The Legitimate Route to the Scientific Truth©

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ABSTRACT

We live in a beautiful and uniform world, a world where everything probable is possible. The humans have become a dominant component of life form on earth for some time. We realized that intellectual inquiry can have practical outcome, and the humans list of achievements are enormous and impressive. Until the Middle Ages our scientific development has influenced tolerably the existence of all life on earth. However the fast scientific and industrial development of the last two centuries has had devastating consequences. Human thirst for more energy and our failure to harness energy without grave polluting our planet has placed all of us on the path to probable extinction. The burning of organic matter for extracting energy has been a constant and ever increasing source of pollution, we are still doing it. The amazing human intellect has proved capable of amazing engineering discoveries. However, we failed to harvest in a safe way atomic energy and we just started to capture some of the enormous amounts of energy the sun sends in our direction. Since the epic theory of relativity many scientists have embarked in a pursuit of astonishing theoretical fantasies, abandoning the prudent and logical path to scientific inquiry. The theory of relativity is accepted as the work of an undisputable worshiped genius. The theory is a complex theoretical framework to which all universal laws of physics must conform. It is based on the abstract space-time continuum fabric concept, and it is well suited and used for interpreting cosmic events. However, it is not well suited for handling of small, local topics as global warming, local energy issues, and overall common humanity matters. The theory has provided us small benefit in facilitating discoveries that are practical in outcome. Complex dogmatic theories are at times irrefutable since there is no method by which can be firmly challenged. We now forward may fancy theories and spend unimaginable effort to validate them, even when we are perhaps headed in a wrong direction. For example, in our times matters of climate changes are debated by politicians based on economical considerations that are as illogical as they come. The venerable paths of scientific method developed during centuries by prominent scientists and philosophers has been willingly ignored and abandoned for various and prejudiced purpose.

INTRODUCTION

Human activity is universally justified by its essential obligation and endeavor for sustaining its existence; for preserving life. In search of efficiency, along with our human inability to tolerate un-described chaos, we are restless on sorting and ordering of diverse objects. As Freud noted, *"The*

benefits of order are incontestable - It enables men to use space and time to the best advantage". The desired road to order is by adhering to principles such as simplification and efficiency. Primal actions such as counting, grouping, and classification of objects have assisted us in the development of arithmetic, and geometry; they have aided in accomplished a unique attentiveness and facilitated the development of logical/rational awareness. Our minds require order with respect to spatial placement of objects, also with regard to the sequence and duration of events; therefore it substantiates the emergence of the concepts of time and spatial geometry. The beauty and majesty of our universe is undeniable. Physics describes the behavior and structure of matter, and was for long time the focus of our inquiries. The beauty of the stunning *simplicity of the world* is revealed in the laws of physics. It is important and puzzling to mention that generalizations are many times illogical, and nerveless the laws of nature are in some way generalizations. We also must separate the legitimate scientific method from metaphysical speculations. More important to new solutions to the wonders of science, is to challenge and refute unfounded theories based on pre-conceptions. It is obvious that progress is stagnated by the restless acceptance of useless dogmatic ideologies, and an incredible amount of effort is wasted.

Science itself it is a creative activity that in many respects resembles other activities of the human mind. Scientific laws represent mathematical functional relationships between variable quantities. There are two varieties of scientists: applied scientists interested in gaining knowledge from empirical observations and techniques. And there is the pure scientist, he is committed to theoretical understanding of our world, and in some way his tasks are similar with that of solving puzzles. Scientific discoveries are valuable and perhaps now indispensable for the humanity development.

It might be inaccurate yet it is necessary to say that at times scientific research has become scientific self-mutilation, a research preoccupied with increased complexity and speculation, a research that has abandoned the prudent way of validating the truth. Sometimes we accept as true improvable theories that please our intellect with extravagant formulations and results. Some theories are not only improvable, but the avenue to refute them is also non existent. They belong to human imaginative achievements such as the finest novel or symphony, and have no qualified value as scientific contributions.

