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Recognizing "Non Self-Cancelling Contradictory Evidence" as and when it Occurs or Arises: Delineating its Special Place in Twenty-First Scientific Method

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Abstract:- We believe that this paper is an important part and a core constituent of our ongoing globalization of science movement. Before we move on to the meat and to the essence of this paper, we commence it by discussing what evidence is, and also by emphasizing its importance and value in science. We also discuss different types of evidence summarily as they are understood by scientists, researchers and laymen, and explain what is meant by contradictory evidence as well. The same exercise is repeated with respect to both data and paradoxes, and the different types of data and paradoxes are also scrutinized and analyzed, by drawing information and inspiration from several of our previous papers, and also from commonly known and widely available data and information. The meat and the core essence of this paper lies in the delineation and the systematic discussion and exploration of the core components of this approach, along with the steps involved, and the raison d'etre for each step. We then wind up this paper by providing a large number of case studies and examples, and offering suggestions and advice on how researcher and scholars must go about implementing such approaches in the cause and in the interests of good, high quality and repeatable science. This will male science must more widely accessible and palatable to the layperson, and can led to what we have always called 'Scientific progress at the speed of light".

I. INTRODUCTION

There must be no barriers to freedom of inquiry. There is no place for dogma in science. The scientist is free, and must be free to ask any question, to doubt any assertion, to seek for any evidence, to correct any errors. - J. Robert Oppenheimer

Science is simply common sense at its best, that is, rigidly accurate in observation, and merciless to fallacy in logic. - Thomas Huxley

In questions of science, the authority of a thousand is not worth the humble reasoning of a single individual. - Galileo Galilei

We believe that this paper is an important part and a core constituent of our ongoing globalization of science movement which is some two decades old by now. Before we move on to the core meat and to the core essence of this paper, we commence it by discussing what the meaning of the term evidence is, and also by defining and emphasizing its importance and value in science. We also discuss different types of evidence summarily as they are understood by scientists, researchers and laymen, and explain what is meant by contradictory evidence as well. The same exercise is repeated with respect to both data and paradoxes, and the different types of data and paradoxes are also scrutinized and analyzed, by drawing information and inspiration from many of our core and important previously published papers, and also from commonly known and widely available data and information pertaining to scientific method. The meat and the core essence of this paper lies in the delineation and the systematic discussion and exploration of the core elements and components of this approach, along with the steps involved, and we accordingly provide the raison d'etre for each step as well.

We then wind up this paper by providing a large number of case studies and examples, and offering suggestions and advice on how researcher and scholars must go about implementing such approaches in the cause and in the interests of good, high quality and repeatable science. This will make science must more widely accessible and palatable to the layperson, and can led to what we have always called 'Scientific progress at the speed of light". Many of our papers, particularly on scientific method are all interrelated and integrated in a continuous chain; in some respects, they all provide multiple facets of a smaller set of more rudimentary issues. Before we wrap up this paper, we also emphasize that all evidence need not be self-canceling. There may be non self-canceling evidence too, which means that evidence can be primarily of two types from our perspective. The term "non self-canceling" here means that the process of enquiry or investigation does not stop automatically, or must not be terminated automatically, and must be further investigated or pursued. In some respects, this is a much more powerful term. Alternatively, the terms "auto canceling contradictory evidence" or "non auto canceling contradictory evidence" may also be used. We leave it to future researchers and scholars to decide which

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one is better. Time alone will tell which term will come into general and widespread usage. [1] [2] [3]

