A CRITICAL EVALUATION OF MODERN PHYSICS

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revision 15

Introduction

In his article, ***Science And The Mountain Peak,*** Prof. Isaac Asimov wrote: "There has been at least one occasion in history, when Greek secular and rational thought bowed to the mystical aspect of Christianity, and what followed was a Dark Age. We can't afford another!" I don't think I am exaggerating when I say that, when it comes to Modern Physics (also known as New Physics), we have indeed been in some sort of intellectual dark age, whether we can afford it or not. In fact, we have been in it since the end of the 19th Century; and this is when Classical Physics started to be substituted with Modern Physics. This despite the fact there were lots of instances that clearly show the absurdity and science-fictional character of most of the theories of this kind of physics, which I will be discussing in details further on in this article. But for now, the following few examples should prove the correctness of my opinion on this topic. Incidentally, for the purpose of this article, the word 'physics' means mostly 'Relativity' and 'Cosmology'. Also, whenever referring to modern physicists, I think it is more accurate to add the adjective 'theoretical' before the word 'physicists'. I am saying this because I just cannot associate the main tenets of Relativity and Quantum Physics theories with physical reality. The following example should attest the truth of my statement. Back on September 10, 1989, the Australian newspaper *Sunday Telegraph* carried the following bizarre article entitled *Keep Looking or the Moon May Vanish.* Here how it goes: "We now know that the Moon is demonstrably not there when nobody looks at it." No, this isn't a joke or a line from the book *Alice in Wonderland*, but the words of astrophysicist David Mermin, from Cornwell University in the United States. This is an implication of Quantum Physics, according to which the Moon or any other physical object exists only because we observe it. This means that if nobody looked at our natural satellite, or at anything else, it would physically cease to exist. Surely, this has to be one of the most absurd, bizarre, and unscientific statement in the world! Likewise, *Special* and *General* theories of Relativity—another two cornerstones of Modern Physics—have their fair share of illogical and science-fictional theories—and trying to debunk them is the main purpose of this essay.

For many decades, physicists, cosmologists, and some other men of science with a metaphysical-theological bent, have made pronouncements to the effect that recent scientific discoveries have validated the truth of theistic religions. Theologians and the mass media have extended and distorted these pronouncements; as a result, millions of people have derived the impression that science confirms practically most of the Book of Genesis. However, normally these claims cannot stand any serious scientific investigation. A staunch proponent and propagandist of the Big Bang theory and creation from nothing was the late American physicist and professor of astronomy, Robert Jastrow. He was the author of the book *God and the Astronomer*, as well as various articles. Professor Jastrow wrote: " … the scientist who has scaled the mountains of ignorance, is about to conquer the highest peak, and as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries." Here what he meant was that the Book of Genesis was right, and while the theologians knew all along that the Universe began very suddenly in what is called a big bang. But scientists, to their great dismay, had to learn this scientific fact the hard way. Jastrow's metaphorical piece of fiction about scientists scaling mountains is quite charming, but it has nothing to do with Physical reality. Perhaps Jastrow should have been reminded that, according to most cosmologists, the Universe is about 15 billion years old, and the Earth was not created on October 23, 4004 B.C. as Irish Archbishop James Ussher declared about 400 years ago. In fact, it wasn't created but formed about 4.5 billion years later.

Since the advent of the so-called Modern Physics, many physicists and other men of science have made pronouncements to the effect that recent scientific discoveries have validated the truths of religion. Theologians and the mass media have extended and distorted these pronouncements; as a resort, many people have derived the impression that science confirms practically mostly the Book of Genesis. However, when the claims of these scientists have been carefully scrutinized, they have been found to be groundless! Theologians and philosophers with a religious bent, have often tried to bridge the immense between science and religion—reason and faith. However, not surprisingly, their efforts have been fruitless. Anyways, even if some sort of a link between science and religion could be found, its strength would be directly proportional to the degree of deterioration undergone by science! Science can be defined as the study of Nature and behaviour of everything that exists in the Universe. It is based on human reason, observation, experiment, and measurement. On the other hand, religion is a system of faith and worship based on the fear of death and the unknown. Science deals with facts and objective reality, while religion concerns itself with the imaginary and the fictional.