Genuine vs. Speculative Scientific Theories

If God tells us anything, we must fully believe it; it is the divine truth. But when humans tell us anything we must allow for a chance that the truth is partially or even totally non-existing. There is no harm if it is accepted that some knowledge and truth are beyond our natural abilities to discover or even comprehend. Many serious scientific questions have no possible answer, not entire truth is always known. Even partial scientific detail must conform to a logical validation and we must be careful not to be allowed to travel in the world of fantasies. The philosophy and scientific history is packed with example of scientific errors and we should believe that it continues at the present time. The atomic structure of matter is assumed mostly theoretical, and that implies the possibility that it is tainted with countless ad-hoc theories. Many discoveries based on empirical observations have unsound theoretical explanation by respected scientists. Some sciences can develop for a long time, be widely accepted, and still be no genuine. Conceptual inconsistency, absurdity, disorder, confusion by complexity will lead to false science. Much effort is wasted and progress is stagnated by the restless acceptance of useless dogmatic ideologies.

> As Descartes once said*: "Many assumptions are imaginary and arbitrary inventions of our mind."*

Historically, many scientific theories have been initially rejected or accepted based on general opinion, and some have survived our times as undisputable valid. It is reasonably expected that many "scientific discoveries" of the 20th century are not valid. An essential duty of the scientific marvel is to challenge and refute entrenched theoretical pre-conceptions, to nullify the dogmatic elements of scientific knowledge. Scientific knowledge must be proven/verifiable knowledge; however scientific truth is in fact a universal statement and commonly it is agreed that universal statements are not entirely verifiable. Theoretically, from a probabilistic view any possible event might occur or might never occur but only God can take all things into consideration. Accepting this fact should not encourage us to allow the acceptance of dogmatic theories, the danger of such acceptance is just unmanageable. Therefore we must conclude that unverifiable scientific statements are un-scientific, but not always invalid. Some theories need other new theories to justify them. The new theories also can also be based on some other theories, and in this way we go logically nowhere. That is why at some point the empirical validation is also not only important but mandatory for a scientific discovery to be proven valid.

Scientific progress or revolution is not based in replacing former valid scientific discoveries. The scientific revolutions do replace old and invalid theories that were based on assumptions that are now rejected as unfounded. The genuine scientific discoveries remain universal valid and in no danger to ever be replaced. For example the Archimedes law will always be valid and not questioned.

Intellectual scientific inquiry can have practical outcome with advances in human condition. We need to discover a way to satisfy our energy needs without recklessly polluting our living environment and thus endangering our own wellbeing and even existence. The modern easy access to stored scientific knowledge guarantees the speed up of future scientific progress. In the next paragraphs I'll consider the logical framework need for the genuine scientific discovery and some of the difficulties and misconceptions of today's pure science.

LOGICAL CONSIDERATIONS

We must acknowledge that conditions that rule the universe are not always present in our small section of it. One of requisite of philosophy and also of science is to put forward complex information in a simple and comprehensible way. There is a deep divide between imagining and inferring as a result of a logical train of reasoning. However, reason alone, isolated from observation, can not arrive to a guaranteed valid conclusion about the nature of things. Facts do not reside in our minds and are independent of our understanding of them, and without factual evidence our conceptual theories based on reasoning alone might be qualified as guesses. Humans can be rational; however one might also rationally believe what it is false.

Much valuable philosophy work exists, and it might be able to guide a scientist in making correct evaluation of a scientific endeavor. Following a few points that might guide us in accepting a theory as valid or it would encourage us to reject it until more information/proof of his validity is provided.

1. *A complex dogmatic statement it is sometimes irrefutable since there is no method by which can be firmly refuted.*

2. *To posit a hypothesis as true when not well understood or when on large consensus that is rooted in the author's fame and not much on merit of the work.*

3. *Dogmatic adherence to a favorite/popular theory.*

4. *Scientific discoveries to be valid cannot be in contradiction to any other valid scientific laws, from whatever subject of study. Genuine laws of nature do not contradict any other*

truths, such as scientific or abstract logic as mathematics. No new theory should attempt to nullify legitimate empirical evidence or any conclusive logical evaluation.