➢ *What is Evidence?*

Evidence can be virtually anything that can be used to prove the occurrence or existence of something; Many different examples of evidence can be culled or cited from the real world, or from real world instances, and more common and mundane examples could be evidence presented in a court proceedings or a trial, or evidence used to show who "left the tap open" or "who drank up the coffee". It is also widely used in detective fiction, and in novels. These are humorous but practical and real world examples; many more can be easily cited by subject matter experts, and non subject matter experts. The word evidence is derived from an old Latin term "evident", which means "obvious." Documentary evidence may also include all documents, mostly original and non-duplicate ones including electronic records produced for the inspection, perusal and scrutiny of the Court. This process may be required to assess and ascertain the originality, authenticity, and provenance of the documents, and to prove that they have not been forged, or are fraudulent by any other means. In law, evidence may be classified into categories such as testimony, (including witness testimony, eyewitness testimony expert testimony) documentary evidence, and physical evidence. More categories also of course do exist, and this does not purport to be a complete list. Evidence may also be weak or strong; it may also be classified as being conclusive, clinching or non-conclusive. In extreme cases, a piece of evidence may provide non-disputable proof. Evidence may also often be evaluated probabilistically with factors or ratings assigned. According to the hypothetico-deductive approach, a theory is tested with more and more evidence, and is eventually proven, modified, or even falsified.

➢ *What is Evidence in Science?*

In the philosophy and general method of science, evidence refers to any material that proves or disproves a specific scientific theory or hypothesis, and in some cases, may be used to identify and determine which of two or more rival and competing theories or hypotheses is the right one, and which other one needs to be discarded or abandoned. Evidence also represents the very foundation of scientific knowledge as it is used to build, test, and justify scientific theories and hypotheses, and naturally helps science evolve and mature as well. Evidence is also used to communicate scientific findings to other scientists as a part of the general process of consensus building, and to the general public at large. Evidence is generally based on data or observations, and the two must be reliable as far as possible, or at least believed to be reliable in the short and in the medium term. Evidence may be classified into physical evidence based on DNA or fingerprinting, anecdotal evidence – this is notoriously unreliable and uncertain, documentary evidence or evidence based on documentation, experimental evidence based on experimental research design, and randomized controlled trials, and observational evidence which may include case studies, panel and cohort studies. Circumstantial evidence also suggests something, but does not prove it directly. An alibi is used to prove that an individual was in some other place when an act was committed – this is somewhat less important to scientists, but may be briefly mentioned in passing nonetheless. Evidence may also be oral or written, primary or secondary, and may be based on witnesses, testimonies, or provided under oath or duress. Evidence is continuously and continually being sought for theories such as Einstein's theory of general relativity, the existence of a planet beyond Neptune or Pluto or in another solar system or galaxy, and fresh or new evidence can even often be used or employed to hone existing theories to perfection, and tweak and fine tune them. [4] [5] [6] [7]

➢ *What is Contradictory Evidence?*

Contradictory evidence is extremely important in science, and is of great value to scientists as well. Contradictory evidence is evidence that assets or otherwise implies that two opposite things are true by providing evidence for two opposite sets of facts. It also refers to a situation where a new piece of evidence contradicts an already pre-existing piece of evidence. Contradictory evidence can be used to question a witness's testimony in the case of legal testimonies, but is also otherwise important to scientists as well. Scientists sometimes overlook or gloss over contradictory data or evidence, and one that does not suit their cherished beliefs, ideals, or their worldviews. This may often be due to what is known as confirmation bias. Confirmation bias refers to the general tendency on the part of many scientists to fallaciously and erroneously interpret new evidence as being a confirmation or validation of their own existing beliefs or pet theories. This may also

1 Operationalizing cross-cultural research design: Practical, cost-effective, and a minimalistic application of cross-cultural research design to minimize cultural bias in research and reconcile diverse viewpoints IJISRT, April 2023, Sujay Rao Mandavilli

2 Implementing "Epistemic coherentism" in twentyfirst century science: "Epistemic coherentism" as an essential pre-requisite of interdisciplinary and transdisciplinary research Sujay Rao Mandavilli IJISRT, November 2024

3 Popularizing auto-dialectics in scientific endeavour: A potentially productive tool in the interests of better and higher-quality science Sujay Rao Mandavilli IJISRT, June 2024

4 Bill, Thompson (2007). "2.4 Formal Science and Applied Mathematics". *The Nature of Statistical Evidence*. Lecture Notes in Statistics. Vol. 189. Springer. p. 15.

