The Journal of **Common Sense Science**

FOUNDATIONS OF SCIENCE

February 2017
Volume 20
Number 1

What Is Time and Space?

Charles William (Bill) Lucas, Jr.
29045 Livingston Drive
Mechanicsville, MD 20659
Bill.Lucas001@gmail.com

Abstract. The history of the concepts of space and time in natural philosophy reveals common threads that the Greek historians attribute to Mochus the proto-philosopher. These notions come to full fruition with the discovery of the universal electrodynamic force. From the perspective of the universal force, empty space consists of electrodynamic fields from which all matter is formed from solitons or standing waves of the field. Time is measured in terms of quantized periodic processes in nature.

Introduction. The common sense of the average man says that time is based on regular periodic events in nature. Thus the day is measured by the rising and setting of the sun. A month is defined by the phases of the moon. A year is defined by the motion of the stars in the night sky as the earth goes around the sun. The seasons of the year each last three consecutive months. These common sense notions were sufficient for man to plant and harvest his crops, to measure the age of his children and himself, and to measure the age of most objects. In a similar manner common sense says that space is a three dimensional volume empty of all matter.

Ancient Concepts of Time and Space. Mochus the Phoenician is listed by Diogenes Laërtius (180 - 240 AD), the principal biographer of Greek philosophy, as the proto-philosopher or first philosopher. [1] Strabo (64 BC - 21 AD), on the authority of Posidonius (135 – 51 BC), speaks of Mochus (1391-1271 BC) as the original author of the atomic monad theory and says that he was more ancient than the Trojan wars (1260 to 1249 BC).[2] He is also referred to by Josephus (37 - 100 AD) [3], and Tatian (110 - 180 AD) [4] who said that "men ought to believe the more ancient authority of Mochus than the Greeks who had borrowed from Mochus, as from a spring, without acknowledgment and in many cases had perverted what they took", and by Eusebius (263 - 339 AD). [5] The 17th century Cambridge Platonist Henry More (1614-1687 AD) traced the origins of ancient atomism back, via Pythagoras and Moschus, to Moses the Hebrew lawgiver.[6] Colin Maclaurin in his four volume series on the philosophies of Isaac Newton (1643-1727 AD) records that Isaac Newton agreed with Henry More's conclusion. [6]

Unfortunately copies of the early writings of Mochus on monads, atomism, time and space have not reached our time directly. However, it appears that they were known to the ancient Greeks and other nearby societies such as the Babylonian, Persian, Indian, Islamic, and Roman. If Mochus was indeed the Hebrew Moses, then there was probably a religious orientation to the original theory of time and space. In any case it may be possible to piece together the original theory of time and space by combining the ideas of these nearby societies in a coherent fashion. Many of them appear to have emphasized various parts of "proto-atomism" that fit their culture or religion.

Ancient Greek philosophers, including Plato in the Timaeus, identified time with the periods of motion of the heavenly bodies. They also believed that the universe had an infinite past with no beginning.

Ancient cultures such as Incan, Mayan, Hopi, and other Native American Tribes – plus the Babylonians, Ancient Greeks, Hindus, Buddhists, Jains, and others - have a concept of a wheel of time. They regard time as cyclical and quantized. It consists of repeating ages that happen to every being and bit of matter of the Universe between birth and extinction.