5. *Scientific truth is independent of our methods trying to discover it or our classification of it as valid or invalid.*

6. *Some intricate scientific theory can not be completely validated, mainly because it's complexity. It must be abandoned or replaced.*

7. *Scientific truth must always be proven, no exceptions can be accepted.*

8. *Unverifiable statements – even if later proven valid still un-scientific.*

9. *Information truthfulness is no determined by the source or method of acquiring it.*

10. *Some statement are sometimes both true and false – For example if we say the "today is Monday", that can be a true statement only if it happens to be Monday indeed.*

11. *Can we witness an event which do not conform the laws of nature? Such an event is impossible, since any event is a consequence of the laws of nature.*

12. *What's probable is possible. However, just being possible alone does not provide proof of existence.*

13. *The abstract syllogism does not guarantee a unique conclusion, and therefore it is not suitable to be considered scientific.*

14. *We cannot search the world to establish that something does not exist*

15. *Scientific discoveries are validated by the result they arrive and not at the method used to arrive at it.*

16. *Multiple observations can be soundly linked by the use of logical statements.*

17. *Events do not contradict a valid theory, only their intellectual interpretation might.*

18. *Rejecting an argument by objecting to the validity of the premises is sometimes mistaken, because the faulty premises might allow arriving to a correct conclusion.*

19. *The laws of science do not distinguish between past and future.*

20. *In the strict sense, the laws of nature are all deterministic generalizations.*

21. *A generalization does not validate any particular event.*

22. *Abstract premises or middle-term does generate false non-abstract conclusions.*

23. *The syllogism conclusion does not extend the domain of the combined premises, and should not lead to generalizations.*

24. *It is irrational to evaluate a scientific theory on economical, political or religious considerations.*

25. *A generally accepted opinion is not, on that basis, guaranteed valid or a proof of its accuracy; equally, it is not a proof of its falsity.*

MATHEMATICS

Mathematics is not the reality itself; mathematics is an abstract language of precisely describing some logical relation between quantities. There is no real line or point that meets its mathematical definitions. Impossibility of the mathematical abstraction in relation to the material world - a universe filled with mathematical constructs would still be empty. Also mathematics, stripped of meaning, is an integral and indispensable part of logic. I'll like to look at some mathematical tools as statistics. Statistics provide ability in dealing with extraordinary complicated phenomena. By using probabilistic method of some event it does not imply that the event itself is not deterministic. Some problems related to weather, general population, or similar complex events can be studied only by statistic methods, but that do not imply their random characteristic but only great complexity. The probabilistic evaluation would necessitate the use of abstract concepts as random, erratic or chaotic. A chaotic or random view is based on a very complex observation, beyond our mental capabilities to manage.

Furthermore, a computer algorithm to generate random numbers is also deterministic, it generates numbers as it was designed and it furthermore rejects the concept of absolute randomness. Numbers randomly generated satisfy some probabilistic distribution and I can say that absolute random numbers series might not exist outside the metaphysical space. Absolute Randomness and Chaos are metaphysical concepts. There is no random or chaotic force in the Universe, since all forces are consequences of the universe creation by expansion. (big bang) The creating of new forces in the universe is impossible as stated to the universal principle of transformation. (all is a transformation, and not creation) It applies to forces also, not only on the material transformation.[1]

Mathematical expression ***Limit a/0*** $\rightarrow \infty$ it does not relate to the physical world, it is suited for theoretical use since the concepts 0 and ∞ lead to an abstract result. In fact, in this context, a/0 should not even be allowed as a genuine division since the symbol 0 (zero) is an abstraction and the division itself never takes place. The division by 0 is widely used in physics; however the result of infinity is not suitable to be used in any material evaluation.

Mathematics uses a specialized language, as the common language contains too much ambiguity and is not suited for a complex and strict logical representation. In contrast, human mind seems to be deploying a form of fuzzy logic. It can process very complex events better than a computer do, but for example can't handle arithmetic operations like an inexpensive calculator. Mathematics is indispensable structure in the progress of scientific discovery, however due to its complexity can become a difficult obstacle in the broad understanding of complex science.

Statistic Mathematics, the Basis of Quantum Mechanics

Great achievements of the 20th century are the Quantum Mechanics and the Theory of Relativity. Let's examine both theories from the point of you of use of mathematics.

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[1] *Our brain conforms to probabilistic logic; an event is more likely to be true is it is validity is provided by a number of independent sources. P(event) = P(observer1) + P(observer2) + P(observer3).*

Insanity: doing the same thing over and over again and expecting different results. – Albert Einstein

Examining with attention the famous Einstein quotation it seems that the sane view of the world is strictly deterministic, even mechanical. Just consider throwing a fair dice and always expect same results or ringing a friend's door bell and expect that he is always at home. Therefore, it seems that in Einstein view the world is deterministic in nature.

