-called "data-base", at least for this stage of scientific knowledge and development, is shattered. As we have noted, everything in the positivist analysis of science rests on their claim or philosophical *assumption* that the observational reports making up the data base are "objective", *theory-neutral* reports or data, equally available to, and usable by, all scientists of whatever theoretical persuasion. Kuhn's analysis of science, however, not only casts serious doubt on this description of the data base, *but actually indicates that scientists operating with different paradigms will disagree about MORE than their theories; in fact, they will even disagree as to what indeed are the data! In other words, even the data themselves are no longer theory neutral* as the positivists would have us believe, and it would therefore appear that there is apparently no way for theorists of opposing schools of thought to arrive at a common agreement by rational debate. Kuhn puts this rather succinctly in the section of his book, titled *Revolutions as Changes of World View*:

Examining the records of past research from the vantage (point) of contemporary historiography, the historian of science may be tempted to exclaim that when paradigms change, the world itself changes with them. Led by a *new paradigm*, scientists adopt new instruments and look in new places. Even more importantly, during revolutions, scientists see new and different things when looking with familiar instruments in places they have looked before. It is rather as if the professional community had been suddenly transported to another planet where familiar objects are seen in a different light and are joined by unfamiliar ones as well. Of course, nothing of quite that sort does occur; there is no geographical transportation; outside the laboratory, everyday

affairs usually continue as before. Nevertheless paradigm changes do cause scientists to see the world of their research engagement differently. In so far as their only recourse to that world is through what they see and do, we may want to say that after a revolution, scientists are responding to a *different world*. (Kuhn, Thomas S., 1962).

Thus, it would seem, from Kuhn's account, that the data-base does not grow steadily and progressively as science advances; rather, with each *revolution*, new data will be added to the base while some old data will be thrown out. What is more, during the revolutionary period itself, Kuhn has made it clear that there will indeed be *no objective, rational, univeersally-agreed-upon principles* for settling the dispute between competing schools of thought or paradigms. In short, despite Kuhn's rather emphatic *disclaimers* to the contrary, his theory comes rather perilously close to equating *success with truth*: in other words, the theory that triumphs or wins out and *becomes* established as the basis of normal science, Kuhn seems to be saying, is the right one precisely *BECAUSE IT WINS!* (And this unexpected outcome may be likened to the conclusions of the French Scholar, Monod, who asserts in his book, "*Chance or Necessity*", the evolutionary theory of survival of the fittest which, in essence posits the rather apparently bland statement that "*What is, is*") Thus, *profoundly disturbing philosophical questions arise: for example could science simply go wrong for a century or two* (Compare the Aristotelian and Ptolemaic geocentric system which held the centre stage of science for virtually a thousand years (millennia) or more! *Could, in fact, some so-called philosophical "crackpot" working in a dusty cellar somewhere away from the mainstream of scientific activity be right when the whole world thinks otherwise? Was the celebrated Albert Einstein not such a "Crackpot" working in the "dusty cellar" of a patent office for a while...?* Thus from Kuhn's apparently powerful and coherent philosophical view, *we, as scholars and scientists, have no real choice for now but to accept the fact that we indeed have no other criterion, no other test, save actual historical success* for the theory that becomes established as *the ruling norm*. Thus, to put the contributions of Kuhn to science and the philosophy of science more succinctly, *it fits the facts better* than the logical positivist viewpoint in spite of the attractiveness of this latter school of thought! In other words, Kuhn's model of periods of normal science dominated by paradigms, interrupted by revolutions in which new paradigms drive out old ones, *explains* and *predicts better* than the positivist story of slow and steady data accumulation accompanied by piecemeal theory change. Thus, *if we are indeed to use the positivist*

*standards for accepting or rejecting scientific theories, we are led to reject logical positivism itself in favour of Kuhn's revolutionary theory which indeed fits the historical and scientific facts better.*