5 Bunge, Mario (1998). "The Scientific Approach". *Philosophy of Science: Volume 1, From Problem to Theory*. Vol. 1 (revised ed.). New York: Routledge. pp. 3–50

6 Furner, Jonathan (1 June 2003). "Little Book, Big Book: Before and After Little Science, Big Science: A Review Article, Part I". *Journal of Librarianship and Information Science*. **35** (2): 115–125

7 Leahey, Thomas Hardy (2018). "The psychology of consciousness". *A History of Psychology: From Antiquity to Modernity* (8th ed.). New York: Routledge. pp. 219–253

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additionally lead to errors such as belief perseverance and wishful thinking.

➢ *What is Data?*

Data is information that resides in the form of observed or observable facts, numbers, or observations that can be used to infer or draw conclusions about something. Data can be numerical or non-numerical. It can be qualitative (based on qualitative aspects such as reviews) or quantitative (based entirely on numerical data); it can be statistical or non-statistical, discrete or continuous, and cardinal or non-cardinal, i.e. ordinal. We also then have categorical data and non-categorical data and interval or non-interval data. Data may also, in some and in some special cases, lie in a continuum between the two extremes. Some of these terms are either widely known, or self-explanatory, it is pointless and futile to provide or offer a detailed explanation of all these concepts here, as they are more of less widely known. A combination of different types of data may be used in an investigation, and these may indeed be drawn from many different sources. Data is also dissected and analyzed threadbare as a part of a complex analysis in order to identify patterns and trends. Contradictory data likewise, refers to a set or a group of data whose elements do not tally or elide.[8] [9]

➢ *What is a Paradox?*

A paradox is widely used term, and is one that is often and commonly used in science, and many fields of scientific activity. A paradox may be defined as an inherently or a logically self-contradictory statement or a proposition that is contrary to what one expects or anticipates, and leads to a highly bizarre or a totally unanticipated – or even unpalatable – conclusion. Paradoxes may be temporary only in a few cases. In most cases, and as the term implies, paradoxes usually involve contradictory and irreconcilable elements with contradictions that persist over time. This is often associated with a lasting unity of opposites. In case of a paradox, one or more elements may be true, while one or more elements may be false; this is of course, an oversimplification, and variations may exist. Paradoxes have been attempted to be categorized by WVO Quine, Frank Ramsey and others. Paradoxes may also be classified into veridical paradoxes – a counterintuitive paradox that is nonetheless true, a falsidical paradox which establishes a result that appears false and also actually is false, an antimony, etc. Ramsey classified paradoxes into logical paradoxes and semantic paradoxes, with the later mostly being based on semantics and language. Common examples of paradoxes include the Ship of Theseus paradox, the liar paradox, etc. Therefore, the validity and reliability of a proposition or a statement must be ascertained on the basis of the number of paradoxes, and the quantum and magnitude of those paradoxes. Refer our paper "Paradox identification and paradox resolution in scientific endeavour: Reconciliation of contradictory rule sets in the interests of better theorization and hypothesis-building" published in IJISRT in January 2024 for more information. [10]

➢ *What is Non Self-Canceling Contradictory Evidence?*

Non self-canceling contradictory evidence means whenever new, additional or contradictory data is unearthed, it should be fitted closely and carefully into the overall scheme of things without any bias or prejudice. Self-canceling contradictory evidence would also mean the following things, and consist of executing the following steps:

- If two pieces of contradictory data or evidence exist, it can mean that both are correct; it does not automatically mean or imply that one falsifies the other. This would also mean that there is a hidden, and a much deeper meaning to explore, and new vistas and horizons that are yet unseen and unexplored. Contradictory data or evidence in this case mean data or evidence in support of, or against a theory, hypothesis, statement, proposition, or assertion.