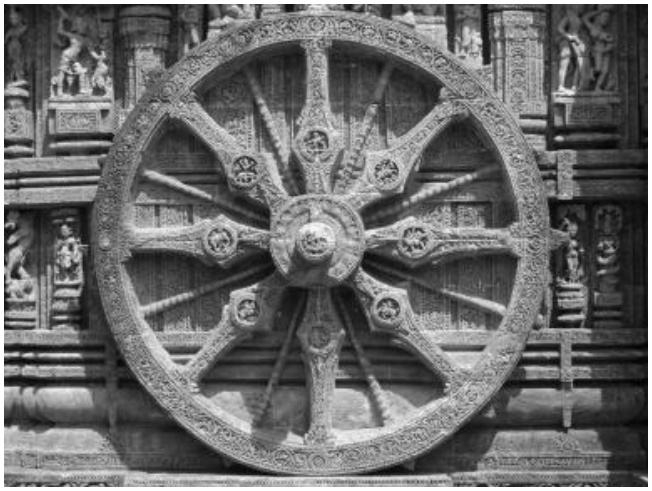

Figure 1 Hindu Wheel of Time

The Hindu timeline is considered by some to be the closest to modern scientific timelines.[7] It suggests that the Big Bang is not the beginning of everything[8], but is just the start of a present cycle preceded by an infinite number of universes and to be followed by another infinite number of universes.[9]

According to the Jewish Kabbalah time is a paradox. [10] The future, the present, and the past are recognized to be combined and simultaneously present.

Medieval philosophers and theologians developed the concept of the universe having a finite past with a beginning. This view is shared by Abrahamic faiths as they believe time started by creation, therefore the only thing being infinite is God and everything else, including time and space, is finite.

Renaissance Time and Space Concepts. As natural philosophers like Johann Kepler (1571– 1630 AD) and Galileo Galilei (1564-1642 AD) began to study our solar system, they discovered that the planets move about the sun in elliptical orbits that sweep out equal areas in equal lengths of time. Thus time and geometry became involved in the empirical data describing nature.

Then Isaac Newton (1643-1727 AD) discovered that Kepler's Laws could be explained in terms of the force of gravity and the force of inertia. This approach could not only describe the motions of the solar system, but also motions and processes on the earth that could be measured more easily and accurately. Newton believed in absolute space and time with all inertial observers measuring the same time interval for any event.

However, Newton encountered some difficulties. When asked by his fellow natural philosophers what mass is, he had to say that he really did not know, but that it was some property of matter that caused the force of gravity or the force of inertia. When asked how the force of gravity and inertia were transmitted through empty space with no matter, he again had to admit that he did not know. The force of gravity was like the magnetic force of the Chinese lodestone on iron. One could not see how the force was transmitted from the lodestone to the iron.

Figure 2 Lodestone Attracting Iron Nails

Normally when one transmits a force from one body to another a tool or device made of matter is used to transmit the force like a hammer or a wrench. Does empty space contain unobservable matter that transmits the magnetic and gravitational forces?

In 1785, the French physicist Charles-Augustin de Coulomb (1736-1806 AD) published his first reports on electricity and magnetism[11, 12] where he stated his law for the electrical force between static charges. Using a torsion balance he found that the Coulomb force depended on $1/R^2$ the same as the force of gravity.