### 3.0 A Brief Digressional Input: The Historical Epistemology of Dialectical Materialism

The major contribution by Professor Marx. W. Wartofsky of Boston University fame in the United States of America, is the contention that all traditional approaches to epistemology would tend to fall flat on their faces from the fact of a major deficiency common to all of them; *the fact that they are ahistorical in nature*. (Wartofsky, 1978). Wartofsky further characterizes all of these traditional epistemological theories essentially under the dominant three, - philosophic or analytic epistemology, naturalistic or evolutionary epistemology and the ahistorical forms of relativist, situational or pragmatic epistemology. He even further concedes a fourth major epistemological theory which is "*historicist*", *in nature, such as the paradigmatic epistemology of Thomas Kuhn*, but which, in his view, is *not "historical"*, and is therefore *also rejected as philosophically inadequate for fulfilling the great tasks that such a theory sets out to accomplish*. We have noted earlier for example that Kuhn himself posited the fact that at some point in time, *deviant data become significant as counter - instances to a ruling paradigm* but (Kuhn) himself *could not tell us the reason why!* Wartofsky aptly attributes this to *the complete lack of a comprehensive epistemological theory* on the part of *all contemporary and traditional schools of thought* ranging all the way from Plato through Descartes, Hume and Kant to logical positivism and Kuhn. To put it more succinctly, Wartofsky characterizes such views as merely speaking:

To the cognitive or perceptual *alternatives* (to his own historical epistemology) which are possible, (but) not yet to the *relation* of such alternatives to historical modes of social human praxis, nor to a history or development of such alternatives. (Wartofsky, 1978).

Thus, as Wartofsky clearly points out, Kuhn's account, while it speaks to sociological and even historical contexts for changes, or revolutions in our modes of Scientific understanding, *indeed has no theory to account for these changes other than the internal sociology of Schools of Science, or of internal dialectic of anomalies and puzzles*. In effect, Wartofsky aptly concludes, such views afford, at best, a relativized or pluralized Kantianism, which, in Wartofsky's view, reveals its impoverished or bankrupt nature. This is precisely because in such an alternative theory, *a priori* forms of perception or of cognition simply multiply options, but in which the genesis of such alternatives, or the condition of choice among them is not given or at best, is given in *an ahistorical and thus for Wartofsky a philosophical incomplete*

and inadequate manner. In contradistinction to all these contemporaneous and traditional epistemological theories, Wartofsky presents his lectures on "cognitive praxis" - which he describes as the human activity whereby knowledge is acquired - its genesis, its development and its specific forms or modes in Science as well as in Art. It is indeed here that he develops his innovative programme which he calls "a historical materialist epistemology", which as we would expect, derives from, and is related to a classic Marxist historical materialism, which, he admits is obviously (ostensibly) the context of his own program, even though he hopes to go further in his project than what is presently part of any philosophical canon even though Marxist in origin... The essential part of Wartofsky's objection to all contemporary and traditional epistemologists having been thus presented, we leave the further development of his theme to future papers and works, when hopefully the whole picture is developed and unravelled, thus lending itself to proper philosophical analysis presently beyond the scope of this rather limited exposition..., and certainly more suited to a more complete critical analysis all on its own. We therefore turn our attention finally to the concluding phase of this exposition, which, simply put, is the obvious rhetorical question, as to where we go from here, and also an attempt, no matter how modest, at providing the beginnings of an answer, (in as coherent and philosophically possible a way as is compatible with our present state of Scientific knowledge and the available data - base of observational reports, both orthodox and deviant) to the way forward in this New Millennium that is already upon us, and in the ages to follow...

#### 4.0 Philosophy and Science must Find a Way out of the Present "Cul - DE-SAC"....

Going straight to the heart of the matter, it is clear that Science, by the end of the twentieth Century and entering into the New Millennium in which we find ourselves, has gotten itself into some kind of scientific and philosophical bind, a veritable scientific *cul-de-sac*, by the narrowness of its foundational pre-suppositions, its limited scope of research (i.e the materialistic), and its very own orthodoxy in both its methods and its chosen tools of research and inquiry. It is thus quite self-evident that a mere proliferation of Scientific gadgets and sophisticated technological equipment - both, electronic, mechanical and what have you... is not necessarily synonymous with progress in Science, Scientific method, nor in culture and civilization as a whole for that matter; indeed quantity can never be equated with quality in these matters. If care is not taken therefore, we may yet be buried, as a Civilization, under the weight of this mere