- The old data should not be discarded or disposed off summarily as and when new data or evidence is found. Just because new data has been found, it does not mean that it will displace or replace the old data automatically, even if the two conflict or do not align with each other.

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- The new data should also be scrutinized fairly and without bias or prejudice. It should also be scrutinized in its entirety, and even issues such as provenance analyzed or assessed. There should not be any kind of confirmation bias or prejudice arising due to experience generated while scrutinizing the old or preexisting data.

- The new evidence should also be scrutinized fairly and without bias or prejudice. There should not be any kind of confirmation bias or prejudice arising due to experience generated while scrutinizing the old or preexisting evidence.

- Both the new and the old data or evidence should be reconciled as far as possible, and without bias, prejudices, or limitations. Reconciliation must be done

8 Unveiling the Sociological Ninety-ten rules for Social Sciences research: Towards better hypothesis formulation in the Social Sciences in the interests of higher quality research and intellectual multi-polarity Sujay Rao Mandavilli Published in IJISRT, February 2023

9 Elucidating the Certainty uncertainty principle for the Social Sciences: Guidelines for hypothesis formulation in the Social Sciences for enhanced objectivity and intellectual multi-polarity Sujay Rao Mandavilli IJISRT, March 2023

10 Paradox identification and paradox resolution in scientific endeavour: Reconciliation of contradictory rule sets in the interests of better theorization and hypothesis-building Sujay Rao Mandavilli IJISRT, January 2024

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carefully, systematically and comprehensively, and data must be used from as many diverse fields of study as possible.

- Causes for differences and variations must be understood, and root cause analyses performed as necessary. Root cause analysis which is also commonly abbreviated to RCA, is a process that identifies the underlying or root causes of problems through the means of diagrams such as fishbone diagrams and cause and effect diagrams, and develops solutions accordingly.

- Paradoxes must also be consciously and conscientiously identified as necessary. A paradox is generally defined as a seemingly or apparently absurd or contradictory statement or proposition with either internal or external contradictions, which when investigated may prove to be either well founded or true. It may also in some cases, lead to more complexities or irregularities being unearthed. It may also led to some elements of a truth proposition being discarded or abandoned. Paradoxes must therefore be examined critically, and with due diligence at all times.

- Variations must be stamped out if possible and applicable, and course corrections initiated as necessary. A variation is often seen as a change or minor difference in conditions, or attributes, often or mostly within tolerable limits. Course correction refers to the process of making adjustments in order to achieve an altered or a new outcome, or change the focus of attention as required.

- More and more data or evidence should be sought out, including contradictory data and data that does not fit in with the investigators worldview. The concept of contradictory data or contradictory evidence has been discussed elsewhere in this paper. Contradictory data is the biggest blessing we can count on in science, given that it has the potential to escalate theories, hypotheses, frameworks, and paradigms to a much higher level of maturity.

- Objectivity in mindset should be pursued, and confirmation biases must be discarded. Objectivity in mindset is, as a concept is somewhat different from absolute objectivity, or objectivity itself. Objectivity in mindset should be carefully inculcated, practiced and nurtured because it will lead to objectivity in the long-term. Absolute objectivity may not be easily fulfilled or realized, but objectivity in mindset is a pathway and vehicle that leads us towards it in the long-term.

- This approach should be adopted by dint and force of habit, and must be intrinsically and foundationally embedded in scientific method. The latter is of extreme and paramount importance because it can be taught, practiced, replicated, and the fruits of it enjoyed. This may take time, but must be rigorously pursued nonetheless.

- On the other hand, there may be self-canceling contradictory evidence also; in some case, a new piece of evidence may counter an older piece of evidence convincingly, and render it invalid; Therefore, there are two types of evidence from this perspective, namely self-canceling contradictory evidence, and non self-canceling contradictory evidence. The two are distinct entities altogether, and must be approached rather differently. It will also become necessary to distinguish between and differentiate between the two as a precursor to any meaningful analysis.