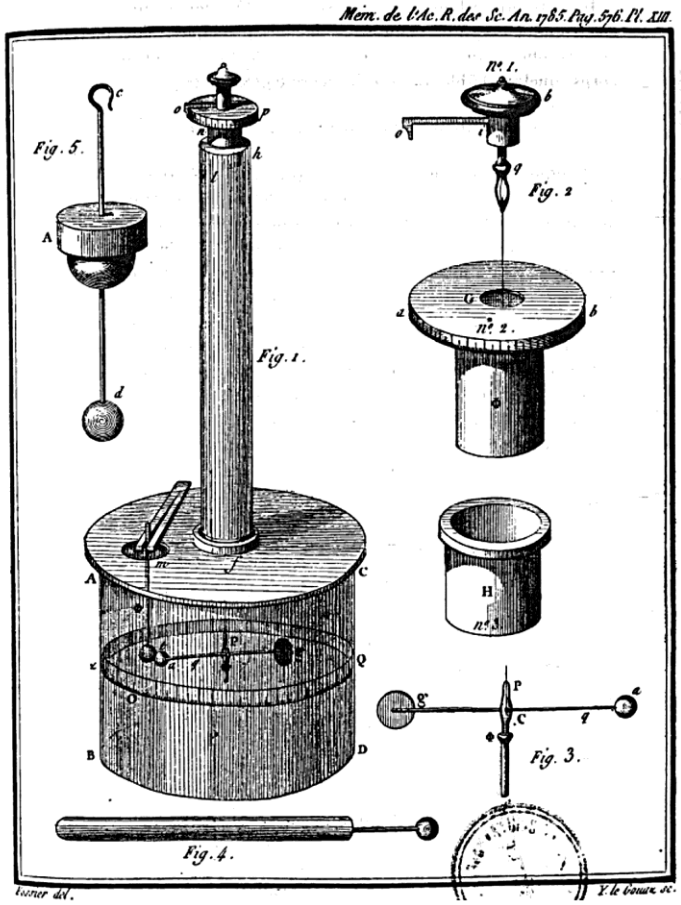

Figure 3 Coulomb's Torsion Balance

Modern Concepts of Space and Time. In 1905 Albert Einstein published his theory of special relativity[13] and in 1915 he published his general theory of relativity [14]. General relativity generalizes special relativity and Newton's law of universal gravitation, providing a unified description of gravity as a geometric property of space and time, or spacetime. According to general relativity, the observed gravitational attraction between masses results from the warping of space and time by those masses. It also provides the foundation for the current understanding of black holes or regions of space where gravitational attraction is so strong that not even light can escape.

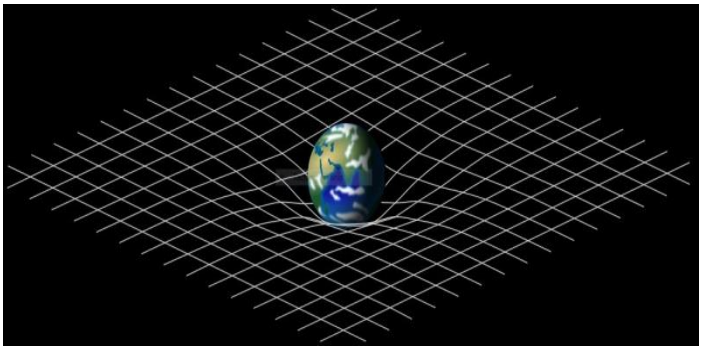

Figure 4 Fabric of Einstein's Spacetime

At this point in science time and space were considered the coordinates of four-dimensional spacetime which is a unified fabric throughout the universe. This fabric has some tensile strength to it, but Einstein did not define it physically only mathematically. Scientists cannot observe the fabric of spacetime directly, but they can make mathematical predictions of some observables.

Einstein's General Theory of Relativity predicts that the path of light is bent when it passes close to a massive body like a star. Sir Arthur Eddington [15] claimed to verify this prediction when he observed the bending of starlight near the rim of the Sun during a solar eclipse in 1919. Thus the sun, stars, quasars and other astronomical bodies should be able to serve as a kind of gravitational lens.

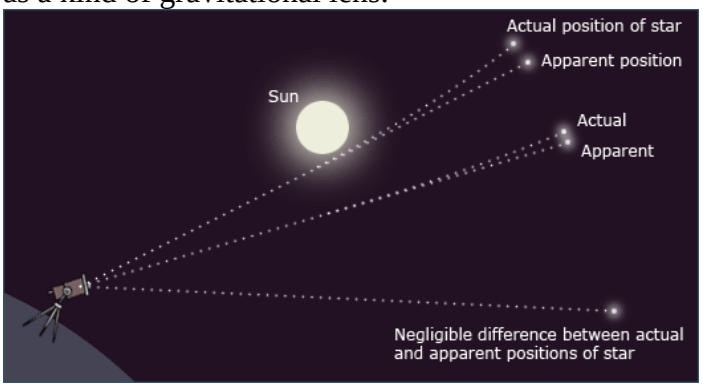

Figure 5 Bending of Starlight Passing Near the Sun

As NASA began its space programs to investigate and confirm these crude findings by Eddington using a telescope as a star passed by the rim of the sun, a different picture emerged. The bending of the starlight observed by Eddington was caused by the thin plasma rim of the sun not General Relativity Theory. Furthermore at distances of 2, 3, 4 times the radius of the sun, which was beyond the plasma rim, no bending of starlight is observed. However, General Relativity Theory still predicts a measurable amount

of bending at those distances. See Figure 6 below which shows what General Relativity Theory predicts. Figure 7 shows what is measured at various distances from the sun using the data of Lebach [16] as corrected by Dowdye.[17]