For many decades the majority of astrophysicists and cosmologists have been busy promoting established pseudo-scientific theories and concepts which, although mathematically acceptable, have never been adequately tested (let alone proved), and have often made a mockery of rational thinking, logic, common sense, and physical reality. Also, to add insult to injury, some of these "scientists" who put these theories in writing, have been very handsomely rewarded! This has been especially the case when they included the word 'God' in the titles of their books. For example, in 1995, Australian physicist Paul Davies was awarded one million US dollars '*Templeton Prize'* for *breaching the barrier between physics and religion.* One million US dollars is a very large sum of money, which could have been used to save the lives of the 25,000 children who died of abject poverty every day. But, these sort of things cannot be expected in the sort of world we live in! For those who have never heard of the *Templeton Prize,* it is an annual award granted to a living person who, 'has made an exceptional contribution to affirming life's spiritual dimension, whether through insight, discovery, or practical works.' As it happened, Prof. Davies received this award because of his two books entitled *God And The New Physics,* and *The Mind Of God.* (If God exists, I wonder what He would thinks about a human who claims to know His mind!) I read bits and pieces of the latter book, but I found nothing in it to keep me reading the whole book. Also, I can't really see how these two books could have helped breaching the barrier between science and religion—reason and faith. Dr John Mood, who holds a master's degree in theology and a doctorate in philosophy and literature, reviewed Professor Davies' book *God And The New Physics,* and here are two of his comments: "It is all here—quarks, miracles, the Big Bang, the soul, quantum theory, time, Black holes, God, Relativity, free will, super-symmetry, the mind, the 'anthropic principle', creation, and galaxies—all thrown together in one indigestible stew. Also: "The fundamental error of confusing different historical epochs and mixing different disciplines underlies many statements by Davies that I found completely insupportable. For example, he thinks that black holes and gravity waves are non-material, that maths enable scientists to describe things beyond the power of human imagination, that life is unlikely in the universe, that 'minds' other than our own can be known only by analogy, that there can be disembodied minds, and that computers can be intelligent beings." Dr Mood ended the review of Davies' book by saying: " The problem is not just Davies'— it affects most philosophers between Plato and Nietzsche as well. If you are an astronomer with a religious or philosophical bent, I cannot help you. Perhaps you do what I have done —give it up altogether for poetry and music, and observing the heavens. There you might find the original meaning of the word philosophy—'the love of wisdom', but you certainly won't in this book." Davis' book is not for astronomers, but for those who are interested in philosophy—more particular metaphysics and theology. Prof. Davies isn't certainly the only physicist who realised the huge money potential of writing pseudo scientific books. Yes, there certainly is; but only for those who value financial gain much more than they value, true morality, scientific truth, and intellectual integrity!

Unfortunately for the advancement of real science, the main trouble with Modern Physics, is that there have been (and still there are) too many theoretical physicists but not enough practical physicists! In his book, *How Einstein Destroyed Physics*, Dr Roger Schlafly, Ph. D., tells the truth about modern physics became science fictional: "Modern physics has been taken over by academic researchers who call themselves theoretical physicists but who are really doing science fiction. They are not mathematicians who prove their results with logic, and they are not scientists who test their hypothesis with experiments. They make grand claims about how their fancy formulas are going to explain how the world works, and yet they give no way of determining whether there is any validity to their ideas." I agree with Dr Schlafly, but for one thing—the damage done to Classic Physics wasn't done by Einstein alone, but mostly by the theoretical physicists and cosmologists of his time, and worse still, by those of the recent past and the present.

As it happened, modern physicists with a theological-philosophical inclination have created a new religion, the 'high priests' of which have managed to turn scientific thought into a system corrupted by metaphysics, theology, and the excessive use of pure mathematics. The irrational and unscientific behaviour of most modern physicists is masterly described by N. Rudakov in his book *Fiction Stranger Than Truth*. In 1981, he wrote: "In the last sixty years physics has been enslaved by theoreticians who have succeeded in abolishing physical reality and replacing it with an empty and barren mathematical formalism. The new physicist no longer studies nature and describes what he has observed in physically meaningful terms. He sits at the desk, manipulates abstract symbols and figures, and communicates what the universe is like and how it ought to behave in the form of equations which are comprehensible only to a very small and exclusive group of theoreticians like himself."