- Evidence may also be categorized into strong evidence and weak evidence, and this principal may always be borne in mind in any kind of an analysis. The principle of epistemic coherentism must also be fulfilled and satisfied. Strong evidence is a type or category of evidence that is relevant, credible, and convincing, while weak evidence is generally less reliable and much less persuasive, relevant, reliable or convincing. Strong evidence may be identified as such based on the originality of the source of information i.e. primary or secondary information, multidisciplinarity, interdisciplinarity, and epistemic coherentism.

- Non self-canceling evidence is said to occur when two or more sets of contradictory, rival or competing evidence are all proven to be correct. In other words, each piece of evidence must be examined and scrutinized independently and its own right without being influenced by any extraneous data, or any other extraneous factors, including any preconceived biases. This is an extremely important concept, and must be pronounced a very important concept in science.

Non self-canceling contradictory evidence applies to non self-canceling contradictory evidence, non self-canceling contradictory qualitative data, non self-canceling contradictory quantitative data, non self-canceling statistical data as well. We had discussed all these terms previously, both in this paper, and elsewhere. It would be needless, pointless, and futile to reiterate them repeatedly and ad nauseum here. We also need to embed the concept of non self-canceling contradictory evidence in scientific method intrinsically, innately, foundationally, fundamentally, and comprehensively. This will boost the veracity and efficacy of scientific method in the long-term and render it capable of providing several new and novel applications. Let us now also discuss briefly about TRIZ. But just what is TRIZ? TRIZ, or Theory of Inventive Problem Solving, is a highly logical, structured and a systematic method for solving seemingly complex and intractable problems. It is based on the idea that there are universal principles of problem-solving that can be applied to any field. This concept was invented by Genrich Altshuller, an engineer and science-fiction author from the erstwhile and now defunct USSR, who developed it in the middle of the twentieth century, or more precisely, over a protracted span and period of time between the 1940's and the 1980's. TRIZ was the outcome of research on a large number of major and complex inventions, and is also largely based on paradoxes. There is

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also therefore, a table of contradictions in TRIZ, with physical or technical contradictions, and there are many parameters- as many as thirty-nine - such as speed, force, length, area, volume, or weight, that may either improve, or worsen as time progresses. According to TRIZ, a separation may occur across space, across time, between part and whole, and between conditions. [11] [12] [13] [14]

➢ *What are Examples of Non Self-Canceling Contradictory Evidence?*

Let is now provide and furnish some examples of non self-canceling contradictory evidence, and these represent a couple of interesting and attention-grabbing ones drawn from across the intellectual and scientific spectrum.

- We can cite the example of Atlantis which is a fictional island mentioned in the ancient Greek scientist Plato's works, namely "Timaeus" and "Critias". Lemuria is another interesting concept proposed in 1864 by the English zoologist Philip Sclater as a continent that sank beneath the Indian and Pacific Oceans. But concepts are now widely discredited. However, if new evidence is found or claimed, it must be vetted and ratified against the vast tomes of contradictory evidence and data against it already available. A comprehensive and wide-ranging approach is necessary. Since so much contradictory evidence has been found, this does not satisfy the principle of non self-canceling contradictory evidence. In sum, it is highly unlikely that Atlantis ever existed. The same goes for Lemuria which is essentially a fringe and a pseudo-scientific theory with limited currency and appeal to mainstream scientists.

- For example, if "Creation" is deemed inefficient because Venus and most other planets in our own solar system or on the Milky way galaxy, and in other galaxies are too inhospitable to harbor life, contradictory evidence must still be addressed. Likewise, the apparent silliness of some forms of life as espoused by some atheists such as the Dinosaurs (Jehovah's Jejune Juvenilia) to argue for the non-existence of a supreme being, and other concepts the "non-overlapping magisteria" argument, must also be counterbalanced against other data. For example, there are many mysteries on the origin of life, the mysteries of time and space that are not yet properly understood. We had discussed all these concepts previously, and it would be instructive for readers to read them.

