A MYSTIC HISTORY IN LIGHT OF PHYSICS

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The author is self-educated with little more math than high school algebra and a course in applied calculus. He retired from a farmer's COOP called AGRIPAC in 1999 after working seasonal at the cannery from 1961. He has learned from an effort of correcting mistakes in providing a clearer path for others to build on.

Besides learning from history, he explains the causes of gravity, electrodynamic phenomena in general and how light and mass are observable parts of a plenum.

FORWARD

When Shayla got off the school bus she laid down on the sidewalk with the neighbor kid. He was doing her homework.

I had to convince Shayla that you learn by doing and that she was not learning by letting someone else do her homework.

As for the reason she did not do her homework, it was because she had a mental block with math. I told her math was a small step by step process and that taking each small step would lead to success, but that getting behind would result in a mental block.

She did not understand how to subtract 60 from 80, but she knew how to subtract 6 from 8. I told her she did not need to memorize each equation, as only ten essential numbers are added, subtracted, divided and multiplied. For instance, subtracting 60 from 80 is nothing more than subtracting 6 from 8 and 0 from 0 to get 20 as two tens.

The mental block had already taken effect. When I gave her a small calculator to help her with her math it became apparent that she was confused as to which way to read numbers. For instance, she would read 56 as 65. She did not have dyslexia, at least as of yet; she had developed instead an inferiority complex in belief that she was expected to know everything grownups know. I told her it is difficult to learn anything if you already know everything and life is a learning process even for grownups. I also pointed out to her that she did learn, as when she correctly answered 11 plus 4 as

15. The praise was to encourage her not to give up in the face of defeat but to confidently know she can find the simple steps to learn. Mistakes can unfortunately be fatal, but I ensured her that those of us who learn from them are more likely to achieve success.

Life is also a learning process for us all, as evident with the historical evolution of theoretical knowledge. However, although scientific theory evolves as a step by step process, a complete knowledge of these steps is generally missing for most of us. An understanding of the tensor calculus of general relativity theory, for instance, is a complex undertaking that only a few of us are willing to commit to. As a result, most of us are inclined to either accept or deny a theory according to faith.

Some of us are more faithful than others. Some of us prefer instead a rationally complete understanding of the world in which we live. Generally we are stuck somewhere between faith and understanding, but the internet now promotes experts on any subject to more easily contribute to a world wide web of knowledge.

Physicists have said a supercomputer is needed to solve Einstein's general field equations, but computer programming is based on a binary code, a simple two number system. It is thus possible to relate Einstein's general field equations to a step by step process for it to be more easily comprehended, but the steps in this case is numerous enough to fill volumes of books.

The math allows us to accurately describe specific aspects of nature. The math complexity also simplifies the task for experts in the field, but it is not needed for a fundamental understanding of theory.

A fundamental understanding of theory can also be undertaken in accordance with its history as a step

by step progression providing a convenient reference to which everyone can relate. However, the history of physics has a mystical side to it. For instance, in view of Aristotelian physics this mystical element included light as the means from which the divine source of all creation supplied the material world with motion and energy. Nowadays relativity of space and time, and of mass and energy, is now described according to how light moves and interacts with matter. Moreover, the whole universe is now assumed to be finite whereby all of its enormous matter and energy expanded, and still expands, from a singularity, a space so tiny that it cannot be defined. Adding to this theory are concepts of dark matter, dark energy, black holes, worm holes, other dimensions, other universes and so forth.

The expanding universe cosmology struggled for a decade or more to become accepted by the majority of mainstream physicists. This difficulty of acceptance is typical of a new theory attempting to overcome the dogmatic view of the establishment. Copernicus, for instance, struggled to establish the heliocentric theory of Earth and the other planets in the solar system, as the Aristotelian doctrine of Earth at rest in the center of the universe had become the official position of the Catholic Church for its interpretation of reality.