Dowdye assumes conservation of energy will determine how an electromagnetic wave will propagate along a minimum path or a least time path in a plasma atmosphere under the influence of the gravitational gradient fields of the sun. Only the electrodynamics of the plasma rim of the Sun is needed to explain the data. There is no role left for General Relativity Theory's fabric of spacetime bending of light!

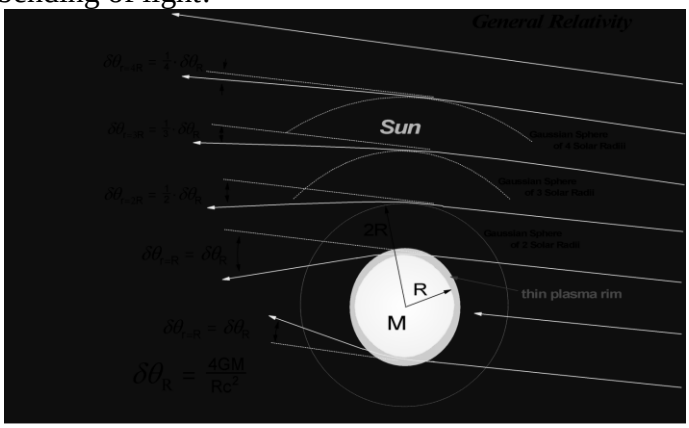

Figure 6 General Relativity Predicted Bending of Starlight by the Sun [16, 17]

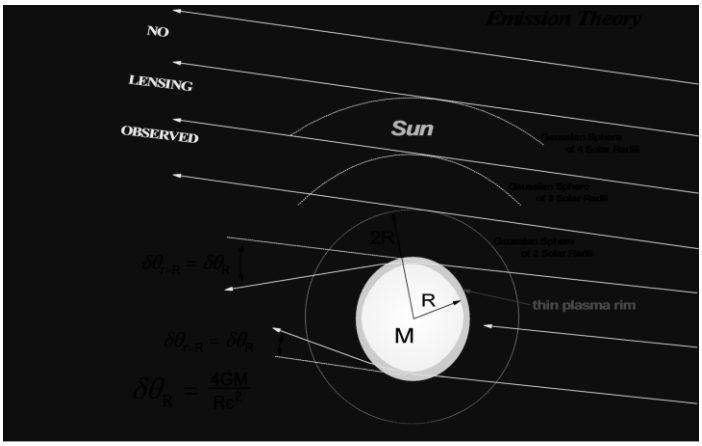

Figure 7 Observed Bending of Starlight by the Sun [16, 17].

Not long After Newton's death in 1727, Titius Bode revealed his new empirical law in 1766 showing the quantum periodicity of the orbits of the planets. His work has been refined by Stanley Dermit as shown below giving rise to the quantum law

$$P_n = P_0 A^n$$

where P_n is the period of the nth planet, P_0 is the period of the sun's rotation and A^n is the semi-major axis of the nth planetary orbit. See Figures 8 and 9 below to see how well Stanley Dermit's quantum law fits the data for planets and moons. The discovery of Bode's Law indicated that time was quantized in periodic processes in nature. Newton's derived force laws were incomplete, because there was another empirical law defining the quantization of gravity and orbital period times that he had not taken into account.