- The origin of life likewise remains a big and an unsolved mystery. The Miller–Urey experiment carried out in the year 1952 by the American chemist Stanley Miller, and supervised by Nobel winning American physical chemist Harold Urey at the University of Chicago was a pioneering experiment that sought to simulate the conditions present in the atmosphere of the early, prebiotic Earth. This is an experiment investigating the origin of life through the process of abiogenesis. However, there are a large number of criticisms of this experiment, and some critics claim that primitive life was never successfully produced. In the year 1953, Alexander Oparin and J B S Haldane suggested that life originated from non-living organic molecules like proteins and RNA. This theory is commonly and widely known as the Oparin-Haldane theory, and other such studies were eventually carried out. In the nearly seventy five years since these two studies have been carried out, we have barely made any progress in solving life's mysteries. There were however, many other studies, and we had dissected a large number of ones previously. The results of a large number of studies must be scrutinized and counterbalanced against each other so long as they have a valid epistemological basis. Anything that is proven either beyond the shadow of a doubt, or has otherwise any kind of a merit must not be summarily discarded.

- From the perspective of modern and contemporary science, the term Indo-Aryan is generally used to refer to a group of languages forming a part of the Indo-European group of languages, whose discovery was initially announced by the philologist William Jones in Calcutta, now Kolkata, in the year 1786. Some Indus archeologists like the late Gregory Possehl and a few others, also often use the term 'Aryan' while referring to alien skeletal remains in the Indus valley to differentiate them from other autochthonous Harappan skeletal remains. We would also state that no one was more experienced perhaps, in Harappan skeletal biology that the late Kenneth A R Kennedy. He had categorically stated on several occasions, that attempts to look for an Aryan biological entity have been unsuccessful. There were most certainly migrations from the Indus valley to the Gangetic plains, but this cannot be used to equate Harappan cultures with post-Harappan cultures. While solving, or attempting to solve, complex issues such as the Aryan problem, we need not only interdisciplinary approaches and transdisciplinary approaches, but also the ability to juggle vast tomes of data, including of course, seemingly contradictory ones. This would set apart noble and meritorious approaches from egregious ones. It is with this intention that we had proceeded to present a complex solution to the seemingly intractable Aryan problem some fifteen and odd years ago or so. We had also naturally found that the issue was highly complex and multilayered, and that there were many different dimensions to it. The results are there for all to

11 Altshuller, Genrich (1999). *The Innovation Algorithm: TRIZ, systematic innovation, and technical creativity*. Worcester, MA: Technical Innovation Center

12 Altshuller, Genrich (1994). *And Suddenly the Inventor Appeared*. translated by Lev Shulyak. Worcester, MA: Technical Innovation Center

13 Emphasizing "integrationism" in twenty-first century science: Another useful tool to generate better scientific paradigms better quality science Sujay Rao Mandavilli IJISRT October 2024

14 Building upon "Foundationalism" to achieve the objectives of contemporary science: How this can lead to faster scientific progress and inclusive science Sujay Rao Mandavilli IJISRT, October 2024

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see, and it must be this kind of approach that must be always followed to lead to just and fair results.

- Jack the Ripper theories have both fascinated and befuddled people for nearly a century and a half. The name Jack the Ripper is used to refer to a yet to be identified serial killer who operated in the Whitechapel district of East London in the autumn of 1888. Suspects included Prince Albert Victor, Joseph Barnett, James Maybrick, W H Bury, Lewis Carroll, Montague John Druitt, etc. Therefore, evidence that is purportedly used to allege a certain individual to be a killer cannot discount all other options automatically. Ditto for evidence for, and against the James Maybrick diary, which is generally believed to be a fake, and a clever forgery carried out a long time after the events took place.