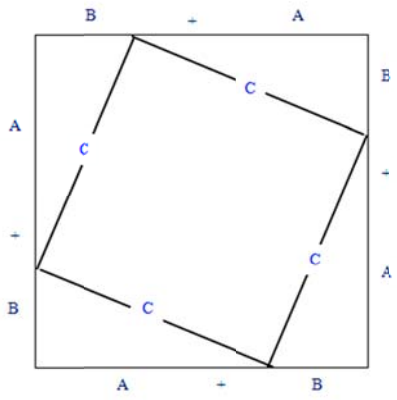
Big bang theory of an expanding universe is now part of the establishment, but throughout history the establishment has been revolutionized by new theory for its ability to better explain new discoveries. It also is questionable whether big bang theory will remain in the distant future as established as it is now. It does have a determined challenge of an “electric universe” theory explaining the cause of light distortion as due to its encounter with the existence of a plasmatic state

of matter in intergalactic space instead of as due to an expansion between galaxies.

The electric universe and expanding universe are both theories with historical origins. Even though the expanding universe theory is now the more popular of the two, in time it could possibly be superseded by the other one. As to whether such speculation of dark energy and worm holes are retained as part of an all embracing new theory or are eventually regarded as having a mystical outlook could very well depend on a general step by step interpretation of the history of theory.

A complete understanding of all this seems out of reach for the simple minded. However, Einstein once suggested an understanding of relativity theory could more be easily understood by way of the Pythagorean Theorem. An effort has thus been made to simplify all the mathematics in this book for it not to be any more difficult to understand than the Pythagorean Theorem is for a sixth grade student.

$$(A+B)^2-4(\tfrac{1}{2}AB)=C^2$$
$$A^2+2AB+B^2-2AB=C^2$$
$$A^2+B^2=C^2$$



INTRODUCTION

Rene Descartes philosophized, "I think, therefore I am . . . . If I am deceived of my existence, then I must at least be the Deceiver." He therefore confirmed his existence by way of his own awareness of himself.

Am I alone?

Resistance to thought and action testifies there is an objective world extending beyond my control. I am not alone. We therefore exist.

I witness existence but do not seem to know how either existence or a state of consciousness is possible. I therefore merely assume we are parts of creation, as by a Supreme Being or from what already exist.

Can something exist without our awareness of it? No matter. Never mind. The mind-matter duality is of no concern, as this book is about the physical world inasmuch as our material existence is comprised of a substance of some sort that varies in shape, size and so forth. In this regard philosophers have attempted to explain everything that exists in the physical world as part of a primary substance that became referred to as æther.

Suppose all physical reality is indeed comprised of æther. What, then, are its properties? How does it, for instance, separate from and recombine with itself in creating all the effects of reality? A substance being primary implies it has no internal mechanism to bond to itself other than by pushing against other primary substance. It must thus be intrinsically elastic in order to maintain a force of action by way of motion, as all

action between itself would otherwise result in a loss of relative motion.

Another likely condition for primary substance is that it needs to be of infinite content, even to partially fill infinite space if not all of it, in order that it is able to change direction by way of elastic collision instead of spreading apart without a way to reverse direction to again interact with itself. The question then comes to mind as to whether space is a plenum of æther or a partial vacuum and æther.

Descartes along with other philosophers assumed space consists of a plenum.

How, then, do various densities of matter exist if the æther is everywhere identical in composition?

A plenum does not even have wiggle room for a wave action to occur in the manner sound propagates through air as compressed states of air molecules. The æther as a plenum is thus contrary to the air medium for sound.

It is no wonder that early Greeks deep in thought regarded our world as illusionary. As for the plenum, they considered circular motion in it as possible. In a roundabout way motion is allowed by the complexity of circular paths.

Descartes also assumed all stuff moves circularly. He described it as evolving into a complex system of vortices of various sizes and rotational speeds. Total motion is conserved, as allowed by the movement of other æther. As for the complexity of motion, endless possibilities exist by way of the movement of vortices inside other vortices in creating various relationships. A number of like vortices in one region of space can thus be relatively denser than those in another region of space. However, since the density of this primary

substance is everywhere the same, the world comes about by the exchange of motion between vortices.