Probabilistic views commonly apply only to multiple events or observations. The random (non-deterministic) character of quantum mechanics is based on Heisenberg uncertainty principle. "The Heisenberg Uncertainty Principle" states that you can never simultaneously know the exact position and the exact speed of an object." - Heisenberg stated that since you could never with great certainty measure more than one property of a particle, you could only work with probability and mathematical formulations. It is said that physical determinism is undermined by the quantum theory, but how and an abstraction view or method of analyses influences the material reality? It is illogical, it can not be. Since simple (singular) events do not satisfy the Heisenberg principle, we can say that they are all deterministic. There is no conflict in the validity of the Quantum View of a System; however labeling a system non-deterministic only due to the use of statistical modeling for analyzing is just non-sense. The undisputed success of the Quantum Mechanics model proves the correctness of the mathematical model, and the uniformity of the properties of matter itself. We live in a world in which the probable is possible.

The classical deterministic laws do not brake down when incorporated in a quantum system. It is impossible, since the event itself is a consequence of the laws of nature. The quantum and the deterministic view of the world are both legitimate, and represent two separate and valid views of the same system.[2]

ABOUT THE THEORY OF RELATIVITY

"If you can't explain it simply, you don't understand it well enough." – Einstein

The Theory of Relativity is a complex scientific framework that facilitates the understanding of the universal laws of physics. Its foundation is the mathematical abstraction of space-time continuum fabric. Theory of relativity uses daring generalizations about the inaccessible that deeply pleases imagination. The today's formal representation of the time-space continuum (a four dimensions object) is not less that a marvel of abstract mathematics. Furthermore, the associated scientific language describing it is highly elaborate and targeted to only a small and select audience. This audience must have a sophisticated knowledge of higher mathematics, and excitingly robust cognitive capabilities, both natural and acquired by experience. In this way, the continuous desired advances of fundamental scientific principles are reserved to only a small number of humans. Curvature of space-time continuum is a mathematical/abstract representation of the object, and not necessarily a characteristic of the space itself. The four space dimensions provide the basis for evaluation of countless theories. That without much rejection since the theories are based on complex dogmatic statements and considered valid since there is no method by which can be firmly refuted. The theory unifies the time and space concepts in a continuum, and the space and time are not regarded as two individual concepts acting concurrently. In physics, space-time continuum is a mathematical model that combines space and time into a single

[2] *For example let's consider the car traffic in a city. For planning purposes a statistical view of the system will provide answers and show patterns that can not be available otherwise, but the deterministic view of the automobile in traffic is not impacted.*

interwoven continuum. By combining space and time into a single mathematical manifold called "the Minkowski space", scientists have a tool to describe in uniform way the laws of the universe at both the cosmic or atomic levels. The theory of relativity is accepted as the work of an undisputable worshiped genius; however that alone it is not a legitimate way to fully validate it.

"The great theories of science may be compared, as creative achievements, with great works of art or literature." – Jeff Giancoli

In the theory relativity, gravitation is an attribute of the abstract curved space-time continuum fabric instead of being a force existing between matter objects. Based on the Theory of relativity the masses distort space-time fabric nearby, and particles move in trajectories provided by the geometry of space-time fabric and objects are free fall travel along geodesics lines of the curved space-time. I have doubt and reservation to accept as valid such a daring theory that sates that the gravitational field is a consequence of a mathematical construct as the space-time continuum fabric is. The space-time continuum fabric is just an abstract concept, and therefore it can not, in legitimate way, be connected to the material world. But since the gravitational field is still mysterious for the human mind, I see this as a major opportunity for future discovery.

The human race has still to handle the need of energy and that without heavily polluting our planet. It has to handle urgent needs such as the global warming. The Newtonian framework has provided a great framework for the development of scientific discoveries, and its basic postulates have been proven genuine again ad again. The theory of relativity has created a wave of research, mainly in the physics related to the construct of our universe. Most of these new theories do satisfy the theory of relativity construct, but it is doubtful if that alone guarantees there validity. We need new scientific paradigm to facilitate the discoveries that would allow us to survive on the overpopulated planet, or it is just a matter of time before we are heading towards extinction. New scientific progress is paramount for the survival of our species.