Unfortunately, for the sake of truth and scientific knowledge, the gurus of Modern Physics have always relied too much on mathematics when attempting to "prove" their bizarre (to put it mildly) theories and postulates. Pseudo scientific, meta-theological articles and books about—space-time, Black Holes, the Big Bang and 'creation from nothing', curved space, vanishing Moon, Black Holes, white holes, worm holes, alternate universes, quarks, infinite distortions of space and time, catastrophic infinite contractions, disappearing of matter from space, creation from nothing, the splitting of the whole universe into a number of parallel universes, etc.—could make their authors rich and famous. Be that as it may, I think most of the theories of Modern Physics were (and still are) developed from philosophical and/or theological premises not scientific ones. Therefore, they deserve no place in the serious endeavour of real science!

In conclusion to this introduction I like to make it clear that the main purpose of this work is to examine the main tenets and theories of Modern Physics, not from any religious and/or philosophical point of view, but from a logical, rational, commonsensical, and scientific perspective. Some mathematics will be used but not the type that can be skilfully manipulated to appear to verify almost any claim, no matter how irrational and unscientific it may appear to be.

Concepts and Physical Reality

At this point, I think that a few words of clarification about the big difference between a 'concept' and 'physical reality' are in order, as this important subject is doesn't appear to be properly thought in high schools and universities. The word concept has many synonyms; some of them are: 'idea', 'theory', 'abstraction', 'hypothesis', 'belief', 'opinion', and 'conception'. A thing qualifies as a 'physical reality', only if it can be seen, heard, touched, and/or measured. Theoretical physicists and cosmologists don't often differentiate between ideas and physical reality. Physical reality is the opposite thing of a concept. Concepts, ideas, theories, opinions, etc. are abstractions, and as such, they have no physical existence, but only a conceptual and contingent "existence". An imaginary thing is also a concept invented by the human brain. Physical reality can either be natural or artificial (man-made), but concepts have always a human origin. Although collectively called 'mind', thought, memory, and feeling are functions of the brain too. The pre-Socratic natural philosophers were conscious of the above truths and facts, which is more than it can be said about today's proponents of Relativity and Quantum theories, as well as other concepts of Modern Physics in general.

Imagination is the realm of theologians, religious philosophers, and the proponents of philosophical idealism in general. While true scientists and the proponents of scientific rationalism see things as they are, theologians and other religionists see things as they would like them to be. Concepts are abstractions, and as such they have no physical existence. But most physicists don't often differentiate between ideas and physical reality. All concepts are generated in the brain, not in the non-existing mind! Although collectively called 'mind', thought, memory, and feeling are functions of the brain too. 'Time' is another concept, and a very important one. Mind and time are two of the most misunderstood and misused words in the English dictionary! Here, some readers may say that if time can be measured, it must be more than just a concept, as I stated above. But time cannot be measured; for example, clocks don't really measure time, as they cannot measure something that doesn't exist! Their ticking away at a constant speed measures only the 'passage of existence, and gaps between events'. Likewise, it isn't the passage of time that makes us old, as this process has to do with the wear and tear that takes place in our bodies, and other reasons. This will be explained in the sections headed *Time* and *Space-Time.*

The Concept of Mathematics

Mathematics is the logical study of numerical and spatial relationships. It is usually divided into 'pure' and 'applied' mathematics. In pure mathematics the general theoretical principles are studied in abstract. In other words, it is a concept which doesn't generally refer to physical reality. This branch of mathematics pertains mainly to Modern Physics. For those who may be interested, the main branches of 'pure mathematics' are: arithmetic, tensor calculus, absolute differential calculus, algebra, trigonometry, geometry, logic, number theory, and non-Euclidean geometry. Some of the branches of 'applied' mathematics are: computer science, chemical engineering, aerospace engineering, electronics engineering, optical engineering, mechanical engineering, and the mathematical theories of conventional astronomy.

From the historical point of view, the ancient Egyptians, Sumerians, and Chinese were all using a form of abacus to carry out calculations for thousands of years before the Christian Era. But it wasn't until the 9th Century A.D. that the Persian scholar and genius Muhammad ibn Musa al-Khwarizmi introduced the idea of writing down calculations. The Venetian mathematicians of the 11th and 12th centuries were largely responsible for the introduction of these methods to the West, when it started to emerge from the Dark Ages. However, the application of mathematics to the physical sciences was mainly a 16th Century development inspired by Galileo Galilei. It is from this development that mathematics greatly progressed.