The source of all creation is thus already created out of what already exists ad infinitum.

In Light of Physics

Some things seem unexplainable; other things we can explain we seem unable to prove. We cannot, for instance, explain the existence of the æther if there is indeed this primary substance from which all things form, but we can use it to explain how constant light speed is possible. A mathematical explanation of it, in fact, was given at the turn of the late 19th century by Hendrik Antoon Lorentz. His equations indicate there is a cancellation of effects whereby the absolute state of rest through which the æther moves is invisible to us.

As an alternative to explaining the null results of experiment Albert Einstein merely postulated instead the constant nature of light speed as an experimental fact and he made no reference to the æther. He stated the concept of the æther is not necessary to formulate theory; all that is needed for describing the observable world in its functional manner is to formulate laws of nature mathematically.

Einstein did formulate special relativity as a self consistent theory in agreement with observation, but physicists were still speculating on the true natures of light and matter. Max Planck had proposed in 1900 a quantum condition for explaining particular effects of thermal radiation. Albert Einstein, in support of this quantum condition, explained the photoelectric effect as particles of electrons recoiling from the impacts of

particle-like radiation instead of wave-like properties, as had previously been discovered of light.

Leading into the twentieth century was thus two revolutionary ideas with regard to the relativistic and quantum nature of light. For the most part these two revolutionary ideas were not at odds with each other. A similar effect to the photoelectric one, for instance, is the Compton Effect whereby Compton formulated quantum effects in a manner consistent with relativity theory. Similarly, in 1924 Louis de Broglie discovered wave-like properties of matter and he also formulated them quantitatively according to relativity theory.

Initially the quantum was nothing more than an added condition of relativity theory, but eventually it developed into a contrary means of explaining nature. Whereas relativity theory is deterministic with regard to cause and effect, quantum mechanics interprets the quantum as conditional to probability.

This condition of probability pertains to the wave effects of nature. Erwin Schrodinger provided a wave equation to formulate de Broglie's ideas according to Wave Mechanics whereby an electron cloud produces quantum effects. However, subsequent analysis of the particle-wave duality by such physicists as Bohr, Born and Heisenberg led to the principle of uncertainty, as stated by Heisenberg. The world on the atomic scale is thus indeterminate with regard to direct cause and effect.

In 1927 the top physicists of the time convened in Copenhagen, Germany to conclude a yearlong debate ending with the Copenhagen Doctrine. Schrodinger's wave equations had been shown to be successful for predicting events, but Max Born, Werner Heisenberg and Niels Bohr argued there is an impossibility aspect

of determining exact position and exact momentum of a particle, as the means of observing them (such as by light) necessarily influences the outcome of the event. Schrodinger's wave mechanics was thus accepted as a means of predicting outcomes, but only with its wave equations reinterpreted as probability equations.

Along with indeterminism and the particle-wave duality was the demise of the æther as a valid means of explaining nature. Since the primary aim of science is to describe nature in accordance with observation, and since experiment indicates the æther is invisible if it does exist, it is thus non-existent as far as science is concerned.

Although Einstein stated the æther is superfluous for the formulation of theory, he did suggest that it is useful for understanding theory by way of a historical perspective. There is as there should be, for instance, experiments attempting to determine the simultaneity of events, as contrary to SRT, but they could easily be misleading if they are without historical reference to the invisible æther at absolute rest. If the simultaneity of events is absolute instead of relative, for instance, it is then possible to determine the speed of light with respect to absolute rest, which is what really needs to be proven. Premature claims contrary to the history of special relativity therefore tend to confuse rather than benefit our understanding of theory.

Even though Einstein was highly respected for his opinion, his suggestion was trumped by other leading physicists of the time. They decreed the concept of the æther is beyond objective science. As far as science is concerned what is unobservable does not exist. Since the æther had been determined to be invisible at best, it was therefore proven not to exist in the real world.

Criteria of Theory

The general criteria of a theory of science are that they describe, explain and predict phenomena. Space, time and motion, for instance, are described as units of distance, units of time and the amount of distance something moves per unit of time. Explaining motion according to theory is according to laws of motion. If mathematically described, then the theoretical laws of motion predict places and times for events to occur.