proliferation of materialistic gadgetry, no matter how sophisticated they may be, goaded on largely by the profit incentive, and lacking in any Scientific or teleological drive towards enhancing the quality of understanding and thus the quality of life itself in all possible frontiers of research and in all the ramifications of life and spirit itself. It is indeed when we have such a teleological drive a *wholistic* approach towards a higher quality of understanding and of life itself that we may begin to talk of real progress in Science and Scientific method as a whole.

What precisely do we mean by all these? How does Science (and philosophy itself) get out of the scientific *cul-de-sac* into which its very orthodoxy has led it in the present era? The answer is very simple, and has in fact been very ably articulated by some of the brilliant minds who are already working quietly away "in their dusty cellars", away from the hustle and bustle of the orthodox Scientific Community. For lack of space and time, we shall focus on the brilliant and innovative suggestions of one such Scientific pioneer and his team of able workers and researchers in the field, none other than Emeritus Professor Willis Harman of Stanford University fame and President of the non-profit organization, the Institute of Noetic Sciences, Stanford University, Stanford, California..., who has been described simply as "a futurist of world renown" (World Goodwill, 1989). In Professor Harman's own words we, as Scientists and philosophers alike, must:

Try to leap over the present form of Science, and explore the kind of Science that we would need in order to do justice to all the phenomena that have not been well studied so far; those relating to the mind and healing, intuition and creativity, the aesthetic sense, spirituality, all that vest territory...  
(Willis Harman, 1989).

As regards the present methods and tools of Science, Professor Harman further continues.

We just don't learn very much (with the present tools of Science) because we are trying to study something from the outside that we really cannot study that way without *distorting or mangling* it.  
(Willis Harman, 1989)

As we all know only too well, Heisenberg's Uncertainty principle and gadanken experiments in Quantum theory such as "the Schroedinger's Cat Experiment" go a long way to support what has been said above about the epistemological role and Scientific paradox of the observer's *unavoidable interference* with that which is to be observed. And what is the way out of this additional scientific *cul-de-sac*? Harman goes to the heart of the matter in attempting to answer this fundamental question: We must: "re-define Science and

include other kinds of research which is more participatory ... and empathic in nature" (Willis Harman, 1989).

Thus, the Copernican Revolution (of the New Millennium) is upon us, and we cannot afford to be mere on-lookers anymore, forever standing by the sidelines...; the time has come indeed to take this *revolutionary* leap along the paradigmatic lines indicated by Thomas Kuhn and, even more directly still, by Professor Willis Harman. And even though Professor Wartofsky is right in pointing out the fact that Kuhn (and all the epistemologists before him) have *not* yet worked out a *theory of the structure and inner dynamics* of Scientific explanation and revolutions, it is yet very clear that Kuhn already *points the way to Scientific progress in the immediate future and beyond*. Further, Wartofsky's historical epistemology, derived as it is from Marx's dialectical Materialism, though having great merit as the very *first* attempt by a Philosopher to work out a *coherent epistemological theory* or schema of the structure of scientific explanation, is largely floored by the *very materialistic nature of its foundational pre-suppositional roots*; it can hardly tell us anything about *Psychic Phenomena, Spirit and consciousness* itself..., about which realms of being and Knowledge, Dialectical Materialism appears wholly unable to comprehend nor indeed understand! For materialism, the basis of reality is *matter* and "*objective material conditions*", not *spirit nor Consciousness* itself, and such an epistemological program even *when it is completely worked out*, can hardly contribute much to our teleological drive towards a Scientific understanding of the workings of consciousness and of spirit itself. It would therefore seem clear that Professor Wartofsky, and indeed historical epistemology as a whole would indeed have to go back to *their Hegelian roots of spirit* before they can hope to make further progress on their *rather ambitious and yet very appropriate, opportune and innovatively laudable and creative program...*