Mathematics can be a very useful, but its usefulness and practical value are directly proportional to its ability to deal with physical reality. Of course, many mathematical formulae have achieved great significance in true science, but mainly in those scientific phenomena that can be proved rationally and scientifically—that is, any physical situation which contains measurable and verifiable elements. However, sometimes some problems can occur during the translation of complex physical occurrences into understandable means of expression. Applied mathematics is great for analysing and describing physical phenomena that occur in those parts of the micro and macro-cosmos which are within the range and capabilities of man's detecting, measuring, and testing instrumentation. In short, applied mathematics has been of paramount importance in almost all practical fields of human endeavour. Most certainly, the same cannot be rightly said about pure mathematics. That is, because of its abstract nature, it has been (and still is) of little use in the physical world. For example, tensor calculus, absolute differential calculus, non-Euclidean geometry, and imaginary numbers are not going to be of much use to the engineers who design computers, photographic lenses, car engines, aircraft, spacecraft, or satellites. Fortunately for the safety of all those who travel regularly by car, train, bus, plane, or ship, the engineers and scientists who design these commercial means of transport make use of 'applied' mathematics, not 'pure' mathematics. Also, unlike past and modern theoretical physicists and cosmologists, these engineers don't base their very important work on imaginary experiments, suppositions, hypotheses , beliefs, assumptions, and/or metaphysics.

I think that very few people have ever known that even Einstein himself sometimes criticized mathemathics!

Not all past and present physicists have a very high opinion of mathematics. Even Einstein himself was one of them.

One example, the well-known Danish theoretical physicist, Holger Nielson, proved the unreliability of mathematics by adding garbage to established mathematical laws, then, by clever manipulation, getting rid of this garbage and ending up with the wanted answer. Physicist, David Bohm remarked that 'future science won't be based on conventional mathematics' —and mathematician, Kurt Godel, shared his opinion. Unfortunately, these two scientists didn't live long enough to realize that the great majority of modern physicists and mathematicians abandoned 'conventional' mathematics many decades ago. The late Prof. S. J. Prokhovnik remarked: "There are plenty of self-consistent mathematical systems which have scant relevance to physical phenomena and observations." I think Prokhovnik's statement needs some clarification. That is, there certainly are mathematical systems which have little or no relevance to physical events - generally, they are those pertaining to pure mathematics. But fortunately for the progress of science and technology, there are many mathematical systems which have great relevance to all branches of practical science. Here I am referring to the importance of using applied mathematics in the fields mentioned above. In other words, applied mathematics (unlike pure mathematics) is applicable to physical reality, not abstractions.

Mathematics is a man-made concept just like, for example, the 'mind' and 'time'. We humans can exist without mathematics, but mathematics cannot exist without us. The Big Bang, black holes, space-time, time dilation, curved space, the uncertainty principle, the expanding universe, and other theories of Modern Physics can be expressed mathematically; but no amount of mathematical formulae can prove their physical existence. This goal can only be achieved by rational thinking and the scientific methods used long time ago by Galileo, Newton, Kepler, and other true scientists! In a nutshell, using mathematics without observation and experimentation is certainly not the way to discover scientific truths and facts! Of course, by skilfully manipulation of formulae, pure mathematics can be made (to "prove" almost anything! Actually, modern physicists have always been more interested in 'disproving' than 'proving'. That is, they have set-out to demolish the whole fabric of Classic Physics, not because it was wrong, but because it left no room for any kind of deity in it. And most people need to believe in a deity for self-protection and a soul for self-preservation - no matter how absurd their beliefs may be. For example, the main implication of the Big Bang Theory*: '*creation from nothing'*,* has to be one of the most irrational, absurd, illogical, unscientific, and nonsensical concept ever concocted by the human brain! Other absurd concepts (such as, for example, 'time dilation') can be expressed in mathematical terms, but 'creation from nothing' cannot. This is because 0 + 0 is equal to 0; and this is true both here on Earth and everywhere else in the universe, and no mathematical formulae or philosophical disquisitions can alter this fact!