If a theory does not predict anything, then it is of no use to science. The ability to predict results is thus what establishes theory. General relativity theory, for instance, was established after astronomers confirmed its prediction that the path of light close to a massive body such as the sun is curved.

Another establishment according to prediction is the big bang theory. It was established by a discovery of a cosmic background radiation whose temperature at present agrees with theory in that the expansion of the universe from creation has cooled it. The original prediction was 5 degrees Kelvin by Ralf Asher Alpher (1921-2007), as in accordance with his explanation of how heavier elements formed from the cooling of the universe from its expansion. At the time, however, an exact rate of the expansion was not accurately known, leading to such other predictions as 50 degrees Kelvin by Gamow and 10 degrees Kelvin by Peebles. It was eventually determined as 2.7 degrees Kelvin although the range in the Hubble Constant has varied over the years from about 50 to 80 kilometers per second for a distance of one million parsecs.

Olaf Kristian Bernhard Birkeland (1867-1917) also proposed a theory as early as 1896 that did not receive

acceptance until confirmed by a space probe in 1967. After providing a general solution to the equations of the theory of electromagnetism given by James Clerk Maxwell (1831-1879), Birkeland applied the theory to explain the auroras of northern and southern lights as disturbances from the sun's radiant energy interfering with a magnetic field above Earth's atmosphere. Since he described the magnetic field as an ionized gas, and because Lord Kelvin had stated all space between the Sun and above Earth's atmosphere is void of matter, Birkeland's theory was discarded until the magnetic field of plasma was discovered by a military probe in 1967. Overwhelming evidence in support of it in the 1970s occurred by way of satellites in orbit. It is now estimated that more than 99 percent of the mass in the universe is in the ionized state now called plasma.

Consistency of Theory

History is not only useful for an understanding of theory; it can help maintain and restore consistency of theory. As a theory evolves it adapts to explain more phenomena. Sometimes inconsistency results because of incorrectly adapting to new discoveries. Sometimes further correction of past theory is needed.

Big bang theory is a prime example of theoretical evolution. It has been modified repeatedly in order to be consistent with new discoveries and it most likely will require further modification if not replaced with new theory altogether.

Big bang theory has been challenged with internal inconsistencies, as with problems regarding flatness, fine-tuning, a monopole, the nature of a horizon, etc. Alan Guth was able to resolved most of them with the concept of inflation predicting lumpiness during early

expansion, but this success is countered with another problem.

The other problem is the expansion rate appears to have increased instead of decreased by gravity. The existence of dark energy is assumed its cause, as by a cosmological constant provided by Einstein's general field equations. The cosmological constant is a natural result of the calculus, but any value, including zero, is possible. It is thus allowed but not required and there is counter reason that it does not apply.

One reason why the cosmological constant might not apply could be a Cosmic Coincidence that the big bang theory does not explain, as of yet. Gravity is an extremely weak force compared to an electromagnetic one, as indicated by the equation

$$\frac{Gm_p m_e}{e^2} = 4.4 \times 10^{-40}$$

G is the gravitational constant of proportionality that determines the gravitational potential at any distance r from any mass m in the manner Gm/r. In contrast, e is an electronic unit of charge relating electromagnetic potential in the manner e^2/mr. The above equation is obtained by dividing the gravitational potential of say the proton mass m_p by the electromagnetic potential at the same distance of the electron mass m_e.