## 5.0 Conclusion: Contemplative Thoughts and Hopes for the Future

We are indeed comforted by Kuhn in that we are made aware (by him) that our new paradigm stands an *equal*, if not a better chance than the old and orthodox, in that, even by the Scientific criterion of logical positivism, *it fits* the facts better, especially the *deviant* data-base or observational reports from, for example, the realm of psychic phenomena, consciousness and spirit. Conventional Scientific theory and method, like the proverbial ostrich merely buries its head in the sands of orthodoxy, and pretends that such matters are entirely *outside* the purvey of Scientific epistemology proper; such matters belong rather to religion, and to religion alone. Thus in the developing areas of the world, such as Asia, Latin America, Africa and the Caribbean, as a whole, for example, where the tradition and culture are suffused with

*interactions and manifestations of a psychic and spiritual nature, a vast opportunity presents itself for the collection of Scientific data or observational reports, especially of the empathic kind, and to begin the formulation of theories based on a new and innovative paradigm*. Such theories as pointed out in an earlier paper (Chinwah, 1988) would perhaps necessarily have to be, at first, *phenomenological* in nature, *progressing dialectically towards the translucent forms* together with the necessary *hypothetical constructs*, if need be..., until a new theory is completely worked out in the usual scientific and dialectical sequence or chain of events.

The challenge to those of us in the developing areas of the world (as elsewhere) is therefore no longer to be mere onlookers and consumers of Scientific Products, but to seize the opportunity of the wealth of new and deviant data around us of a psychic, spiritual and other nature to make *original* contributions to philosophy and Scientific method as a whole. The work must not be left to *the Uri Gellers* alone, not to the brilliance and innovative spirit of *the Harmans* and his famed Institute of the Noetic Sciences of Stanford University fame either. There are *real* Scientific contributions of a *mementous nature to be made here*, and no culture, as the sages tell us, can be said to have made any *real* progress without its having fully developed that which is *intrinsically* its own and given it *as its own peculiar contribution* to the mainstream of the body of philosophical and scientific knowledge that is universal, that is, to the upliftment of the quality of the life and culture of the *whole*, indeed of humanity as an organic unit. Already, brilliant scholars and philosophers like Husserl and Hartman (to mention only a few) have led the way with their innovative work on the phenomenological investigations, the eidetic sciences and aporetics in general (Husserl, 1952).

We can therefore no longer sit back and ascribe everything beyond the reach of orthodox science to "the supernatural". To do so would merely be to be *negligent, if not derelict* in our (sacred) responsibilities as scientists, philosophers and scholars, ostensibly leaders of thought and guardians of the future of our societies and of the human species as a whole. In short, "Spirit" and the so called "Supernatural" must thus be brought down to the realm of the philosophically *scientific* and *tractable*.

In conclusion therefore, our pragmatic scientific program can be summarized along the lines of the type of studies and research that Professor Willis Harman and his Noetic Institute has mapped out in broad outlines as follows:

We can attempt to extend the boundaries of science "a little bit" as it were, by doing work in areas where it looks as though we can get some new insight by research of the more conventional sort, such as, for example, studying "the spontaneous remission of

cancer and other life threatening illnesses", or studying the effect of *positive* emotions on the immune system. (Harman, 1989).

Secondly, and more importantly, we must begin to look "from *the inside*" rather than perpetually from "*the outside*" as we have done "all through the history of science to this point in time; we must, as it were "become one" with that which is the "object" of our study. As Harman puts it:

It is an empathic approach, a compassionate approach, the sort of approach you would use in cultural anthropology or psychotherapy where you wouldn't think of trying to understand human development by just studying it from the *outside*.