Since the 1960s, most cosmologists— with the full support of authorities— have proclaimed that they had abandoned the experimental method and instead derive new laws from mathematical reasoning. As English mathematician George Field said: "I believe the best method is to start with exact theories, like Einstein's and derive results from them." As far as I am concerned, they certainly derived some kind of results, but not the kind true scientists would agree with! Apparently, Einstein was well aware that mathematics and physical reality are often two different things, and that mathematical formulae can be manipulated to appear to verify many claims. Unfortunately for the cause of scientific truth, it isn't only mathematical propositions that can be manipulated, but practical experiments as well. Sceptics and critics are often reminded by academic physicists that both the Quantum and Relativity theories have been validated by practical experimentation. Apart from the dubious nature of these so-called practical experiments (and their "confirmatory" mathematical equations) can be specifically designed in order to obtain a required result! Galileo and Newton, for example, made scientific discoveries, and explained them with mathematics, whereas the proponents of Modern Physics, have been manipulating existing mathematical formulae to suit their theories. Figuratively speaking, mathematical formulae are like clothes, as they can be made to fit. In conclusion, mathematics describes the relationship observed in nature; and it is not an 'underlying reality' as in Platonism and today's modern cosmology. Be that as it may, if—for any practical reason it isn't possible to carry out any observation— mathematics can be very useful. For example, I worked out a mathematical formula that shows how faster a receding galaxy travels away from our planet. Of course, here I am assuming that galaxies are really receding in the first place! More about this topic will be said on the pages ahead.

The great Ancient Greek Pre-Socratic Philosophers

The term *Pre-Socratic* is generally used when talking about those Greek 'natural philosophers' (listed below) who lived from about 600-400 B.C. Here are listed some of the most famous of them.

Thales of Miletus (c. 624-547 B.C.) was the first historically known Greek natural philosopher and the founder of the Milesian School. Thales made an exact prediction of full solar eclipses of 585 B.C. To him was also ascribed the calculation of the time of solstices and equinoxes, the discovered of the annual movement of the Sun. Thales shared with Pythagoras the fame of the founder of scientific mathematics; his theorem is one of the fundamental theorems of geometry.

Heraclitus of Ephesus (c. 544 – 483 B.C.) "This world which is the same for all, no one of gods or men has made; but it was ever, is now, and ever shall be an eternally living fire, with measures kindling and measures going out." Heraclitus cosmological views are presented in a nutshell in his statement: "This world which is the same for all, no one of gods or men has made; but it was ever, is now, and ever shall be an eternally living fire with measures kindling and measures going out."

Anaxagoras (500-428 B.C.). This great thinker invented a naturalistic theory of the cosmos which was correct. "The Universe is infinite, populated by a host of different worlds - many of them inhabited. There is no difference between the heavens and the Earth, no finite Earth surrounded by an unknowable heaven. Instead, all operate by the same principle that can be seen in everyday life, in the workings of nature." "Because the cosmos evolves and changes, it can never have a start in time, a creation from nothing - since such events are never seen to occur. Instead it is unlimited in space and time, for there are no limits to what can be observed and learned."

Democritus of Abdera (c. 460 – 370 B.C.) was a founder of atomism and the brightest exponent of materialism in antiquity. "The atoms, being indivisible particles of matter, are immutable, eternal, and in continuous motion, differing only in shape, size, position, and order. A combination of atoms produces bodies, while their dissolution brings about the end of bodies. An infinite multitude of atoms is eternally in motion in infinite vacuum, which is divisible and atomised." "There is an infinite multitude of worlds, born and dying, created not by any god, but rising and being destroyed of necessity in a natural way." The point of view of the atomists in particular, was remarkably similar to that of Classic Science ;

***Epicurus** (*341-270 B.C.) was a materialist philosopher of the Hellenic period. He revived the Atomism of Leucippus, and Demo, and added his own changes. He introduced the idea of spontaneous (internally conditioned) 'deviations' of atoms from their course in order to explain the possibility of collision between atoms moving in empty space with equal speed. Epicurus' principles are as follows: "Nothing comes from nothing, and nothing returns to nothing." "The Universe has always been and will always be the same as it is now, because nothing else exists into to which it could change!“ “The Universe is infinite both in the extent of void and in the number of its components— compounds and atoms.” “The number of worlds is also innumerable.” “The Universe consists of bodies and void; the existence of bodies is confirmed by the evidence of the senses and the existence of void is inferred from their motion*.”*

The beliefs and theories of the Pre-Socratics thinkers indicates that there has been an ancient time in Greece when rational thinking and true wisdom weren’t as uncommon has they have been for the past twenty-three hundred years, and are still now in some countries. When taking into consideration that Thales, Heraclitus, Anaxagoras, Democritus, and Epicurus did not have any mechanical, optical, electronic equipment, nor had they any previous scientific examples to base themselves on, their superior intelligence, wisdom, enlightened rationalism, and intellectual integrity can be best appreciated. The age of the Pre-Socratics was also the Athenian Golden Age—the age of Pericles’—arguably, the one of the greatest political leaders and statesman of all time! Unfortunately, this Pre-Socratic ‘Golden Age’ came to an end—destroyed by three Post-Socratic religious philosophers: *Pythagoras, Plato*, and *Aristotle*!