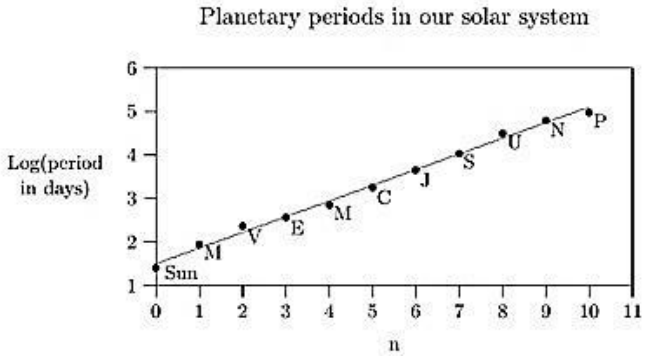

Figure 8 Bode's Law for the Sun and Its Planets

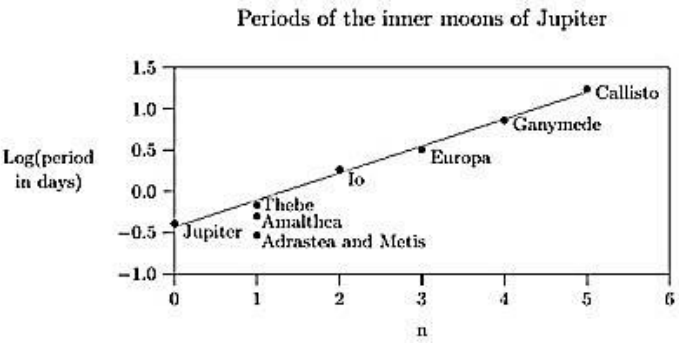

Figure 9 Bode's Law for Jupiter and Its Moons

With the development of the theory of the chemical atom in the 20th century came the development of quantum mechanics. Quantum mechanics sees space as a void. The Heisenberg Uncertainty Principle predicts the random creation and annihilation of particles in empty space. Time is considered an illusion with no necessary relationship between the past, present and future. The universal wavefunction gives a random statistical view of events in spacetime.

In the 1960s Winston Bostick, the last graduate student of Nobel Prize winner Arthur Compton, began experimenting with electrodynamic plasmas and discovered plasmoids (solitons or long-lived standing waves of the electrodynamic field). By 1985 he had sufficient experimental data to propose that the

electron, positron and other elementary particles were soliton structures of the electromagnetic field with different stable algebraic topologies.[18] All solitons, or building blocks of elementary particles, are of the same shape, i.e. a toroidal ring. They consist of only two types, i.e. soliton and anti-soliton.

In 1974 John H. Kenny published his work showing that the masses of elementary particles[19] could be predicted to high resolution assuming that the inertial mass of an elementary particle is due to the vibrations and rotations of the solitons within that particle's structure. This gave considerable support to the soliton approach.

Also in 1974 William J. Hooper published his book **New Horizons in Electric, Magnetic, and Gravitational Field Theory** [20] in which he showed from experiment that there are three types of electric and magnetic fields. Since the time of Maxwell, scientists had assumed that there was only one type of electric and magnetic fields even though the empirical laws of electrodynamics did allow for three potentially different types. Hooper found experimentally that there were three types and they each had distinctively different properties, e.g. some electric and magnetic fields can be shielded and others cannot.

Summary of Concepts of Space and Time. If one assumes that much of the ancient concepts of space and time are bits and pieces of the original concepts of Mochus, one should be able to construct a coherent view that would have been appropriate for Moses the Hebrew lawgiver to have expressed.

From the oldest Indian philosophers one obtains the idea that all elementary particles and chemical atoms are composed of monads or solitons of the electromagnetic fields producing different properties due to different modes of geometrical combinations. These solitons can combine in pairs (dyads), trios (triads), etc. The medium, void, or electromagnetic fields between monad or soliton structures mediates forces and causes conservation of energy and momentum. In this medium monads can be annihilated by their contrary or anti-monad. The motion of matter composed of monad structures is determined by forces on the monads conveyed via the electromagnetic fields. God creates all monads and monad structures from the electromagnetic fields.

From the oldest Greek philosophers one obtains the idea that nature consists of two types of medium, i.e. monad structures and void or electromagnetic fields. Monads or atoms can combine to build larger matter structures based on geometrical combinations giving rise to a variety of shapes, sizes, and other properties. The void is the absence of monad structures in the electromagnetic field. The four basic structural forms of matter are solid, liquid, gas, and electric plasma or fire.