(Willis Harman, 1989)

As far as motivation is concerned, we are not lacking in *imagination* here either; the Scientific benefits that may accrue from such a turning *inward into THE INNER WORLD OF spirit* may be compared to the *knowledge and powers* attained when Science turned "inwards" as it were, to probe into *the innermost recesses* of the atom. In fact, the Scientific consequences for man may be more *MOMENTOUS* than the human mind is yet able to imagine. In fact, considering the yet (seemingly) unfathomable *inner dynamics* of the 'calculus of discontinuities' that is the science and philosophy of "PURE INSPIRATION" (ANSCHAUUNG), *the phenomenon responsible for all great and significant advances in science and philosophy, and thus in civilization and culture as a whole*, it indeed takes very little imagination to picture the obvious - that the science (and philosophy) of the 21st century and beyond would probably be as far in advance of 20th century science..., as the dramatic breakthroughs in QUANTUM THEORY and RELATIVITY PHYSICS at the turn of the century were in advance of CLASSICAL PHYSICS (and 'classical science') as a whole. Thus in conclusion, it is important to make clear the fact that we are not here advocating that normal science of the REDUCTIONIST OBJECTIVE FORM should be abandoned; what we are in fact saying is that such orthodox science must continue; it indeed has its *usefulness*, in spite of its obvious limitations. What is therefore being strongly advocated here is the *urgency* of the need to *AUGMENT* the present RESEARCH METHODS to *include*, as Professor Willis Harman so aptly puts it: "a *participative and empathic form as well...*" (emphasis mine) (Harman, W. 1994)

To the extent therefore that we are able to do this lies the true test of our *imagination* and *creativity* as scientists and philosophers, and, what is more, to that extent lies the *MORE RAPID EMERGENCE* of the 'Greater Science' of the

New Millenium and beyond..., and in that very simple test indeed lies the future *PROGRESS* of "Science" and the human species, as a whole..., if not its very survival as a living, vibrant and creatilvely expanding consciousness and enduring form of life ...

## ReferencesS

- Chinwah, U.H., 1988. Phenomenological and translucid box theories... Journal of Pedagogy, Port Harcourt, Nigeria.
- Chinwah, U.H., 2001. The Metaphysical and Epic Rise of the Scientific Method...., Inp ress...
- Conant, James Bryant, 1951. *Science and Common Sense* (New Haven Yale University Press), New Haven
- Godel, K., 1931. *Uber Formal Unentastcheidbara Satze der Principles Mathematica Und Verwandter Systeme. Monatshefte fur Mathematik and Physik*; (Reprinted in Davis, 1965).
- Hampshire, Stuart, 1956. *The Age of Reason* (New American Library), Boston.
- Harman, Willis, 1989. Spirituality, Science and the transformation of consciousness, *World Goodwill*, Vol. 3:
- Harman, Willis, 1990. *An Incomplete, Guide to the if Future*, Stanford University Press, Stanford, California, USA.
- Harman, Willis; *Global Mind Change, the promise of the Last Years of the Twentieth Century* (Stanford, 1991).
- Harman, et. al. *Higher Creativity*, 1994.
- Harman, et. al. *Paths to Peace*, 1995.
- Heisenberg, Werner, 1871. *Physics and Bayond; Encounters and Conversations*, Harper and Row, New York.
- Hempel and Oppenheimer, 1964. *The Logic of Explanation D-* Van Nostrand Co., New York.
- Holton, Gerald, 1969. Einstein and the Crucial Experiment *American Journal of Physics*, 37: 68-92.
- Holton, 1969. Einstein, Michelson, and the Crucial Experiment, *Isis*, 60: 133-197
- Holton, 1968. Mach, Einstein and the Search for Reality, *Daedalus*,
- Holton, 1968. On the origins of the 'Special Theory of Relativity' *American Journal of Physics*, 31: 37-47.
- Husserl, 1934. *Phanomeonologischen Untersuchungen* (Phenomeonological Investigations), Vienna, Austria.
- Kuhn, T.S., 1957. *The Copernican Revolution*, Havard University Press (Cambridge, Massachusetts)
- Kuhn, T.S., 1962. *The Structure of Scientific Revolutions*, McGraw-Hill Co., New York.
- Wartofsky, Marx W., 1978. *Picturing Modeling and Representating: Science and Art as Modes of Cognitive Praxis* (i.e. Towards an Historical Epistemology) Lecture Notes from work in Progress, Boston University, Boston, 1978.