

ON BEING A THINKER

I am never surprised by the ignorant who believe the pabulum that they are taught and never learn to think for themselves. It amazes that most physicists today know that Einstein believed that black holes (called Schwarzschild's singularities back then) really existed while the truth was that Einstein went so far as to write a paper about why they could not exist. It is therefore a breath of fresh air to find a kindred soul who actually “thinks.” The following online discussion exemplifies how two people by clarifying their definitions, using logic, and really thinking can actually advance their common understanding and further scientific thought.

An online discussion between

Drs. Jacob Ghitis (JG) & James Siepmann (JS)

JS: It is always a pleasure to converse with someone of your caliber. You and I agree on about 90+% of the discussion, which obviously means that you are quite intelligent.

JG: Does this mean that I need to agree with you on (100-90+)%, to be completely intelligent?

JS: Of course: if one of us is 100% right, that makes the other one quite intelligent.

JG: No argument here, Jim: case closed.

JS: Jacob, I too agree that the more math available to validate a theory, the better.

JG: Jim, to validate a theory, it should be proved. Once that is done, the results become part of a given science. Such science now becomes more exact. That's why I said in my previous letter (not posted) that the more math, the more precise the science, which means, more of a science and less of an art.

JS: Jacob, a theory can only be validated, never proven. Once it has been proven or is as close to proven as we can conceive, it becomes fact.

JG: You have now opened a vast range of ideas and definitions to be clarified. I shall start by positing -- actually, stating-- that it is essential to use correct definitions. I'd say that first come the hypotheses, and once they are proved, that is, shown to be correct, a theory can be built upon them. Hypotheses derive from analogical thinking, because they do not appear just out of the blue. Galileo invented a telescope, saw the four Jupiter's big moons, and by analogy, he postulated that Copernicus was right. After this postulate became accepted as a fact, the theory of a solar system was advanced. Nowadays, it is widely accepted that solar systems are common. The theory has now become an accepted fact: the LAW of Solar Systems, which is under study, to round it up.

I do not know how Newton initially approached the now accepted Laws of Motion, but I feel quite sure that first he postulated analogically, and then confirmed the postulates, so that a theory was born. I'd say that the theory was validated by others, resulting in the Laws of Motion: Newtonian Mechanics. Quantum Mechanics is in the process of being shaped. It probably started with the analogy of a legged organism moving by steps, as contrasted with serpentine progress. Besides, the "all or nothing" principle of neuromuscular response was known at the time. I postulate that photons are composed of two units, as shown by having been separated experimentally. They are thus a 'pair,' with very "unusual" characteristics. Quantum Theory will become Quantum Law.

JS: Interestingly, one could make an argument that even what we call facts, are not absolutes. For instance, one could say that the statement "a sphere is round" is a fact, yet an observer in a different reference frame may see it as an ellipse. Very little of what we call fact is 100%.

JG: 'Absolute' refers to a reality that exists, even though H. sapiens may not detect it. It is related to the Platonic "Ideas" or 'Forms,' as contrasted to the Aristotelian 'Material.' Scientists strive to unearth the absolutes, which can be described only in terms of concretions. Aristotle cannot be separated from Plato, and that is what makes their names immortal. Other philosophers delved on this basic subject. Facts are material expressions of absolutes. But... a sphere is round because we call round something that we see as spherical, and the other way around. Thus, it is not a question of being a fact, but just a question of a universally accepted definition. A fact must be 100% true, which means, it must be a concretization of an absolute.

JS: Now we are getting closer to a meeting of the minds as we are refining our definitions. You are therefore saying that reality is beyond any accurate human definition and all we can do is to try and define "facts," the best that we can, using our limited senses, devices, and frames of reference. In fact, in my Laws of Observation, I specifically state that the true reality of an "object" is that from the same frame of reference as the object itself. In doing so, it allows us to give a nonrelative definition to reality.

I do have to somewhat disagree with your premise "the more math, the more precise the science." I believe and can reasonable argue that mathematics is another language that we have created and use to describe both the physically real universe as well as the "virtual" universe (the universe of ideas or concepts which have no basis in reality).

JG: Math is a discipline. It is not a natural or an artificial science, because it doesn't exist as a natural

phenomenon or as a man-made body of thought and technological applications. Once a math equation is proved to be correct, i.e., to represent a natural phenomenon, it becomes an axiom, a truth on which a given science is built upon.

JS: Jacob, math is based on postulates which we assume to be accepted facts (see above). From this logic alone it can be seen that even math is not absolute. Math is not a science but rather a language, allowing us to deal with "objects" that may not exist in the physical universe.

JG: Jim, you are talking of postulates in the sense of axioms, of principles that are universally accepted as being true. I eschew this subject by just telling that the only math that deeply interests me is the one that formulates or purports to formulate absolutes. Maxwell's perfected equations are Laws of Physics; they picture absolutes, which are present in every concretization called electrical phenomenon. Einstein got his Nobel on account of the laws of the photoelectric effect. His Theories of Relativity are being worked upon to modify them until eventually they become Law. His proposed equation of energy and mass has not been validated. Making energy dependent exclusively on arithmetical mass progression is intuitively wrong. What has light velocity to do with the pressure energy stored in the gluons?