Religious Philosophers

As we have already seen at the very start of this work, Prof. Isaac Asimov’s quotation reminds us of what happened in ancient Greece about 23 centuries ago, when Greek secular and rational thought yielded to Christian mysticism! In fact, the Dark and Middle Ages—with their abysmal ignorance (especially in science) massacres, torture, burning at the stake, hanging, filthy-living, wars, the horrors of the Inquisition, and other atrocities—were primarily the result of Greek post-Socratic religious philosophy and Christian obscurantism! Some of these philosophers and theologians were Pythagoras, Plato, Aristotle, St Augustine, Jerome, Ambrose 2

Referring to Plato and Aristotle, Bertrand Russell commented: “Plato and still more Aristotle, did much to kill Greek science.” They surely did that! Also, they disastrously retarded the advancement of physics and cosmology, for about 19 centuries—and not only in Greece, but in the whole of the Western world! This is why these two post-Socratic religious philosophers (and a few others), can correctly be called the ‘harbingers’ of the Dark Ages! The combination with mathematics and theology—which began with Pythagoras and continued with Plato and Aristotle—characterized religious philosophy , not only in Greece, but also in the Middle Ages, and in modern times down to Kant. Before Pythagoras, *Orphism* was the same as the Asiatic mystery religions. However, in Plato, St Augustine - and much later on - Thomas Aquinas, Descartes, Spinoza, and Leibniz, there was a strong blending of the Christian religion and philosophy. The post-Socratic religious philosophers, from Plato and Aristotles, up to our present time (2020) - have almost exclusively concerned themselves with theological and philosophical questions, thus leading true science up a blind alley! Instead of trying to acquire fresh knowledge (like their predecessors had done), Sceptics, and Sophists concentrated on ‘how’ knowledge came about. Then came Plato who, against all evidence rejected the world of senses, in favour of his self-created, abstract world of 'pure thought' and 'pure mathematics'. Aristotle (Plato's pupil) introduced the concept of the 'unmoved mover', and the belief in purpose as the fundamental concept in science. The religious philosophy of these two thinkers contains shortcomings which proved very harmful to the growth of science and technology, truth, reason, and social justice. From an ethic and moral point of view these two highly over-rated religious philosophers were arrogant, anti-feminist, advocated slavery, believed in white male superiority, and scorned democracy. Plato's pathological dislike of women, shows throughout his work. He wrote: "The only worthy companions for men are other men—the only exalted love is homosexual." Women are part of the base emotions which drag the mind down from its pure heights." Plato's hatred for women is best found in his work *Symposium*. Aristotles' opinion of women wasn't as slanderous as Plato's, he declared that the female provided only the row material, and the male supplied the character—an anti-feminist view which has survived to our modern times. Plato's ideal state was a slave-serf state; just like his pupil, Aristotles, he maintained that inequality and slavery were natural; and his scorn for 'the many' guarantees that his 'guardians' (the 'few') would exploit and oppress them. Plato's chapter entitled *Cosmogony,* is full of absurdities! But then, this is what one would expect from a deluded philosopher- would-be-theologian. When it comes to religious ideas, Plato 'borrowed' heavily from Hinduism and Zoroastrianism. Also, according to Bertrand Russell, 'when Platonism is analysed, is found to be in essence Pythagoreanism'. Aristotle' works *On the Heavens* and *Physics* were quite influential until the time of Galileo, who debunked many of them!

Fortunately, four great men of science of the past, such as Copernicus, Kepler, Galileo, and later on, Newton, pulled Europe out of both the Dark and Middle Ages. That is, about nineteen centuries of moral and intellectual darkness, superstition, Christian fanaticism, cruelty, and atrocities—mainly caused, or at least primarily propagated, by Greek religious philosophers, such as Pythagoras, Plato, and Aristotle.