- Yeti or the abominable snowman is an ape-like and possibly mythical creature purported to live the Himalayan region in South Asia. Many dubious and highly doubtful articles have been written in an attempt to prove the existence of the Yeti, along with claimed visual sightings, video recordings, fake or fabricated photographs, etc, all of which are hoaxes as they would also additionally fly in the face of common sense. The Lochness monster or Nessie, is a mythical creature that is said to live in Loch Ness region in Scotland in the United Kingdom. While both these are almost fake, new claimed evidence must still be investigated before being jettisoned or discarded. These two case studies straddle the boundaries of both canceling and non self-canceling contradictory evidence; These also demonstrate the difference between strong and weak evidence, and between bona fide and non-bona fide or dubious evidence.

- The historicity of King Arthur whose first definite mention of Arthur appears circa 828 AD in the work "Historia Brittonumhas" has been scrutinized and analyzed both by academics and by a wide array of popular writers for many years now. While there have indeed been several claims that King Arthur was a genuine historical person, the general and the widespread consensus among experts and specialists believes him to be a mythological figure. Yet again, the techniques proposed in this paper can be extremely useful and helpful here, and can help differentiate between self-canceling contradictory evidence and non self-canceling contradictory evidence. Every new shred of evidence, and every new iota of evidence must be scrutinized against this background and backdrop, and the general principles of this concept always borne in mind.

- The Dead Sea Scrolls are a collection of ancient manuscripts discovered in caves near the Dead Sea at Khirbat Qumran between 1947 and 1956, while the Birmingham manuscripts refer to a set Middle Eastern manuscripts whose dating has also been attempted to be carried out by scholars and other experts. Other documents, artifacts, parchments or shrouds of either a religious nature or a non-religious nature have been found or claimed over the past couple of centuries or decades, and as usual and always, the techniques proposed in this paper can be extremely useful or beneficial. Theories must be constructed and evaluated carefully, and based on the principles of this paper. Read our various papers and publications on scientific method for example, and they can throw and shed further light and clarity on the issue of analysis of evidence.

- Alternatively, this approach can be used to assess and evaluate a wide array of statistics pertain to various aspects of social and cultural life. For example, we may have statistics on people suffering with Cancer, Type two diabetes, or any other ailment. All data and statistics must be evaluated with a generous pinch of salt, and contradictory datasets must be validated and ratified against one another. For example, according to the results of one study, in 2022, there were nearly twenty million new cancer cases worldwide, and in the same year, there were around 9.7 million cancer-related deaths worldwide. The results of this study must be evaluated carefully, along with the method employed, and the results of this study, along with the accompanying and underlying methodologies, must be counterbalanced against the methodology drawn from other rival claims.

- The Piltdown Man was a famous scientific hoax in which a collection of bone fragments were claimed to be the fossilized remains of an early unidentified human ancestor; This claim was made in the year 1912, by an amateur archaeologist named Charles Dawson and Arthur Smith Woodward, a geologist at the Natural History Museum, and the discovery made in England. Though widely accepted in early years, the concept was eventually demonstrably proven to be a fake through radio carbon dating studies carried out in the 1950's, and subsequently completely discarded. Many other scientific frauds have since been orchestrated – we have dissected some threadbare in the recent past, but the same approach for investigation needs to be carried out here, by identifying patterns, and admitting to a wide range of possibilities.

➢ *How do we Proceed in Such Cases?*

There must also of course, be a definite methodology of how we need to proceed in such cases; for example, we need to probe, investigate or dig deeper, carry out a detailed, rather than a shallow scientific investigation investigating all aspects on the data or evidence systematically and meticulously. We must also stay on course with the research regardless of how long it may take, and not be satisfied with preliminary, and non-comprehensive explanations. We must also reconcile contradictory data sets thoroughly and continuously till we get to the root of the problem. This must be done by proactively look out for, or seeking out more evidence. We must always admit to all possibilities, and proactively unearth and discover more complexities in research. This is because critically examining contradictory data and evidence can open up or yield new vistas, avenues and horizons for further critical and meaningful research.