From the oldest Roman philosophers one obtains the idea that "nothing is made from nothing". Thus all monads and monad structures are solitons of the electromagnetic fields.

From the oldest Arabic and Spanish Islamic philosophers one obtains the idea that monads are the only semi-permanent things in existence. All else is accidental and lasts only for an instant. All of the monads and monad structures in the universe are a direct result of God's creation and continuous intervention. All of nature is completely dependent on God's sustaining it by means of electromagnetic fields.

From the Hebrew prophets after Moses one gets the idea that God exerts his power electromagnetically as in "His brightness was like the light; He had rays flashing from His hand, and there his power was hidden." [Habakkuk 3:4 NKJV] The Psalmist says "By the word of the Lord were the heavens made, and all the host of them by the breath of his mouth. For He spake and it was done; He commanded and it stood fast." [Psalms 33:6, 9] Also in Hebrews 1:2-3 "But in these last days he has spoken to us by his Son, whom he appointed heir of all things, and through whom also he made the universe. The Son is the radiance of God's glory and the exact representation of his being, sustaining all things by his powerful

word." Thus the word of God is synonymous with the electromagnetic fields which originate in God and carry out His will.

Also the Hebrew prophets after Moses believed that evidence of the past, present, and future were present everywhere. If the electromagnetic fields emanating from God are creating and controlling everything, the current fields reflect the past, present, and the future, because they are continuous.

Modern day science has discovered that the ancient monads of the Greek and Indian Jains are solitons constructed from the medium of the electromagnetic field. Winston Bostick discovered how to make plasmons or solitons from the electromagnetic field within electromagnetic plasmas. All solitons are of the same shape, i.e. a toroidal ring. He proposed that all elementary partices were just geometric soliton structures.

Another modern day scientist, William J. Hooper, discovered that charged elementary particles, such as the electron, were not only made out of solitons of the electromagnetic field, but variations in the field around them due to their field structure extends to great distances and has tensile strength. Thus there is an electromagnetic field fabric to space. If God is the source of all electromagnetic fields in nature, then this explains how he could create and sustain all the matter in the universe in terms of the electromagnetic fields emanating from himself.

John Kenny discovered that the masses of all the observed elementary particles can be predicted and explained by vibrations and rotations of the monads or solitons in the various elementary particle structures.

Hooper discovered that there are three types of electric and magnetic fields. One of these types is due to velocity effects from Lenz's Law causing it to have the property that it cannot be shielded. Thus electromagnetic fields exist everywhere in the universe.

Einstein discovered the fabric of spacetime. The tensile force of that spacetime fabric causes the force of gravity. The presence of solitons in the electromagnetic fields of space causes a warping of the electromagnetic fields about them.

In summary it appears that the concepts of space and time by Mochus the proto-philosopher are that space consists of the electromagnetic fields emanating from God. These fields form the fabric of space and they have tensile strength. Ripples or waves in these electromagnetic fields result in the formation of monads or solitons that combine together to form elementary particles which group together to form chemical atoms and all other forms of matter in the universe. Time is determined by quantized periodic motions in atoms, solar systems, etc. Without God there would be no space defined by the electromagnetic fields emanating from him and no time defined by the periodic motions of the matter built from the solitons of the electromagnetic fields.

For additional information corroborating this article see the author's books **The Universal Force Volume 1 – Derived From A More Perfect Union of the Axiomatic and Empirical Scientific Methods** [21] and **Fingerprints of the Creator – The Source of All Beauty in Nature**.[22] In the first book the forces of gravity and inertia are derived from the unique electrodynamic fields that cannot be shielded. In the second book the symmetry of the electrodynamic force is shown to be identical with the symmetry of the godhead.

For since the creation of the world His invisible attributes are clearly seen, being understood from the things that He made, *even* His omnipotent power and the structure of the Godhead… [Romans 1:20]

References.