Christian Fathers, such as Tertullian and Clements of Alessandria; Doctors of the Western Church, such as St Jerome, St Ambrose, St Augustine (also a philosopher and theologian), and Pope Gregory the Great; later on came St Thomas Aquinas, considered by the Catholic Church its greatest scholastic philosopher. Much later on,
Clements of Alessandria, Tertullian, St Augustine, St Ambrose, and Jerome; and later on St Augustine, St Thomas Aquinas, Descartes, Spinoza,

As we have already seen at the very start of this work, Prof. Isaac Asimov's quotation reminds us of what happened in ancient Greece about 23 centuries ago, when Greek secular and rational thought yielded to Christian mysticism! In fact, the Dark Ages - with their abysmal ignorance in general, and in science in particular, massacres , torture, burning at the stake, hanging, wars, and other atrocities - were primarily the result of Greek post-Socratic religious philosophy and Christian theology! Some of these philosophers and theologians were Pythagoras, Plato, Aristotle, St Augustine, Jerome, Ambrose 2

Speaking figuratively, Galileo, Kepler, Newton, and other true scientists of the past, who dealt with physical reality, would turn in their graves if they could see what a farce physics has become! (In fact, there is a book aptly entitled *The Farce of Physics*, written by the late American author Brian Wallace). During his life, Galileo was involved in the ideological war with the Catholic Church—a 'war' he won, thus bringing the science of cosmology out of the Dark and Middle Ages. Now, nearly four centuries later after his death, true science needs to be rescued again. Galileo, Newton, and Kepler, for example, first conducted observations and made cosmological discoveries, and only then they used mathematics; but only as an implement with which to obtain the maximum amount of information from their observations and experimentations. On the other hand, most of today's physicists and cosmologists, 'put the cart before the horse', so to speak. This shouldn't surprise anyone, because the proponents of Modern Physics have been doing the same for the past 120-odd years. In other words, their theories don't start with observations and/or experimentations, but with mathematical formulae, questionable assumptions, philosophical disquisitions, and religious belief.

Did Einstein Invent Relativity?

As soon as we mention the word Relativity, German theoretical physicist Albert Einstein (1879 - 1955) springs to mind. In fact, the name 'Einstein' and the word 'relativity' have become synonymous. However, I think very few people are aware that what has been known worldwide as 'Einstein's Relativity', is based on the works of mathematicians and theoretical physicists who lived before and during his time. Contrary to what people around the world have been lead to believe for the past twelve decades, Einstein neither invented relativity nor most of the other theories for which he has been, and still is now credited for. He deserves scientific credit, but mostly for refining the scientific ideas of others, as well as coordinating them. Although Einstein 'borrowed' some mathematical formulae and scientific theories from other mathematicians and theoretical physicists, there is no record that he ever gave credit to them—not even to his first wife Marie Maric (herself a physicist) who worked with him on relativity.

Below is a list of the various mathematicians, physicists, and/or theoretical physicists who, from about the last twenty-five years of the Nineteenth Century played an important role in various field of Modern Physics, before and concurrent with Einstein's time. One thing these gentlemen had in common is that they all contributed (although to different degrees) to the demise of Classical Physics. Of course, this list isn't complete but, for the purpose of this essay, it should suffice.

Elwin Bruno Christoffel (1829-1900) was a German mathematician and physicist. He introduced fundamental concepts of differential geometry, opening the way for the development of 'tensor calculus', which would later provide the mathematical basis for General Relativity. Christoffel is mainly remembered for his seminal contributions to differential geometry. In a famous 1869 paper on the equivalence problem for differential forms in *(n)* variables, published in *Crelle's Journal*, he introduced the fundamental technique later called ‘covariant differentiation’ and used it to define the ‘Riemann–Christoffel tensor’—the most common method used to express the curvature of Riemannian manifolds. In the same paper he introduced the Christoffel symbols, which express the components of the Levi-Civita connection with respect to a system of local coordinates. Christoffel's ideas were generalized and further developed by Gregorio Ricci-Curbastro and his student Tullio Levi-Civita, who turned them into the concept of tensors and the absolute differential calculus. The absolute differential calculus, later named ‘tensor calculus’, forms the mathematical basis of the General Theory of Relativity.