A numerical equivalent to this ratio is obtainable in relation to the Hubble Constant. Its value according to the data obtained by the WMAP space probe is H_0 = 70.5 ± 1.5 kilometers per second from a light source one hundred million parsecs from us. At a distance of $2r_n = 5.76 \text{ X } 10^{-12}$ centimeters, which is the diameter of the nucleus of the hydrogen atom, the velocity of the Hubble Constant is much smaller. Since one hundred

million parsecs is 3.09 X 10^{19} kilometers, dividing 70.9 km per second by 3.09 X 10^{19} km and multiplying by 5.76 X 10^{-12} centimeters is 1.32 X 10^{-29} cm per second. This velocity per light speed of 3 X 10^{10} cm per second is also 4.4 X 10^{-40}. Because 70.9 km per second is well within the range of 70.5 ± 1.5 km per second:

$$\frac{H_0(2r_n)}{c} \cong \frac{Gm_pm_e}{e^2}$$

The speed of the Hubble Constant at a distance equal to the diameter of the hydrogen nucleus thus appears equal to the ratio of electromagnetic and gravitational potentials between the proton and electron masses.

Big bang cosmology provides no explanation for the Cosmic Coincidence as of yet. The reason for this lack of explanation is the constant rate of expansion is actually variable. If the universe does expand, the rate of expansion is only constant with regard to distance. It is not constant with regard to time. It decreases by the increasing distance between galaxies. The Cosmic Coincidence, in theory, is thus just a coincidence.

A remarkable coincidence it is and one that might be explained by either another modification of the big bang theory or another theory altogether. There is no lack of candidates, which include the electric universe of plasma cosmology, a new tired light theory, and an application of Zero Point Energy (ZPA).

Another asset of history is discarded ideas due to lack of development and verification might still prove to be useful. Birkeland's plasma is one example; ZPA might be another.

Plank proposed the concept of ZPE as an attempt to explain the quantum according to classical laws of nature. It means that if you remove all mass and heat

energy from a system, there is still motion of energy in space. Although it was proposed by Plank in 1811 before Heisenberg proposed his uncertainty principle, ZPE is consistent with the principle, which predicts events exactly according to their uncertainty, such as the existence of a virtual field of particles. There is too the condition of probability that motion must exist at a temperature of absolute zero.

Another requirement of theory is that it needs to be consistent with other theory. Einstein, for instance, attempted for several years to unify his field theory of gravity with that of electromagnetism. Here, too, the concepts of ZPE and electric plasma cosmology could be relevant. Plasma is of an electrical origin and ZPE could be the means of explaining both it quantum and relativity aspects.

Big bang theory requires an underlying source of energy to explain an increase in the rate of expansion. ZPE might well be the mysterious dark energy that is hypothesized. However, this assumption implies big bang theory is indeed correct.

Another possibility is a New Tired Light Theory proposed by Lyndon Ashmore. It explains the Hubble Constant not as a red shift due to galactic recession; it is instead a red shift caused by the absorption of light energy as it moves through the plasma in intergalactic space. Some evidence in favor of it is the discoveries by Tift and other astronomers that there appears to be a red shift in correlation with the plasmatic density of galaxies and their clustering.

The Objective

As for the objective of this book, it is to review the history of theory for a more simple understanding of

its development. The history of theory, as considered here, reaches as far back as Aristotelian physics and it includes quantum physics, relativity and cosmology.

Although the æther is now regarded scientifically invalid, it is here used for an understanding of theory. The æther not only provides the means to explain the constant nature of light speed; an explanation of how it is possible matter can emit gravitational energy in a way it continues on gravitating all mass the same and not violate conservation of momentum is provided as well. How the continuous creation of gravity does not overfill space with it is also explained. Moreover, the underlying nature of mass is explained along with the equivalence of inertial and gravitational mass, and the effects of electromagnetism. The positive and negative charges of electricity attract each other; charges of the same polarity repel each other. However, currents of electricity contract if moving in the same direction but repel if moving in opposite directions. Furthermore, light reflects and moves at the same speed, but matter reflects to move at various speeds. Different light can occupy the same space; different mass cannot.

All of these explanations are in view of a plenum and consistent with a tired light theory and recycling universe that is without limit except it is divided into finite parts limiting observation to within it.

For the most part there is no modification of GRT, but gravity is no longer considered the fundamental source determining the nature of all reality. SRT and GRT both describe relativistic effects of spacetime, but more primary than is gravity is the “electric universe” from which gravitational radiation is a particular part of the electromagnetic spectrum of light . . .