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Critically examining contradictory data and evidence can also unearth more complexities which will not be otherwise discovered through shallow, unidirectional or monochromatic research. We can also adopt cross-cultural research design, particularly for the social sciences – this is an idea that we have championed all along, and will continue to champion for the foreseeable future. This is however yet to become mainstream in many or in most fields of study, just as scientific method is also not widely or universally taught to students in schools.

Dialectics and auto dialectics along with reflective equilibrium (proposed by the American political philosopher John Rawls) must also of course be pursued, and we have dedicated an entire paper to this issue. This idea first arose in Socratic dialogues or the method of Elenchus, and were further refined by GWF Hegel and others; of course, later, much more notoriously, and in a simplistic material sense by Karl Marx, the founder of Marxism and Communism. Likewise, we also need coherentism and epistemic coherenstism in most if not all fields of study, and in all endeavours and walks of daily life. Read our paper, "Advocating Output Criteria based Scientific and Research Methodologies: why the Reliability of Scientific and Research Methods Must be Measured based on Output Criteria and Attributes", that lists out the key characteristics and attributes of good research based on a measurement of the results or output of research. It was published in 2023. [15] [16]

We must also merge local and global considerations, merge short-term and long-term considerations, carry out a synthesis of data, and perform an optimization, prioritization and tradeoffs as necessary. These are concepts known fully well to most scientists and researchers, but must be pursued rigorously and assiduously nonetheless. We also need institutional coherentism. We had also additionally proposed the concept and the idea of "institutional coherentism" in a paper that we had published a year or so ago. As per this approach and technique, all works in any field of study must tally with each as far as practically possible, and careerism wherever pursued must be kept as low as practically possible. It must also be additionally healthy to boot. Likewise, we also need methodological inductivism. Methodological inductivism refers to the aggregation of methods and techniques in a similar fashion or manner as inductivism in order to arrive at, or derive a vastly improved set of methods, techniques and methodologies. This is just a brief summary; read all our previously published works on science and scientific method if possible, and as and when time permits along with standard scientific method. We hope they will open myriad new vistas and horizons for science. We could also humourously suggest that such techniques could be applied to the assessment of trivialities such as the Peter principle and the Dilbert principle; jokes apart such approaches can make a world of difference in the interests of high quality science. [17] [18] [19] [20] [21] [22] [23] [24]

II. CONCLUSION

We believe that this paper is an important part and a core constituent of our ongoing "globalization of science movement" which if its initial contributions are considered and reckoned, is some two decades old by now. Before moving on to the core essence of this paper, we began it by discussing the meaning of the term "evidence", and also by defining and emphasizing its importance and value in science. We also then discussed different types of evidence briefly as we believed they were understood and applied by scientists, researchers and by the common person on the street, and also then explained what was meant by contradictory evidence too. The same exercise was them likewise and similarly repeated with respect to both data and paradoxes, and the different types of data and paradoxes were also scrutinized and analyzed, by drawing information and inspiration from several of our previous papers, and also from commonly known and widely available data and information pertaining to scientific method. The meat and the core essence of this paper we argued, lay in the

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delineation and the systematic discussion and exploration of the core elements and components of this approach, along with the steps involved, and we accordingly provided the rationale for each step as well.

We then wound up this paper by providing a large number of case studies and examples, and offering suggestions and advice on how we believed researcher and scholars should go about implementing such approaches in the cause and in the interests of good, high quality and repeatable science. This, we argued, would make science must more widely accessible and palatable to the layperson, and could inevitably and invariably led to what we have always called 'Scientific progress at the speed of light" as well. Many of our papers, particularly on scientific method were all interrelated and integrated in a continuous chain; in some respects, they all provide multiple facets of a smaller set of more rudimentary issues. Therefore, this paper, we argue and believe is an important cog in the wheel, and an intrinsic part and parcel of our globalization of science movement. This we argue will yield just rewards for science, with a commensurately higher quantum and quality of scientific output in not just one region, but all across the world.