JS: Physicists from H.A. Lorentz to H. Poincare to many current theorists, believe that theories need not be understandable as long as the math works (i.e., 7+ dimensions, or that matter is nothing but math).

JG: There is hardly a theory based on math that I can understand, because I know very little math. Yet being a philosopher of science by dint of knowledge and intuitive thinking, I can follow a simple equation and understand its implications. The math used to present a theory will be said to work only after the theory is validated.

Please explain the "7+ dimensions." Are they part of String Theory? I do not know that more than 3 dimensions have been demonstrated to exist. To me, time is a dimension of change, i.e., of energy, not of objects.

As for "matter is nothing but math," I would find more apposite to say, "matter is essentially math." Personally, I have stated: "Math is the core of physics, which is the core of matter."

JS: Jacob, as to the multiple dimensions beyond the typical 3+1 (lwh+t), I myself do not understand the math behind these other dimensions, which my mathematical friends talk about. All I know is that there are a bunch of dimensions in math of which "7" was surpassed some time ago.

JG: Jim, what a relief to read that you also find those "dimensions" queer. Although those working on them humbly accept almost the same ignorance.... Now, I read your paper "Laws of Space and Observation," and of course was unable to understand your advanced mathematics. But I was relieved when reading that you also cannot agree with time as being concrete, but an expression of change. Therefore, why do you use the lwh+t formula?

JS: I do not think that time is relative but I do believe that it exists. A simple logical argument that I use is that if all of the universe began at the same instant and assuming that it will ultimately contract and all the universe will end at the same instant then time must be consistent throughout the entire universe. The only definition of time that I can give is that it is the artificial measurement of the universe's lifecycle. Man

therefore has made artificial units of “time” to describe the advancement in the universe’s life. Therefore philosophically, I agree with you that time as a specific entity does not exist but it is a useful tool in describing reality. Just like “radius” does not really exist, it is descriptive of “length,” likewise I have tried to show that time is nothing more than a way of describing light. For instance, 1 second = $3E8$ m/s length of light.

JG: Let this now be an opportunity to challenge your postulate that space is fixed. Then you say that it is there just waiting for mass to fill it up to its boundaries? I have postulated that space is created by mass and that therefore its boundaries are an expression of the amount of mass in the universe. The boundaries will be set by the mass's capacity to keep moving and therefore expanding the universe. There is a LIMIT, because everything that is under the influence of the Laws of Physics has limits.

JS: You and I actually agree that space is not fixed and that it is related to mass. We probably just have come to it from a different perspective and used different terms to get there.

From a previous conversation about math:

JS: Math is a language in that it allows us to describe and compare ideas, just as words do. For instance, I can say "4" or I can say "2 sets of two," of which the latter is a more descriptive form of the actual idea/reality.

JG: Math is a symbolic language that simplifies word language; "4" symbolizes: one plus one plus one plus one.

JS: Jacob, I was trying to communicate, "2 sets of 2" yet if I were to have said "4" you would have misinterpreted what I was trying to communicate. "4" would have been more vague than the object(s) that I was trying to describe.

JG: Clear: case closed.

JS: Jacob, math is nothing but relations and descriptions of ideas and realities. When Einstein derived $E=mc^2$, he did not create anything but he was rather more accurately describing an aspect of physical reality. I could express the same idea by saying "energy is confined within matter and can be quantified by taking the mass of the object times the speed of light (in a vacuum) squared. In fact, I probably was more descriptive in the prose than the math, as the speed of light was detailed as being that which is measured in a vacuum.

JG: Jim, when I refer to math, I mean the symbolic equations that express any one of the Laws of Physics. Einstein's equation took time to be developed by himself, as representing in a symbolic manner one such law. It has not been validated yet. Its impact resulted from its address to the convertibility of matter into energy. I have posited that "gamma bursts" result from a complete conversion of all the nuclear components of a given dead star when it is ingested and compressed to the ultimate critical point inside a monstrous black hole.

How was Einstein's " c^2 " derived and then validated? His equation is not yet a law of physics, that is, not an axiom. I have posted on this conundrum, and now I believe that the equation should be $E=mP$, where P is the pressure required to create the nucleus of an atom. Thus, the more nucleons, the more P, and most probably not in an arithmetic progression. Einstein's formula indicates that uranium contains only about 238

times the energy of hydrogen, which is an intuitive absurd. The pressure required to compress 238 nucleons must be much more than 238 times the one required to make one proton.

It is not difficult to understand the logic of my equation, and therefore of the expression "gluon plasma," since gluons result when the pressure applied reaches the critical limit to make a given nucleon.

JS: Jacob, I did not intend to lead you to the conclusion that I believe in the special relativity. In fact, I agree with you that special relativity it is far from being validated despite academia treating it as dogma. This is quite an extensive discussion that I will defer to Pari Spolter in her book, "The Gravitational Force of the Sun" to which she devotes chapters 2&3 to this topic. In fact, my article on the Laws of Space and Observation in fact are more validated than special relativity and it explains gravity too.