1. Diogenes Laërtius, **Vitae Philosophorum, Book 3**, p. 126a which calls him Ochus.
2. Strabo, **Geography, Book 16**, p. 757.
3. Josephus, **The Works of Josephus Complete and Unabridged** translated by William Whiston (Hendrickson Publishers, Inc., Peabody, Massachusetts, 1989) **Antiquities of the Jews, Book 1 Chapter 3**, p. 107.
4. Tatian, **The Oratio Chapter 40**.
5. Eusebius, **Praeparatio Evangelica**, **Book 10**, p. 289.
6. Maclaurin, Colin, **An Account of Sir Isaac Newton's Philosophical Discoveries in Four Books Third Edition**, London, **Book 1 Chapter 2**, pp. 26-27 (1775).
7. Harry Oldmeadow , **Light from the East: Eastern Wisdom for the Modern West**,World Wisdom, p. 273 (2007). ISBN 9781933316222
8. Sushil Mittal and Gene Thursby, **Hindu World, (**Routledge) p. 399 (2012). ISBN 9781134608751
9. Andrew Zimmerman Jones, **String Theory For Dummies**, (John Wiley & Sons), p. 262 (2009). ISBN 9780470595848.
10. Bo'az Hus, Marco Pasi, Kocku Von Stuckrad, **Kabbalah and Modernity: Interpretations, Transformations, Adaptations**, (BRILL), (2011) ISBN 9004182845
11. Charles Augustin Coulomb, "Premier mémoire sur l'électricité et le magnétisme". **Histoire de l'Académie Royale des Sciences. Imprimerie Royale**, pp. 569–577. (1785)
12. Coulomb, Charles Augustin Coulomb, "Second mémoire sur l'électricité et le magnétisme", **Histoire de l'Académie Royale des Sciences. Imprimerie Royale**, pp. 578–611 (1785).
13. Albert Einstein, "Zur Elektrodynamik bewegter Körper" [On the Electrodynamics of Moving Bodies], **Annalen der Physik** (in German), (Berlin, Germany), 1905.
14. Albert Einstein, "Die Feldgleichungen der Gravitation" [The Field Equations of Gravitation], **Königlich Preussische Akademie der Wissenschaften** (in German), Berlin, Germany, pp. 844–847 (1915).
15. Arthur Eddington, **Report on the Relativity Theory of Gravitation**, (London, Fleetway press, Ltd), 1918.
16. D. E. Lebach, B. E. Corey, I. I. Shapiro, M. I. Ratner, J. C. Webber, A. E. E. Rogers, J. L. Davis, T. A. Herring, **Phys. Rev. Lett**. **75**: 1439-1442 (1995). http://www.cfa.harvard.edu/qpb/vlbi/lebach_prl1995.pdf
17. Dowdye, Jr., Edward H., "Are the Conventional Concepts of Gravitational Lensing Adhering to the Observational Evidence and Mathematical Physics Fundamentals?", **Infinite Energy, Vol. 15 Issue 88**, p. 40 (2009). http://www.extinctionshift.com/SignificantFindings06.htm
18. Winston H. Bostick, "The Morphology of the Electron**", International Journal of Fusion Energy, Vol. 3, No. 1**, pp 9-52 (1985).
19. John Kenny, " An Electromagnetic Inertial Mass Theory Applied to Elementary Particles", **International Journal of Theoretical Physisc, vol. 13, No. 5**, pp. 341-361 (1974).
20. Hooper, W. J., **New Horizons in Electric, Magnetic, and Gravitational Field Theory** (Electrodynamic Gravity, Inc., 543 Broad Blvd., Cuyahoga Falls, OH 44221, 1974), preface. http://www.rexresearch.com /hooper/horizon.htm
21. Charles W. Lucas, Jr., **The Universal Force Volume 1 – Derived from a More Perfect Union of the Axiomatic and Empirical Scientific Methods** (Create Space, version 7 July 2014). See www.amazon.com
22. Charles W. Lucas, Jr., **Fingerprints of the Creator – the Source of All Beauty in Nature** (Create Space, March 2014). See www.amazon.com