JG: Jim, it is a relief to read that you do not reject off-hand my equation. Does Pari Spolter comment on the implausibility of Einstein's? I suppose she deals with pressure, but does she take P in account as I do, to formulate the concise 'E=' equation?

JS: Pari does a good job at pointing out why special and general relativity are not valid as well as giving examples of scientists altering their data and conclusions to fit the dogma of relativity. Any intelligent review of relativity would show that it is wrong or at least needs major revisions, but unfortunately, too many in science today just believe what they are told without investigating it for themselves.

As with all theories, they are attempts to describe that which exists. I do not find anything wrong with the attempts to better understand/describe reality. Quite the contrary, it is our striving to understand the universe that is one of man's most exciting and challenging endeavors. You like me, seem to be one who enjoys helping others in learning how to think rather than just filling heads with facts/figures. A mind that can think is worth more than a million minds that parrot. Unfortunately, the "status quo parrots" greatly outnumber us thinkers.

JG: I would say that no number of non-creative minds can create at all. We belong to a select group of thinkers; we can help only creative minds develop their capacities. That they are few is just a fact, which is not unfortunate, but a reality that spurs us to fill in the vacuum, for as long as it gives us joy.

JS: Alas, Jacob, though my experience seems to agree with your conclusion, I still hope that we can stimulate dormant creative minds. It would be sad if the human race is losing the art/ability of thought.

JG: Amen, Jim: case closed.

Definitions Addendum

Dr Ghitis' Definitions:

Science: The results of the activities for advancing the knowledge of natural phenomena, and the creative application of such knowledge.

The sciences: Corpora of scientific knowledge on specific areas of human interest.

Natural sciences: Sciences dealing with the study of natural phenomena.

Artificial sciences: Sciences invented, constituting specific corpora of knowledge.

Applied sciences: Sciences --Natural or Artificial-- dealing with the application of scientific knowledge.

Idea: In science, a thought expressed with or without the specific intention of being considered as a proposition.

Positing: (From: to posit.) Presenting a proposition.

Proposition: (Verb: to propose.) A thought submitted for consideration.

Postulate: (Verb: to postulate.) In science, a complex proposition.

Statement: (Verb: to state.) A declaration based on real or alleged information. (A word not applicable in science.)

Hypothesis: In science, a postulate based on analogical thinking. (In philosophy, the parallel is called thesis. In theology, belief.)

Theory: In science, a set of hypotheses, some of them validated, intending to explain interrelated complex natural phenomena.

Law: In science, a theory, once the component hypotheses are considered to have been totally validated.

Scientific Method: The application of observation by means of inductive reasoning, followed by classification and verification by means of deductive reasoning. The use of instruments increases the scope. The reproducibility of positive observations under experimental conditions --by different scientists in different laboratories-- allows the results to be considered as facts.

Fact: In science, a finding consistently verified by the scientific method.

Axiom: In science, a fact or set of facts serving as a stepping-stone to build upon it any of the sciences.

Empirical: Based on inductive and then deductive observations. This is the stepping-stone for scientific research.

Scientific: Based on experimental results, which are referred to as scientific facts.

Dr. Siepmann's Definitions:

describe: to understand the nature of something in the universe and define it in a manner that allows it to be studied and communicated.

fact: a theory that has been validated close to certainty.

hypothesis: a tentative or working assumption which scientific study has yet to validate.

For instance, I can make the hypothesis that fire is hot. I put my hand into a fire and find it is hot. Now it is a theory. If it is validated by many to the point of certainty then it is a fact. Technically, there is nothing that is 100% certain. For instance, I could be existing in a dream world where fire is hot while in my real world fire is cold. Though this is highly unlikely, it still could be so. But when something seems to be confirmed by every reasonable method, then we can call it a fact.

law: a characteristic of the universes that seems fundamental to the workings of the universe.

part: any component of the universe.

Science: the field of study which tries to describe and understand the nature of the universe in whole or part. The field of study or discipline that we call Science is spelled with a capital "S" as it is a proper noun in this use while science with a small "s" is the application of this discipline.

theory: a hypothesis or group of hypotheses which have been validated but not to the point of near certainty.

universe: that which exists and in its entirety. This includes all that exists whether it can be perceived or not.

whole: something that permeates the universe at large. e.g. gravity.

In addition to the above definitions of hypothesis, theory, fact, and law, below is an example of their appropriate use.

Let's say that I form the hypothesis that fire is hot. I then put my hand into a fire and find it is hot. Now it is a theory as it has been verified. If it is verified by many to the point of certainty then it becomes a fact.

Technically, there is nothing that is 100% certain. For instance, I could be existing in a dream world where fire is hot while in my real world fire is cold. Though this is highly unlikely, it still could be so. But when something seems to be confirmed by every reasonable method, then we can call it a fact.

A Law on the other hand is not a fact, but rather it is something that seems fundamental to the workings of the universe.

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