It is hardly ever mentioned, but Einstein elaborated this theory on the mathematical work ‘tensor algebra’ of Christofell and the two previously mentioned Italian mathematicians: **Gregorio Ricci-Curbastro** (1853 - 1925) and **Tullio Levi-Civita** (1873 - 1941). Einstein was particular fond of the latter. In fact, when he was once asked what he liked the most about Italy, he answered: “Spaghetti and Tullio Levi-Civita*.”* This Italian mathematician actually urged Einstein to explore the use of **‘**curvature tensors**’** to create a ‘gravitational theory’, lately called the General Theory of Relativity. Einstein did just that, and found the tensor calculus very useful for the mathematical development of his theories. But this calculus was more than just ‘very useful’. That is, although almost totally ignored (in Anglo-Saxons books and other mathematical and scientific sources), Ricci-Curbastro and Levi-Civita‘s studies on the ‘absolute differential calculus with coordinates’ have been a fundamental reference and the base of the mathematical structure of General Relativity. Unlike the infinitesimal calculus, the ‘tensor calculus’ allows physical equations to be presented independently from the choice of the coordinate system.

Herman Minkowski (1864-1909), continued Poincare’s work from 1907). Other contributions were made by Roberto Marcolongo (1906) and Richard Hargreaves (1908). This was based on the work of many mathematicians of the 19th Century, like A. Cayley, F. Klein, or William Kingdon Clifford, who contributed to Group theory, Invariant theory and Projective geometry. Using similar methods, Minkowski succeeded in formulating a geometrical interpretation of the Lorentz Transformation. He completed, for example, the concept of four vectors; he created the Minkowski diagram for t he depiction of space-time; he was the first to use expressions like world line , proper time, Lorentz invariance /covariance, etc.; and most notably he presented a four-dimensional formulation of electrodynamics. Similar to Poincare’ he tried to formulate a Lorentz-invariant law of gravity, but that work was subsequently superseded by Einstein’s elaboration on gravitation. In 1907 Minkowski named the four predecessors who contributes to the formulation of the relatively principle: Lorentz, Einstein, Poincare’ and Planck. And in his famous lecture Space and Time (1908) he mentioned Voigt, Lorentz, and Einstein. Minkowski himself considered Einstein’s theory as a generalisation of Lorentz’s and credited Einstein for completely stating the relativity of time.

Roberto Marcolongo (1862 –1943) was an Italian mathematician, known for his research in vector calculus and theoretical physics. He worked on vector calculus together with Cesare Burali-Forti, which was then known as the ‘Italian notation’. In 1906 he wrote an early work which used the ‘four-dimensional formalism’ to account for relativistic invariance under 'Lorentz transformations'. In 1921, Marcolongo, published one of the first treaties on Special and General Relativity, where he used the absolute differential calculus without coordinates, as opposed to the absolute differential calculus with coordinates of Tullio Levi-Civita and Gregorio Ricci-Curbastro. For the sake of accuracy, these two scientists made use of the 'Christoffel Symbols' in some of their mathematical work. The Christoffel symbols find frequent use in the theory of General Relativity, where space-time is represented by a curved 4-dimensional Lorentz manifold with a Levi-Civita connection. The Einstein field equations— which determine the geometry of space-time in the presence of matter— contain the 'Ricci tensor'. Once the geometry is determined, the paths of particles and light beams are calculated by solving the geodesic equations in which the Christoffel symbols explicitly appear. In General Relativity, the Christoffel symbol plays the role of the gravitational force field with the corresponding 'gravitational potential' being the 'metric tensor'.

Max Planck (1858-1947), German physicist—the originator of 'Quantum Theory'. In 1900, Planck solved the problem of the 'Black-Body Radiation' by assuming that the radiation was emitted in discrete amounts ('quanta'), known as 'Photons'. The equation. The energy (E) of a photon is related to the frequency (F) of the radiation by the equation (E = hF), where (h) is known as 'Planck's Constant'; and this constant has a value of 6.626196 x 10^{-34} Joules. For this work he received the Noble Prize in 1918. Planck's theory was used by Einstein to explain the photoelectric effect—and in 1913 by Niels Bohr to explain the spectrum of hydrogen.

English mathematician, **William Kingdom Clifford** (1862 – 1879), was above all else a geometer. The discovery of 'non-Euclidean geometry' opened new possibilities in geometry in Clifford's era. The field of intrinsic differential geometry was born, with the concept of curvature broadly applied to space itself as well as to curved lines and surfaces. Clifford was very much impressed by Bernhard Riemann's 1854 essay ***On the hypotheses which lie at the bases of geometry***. In 1870, he reported to the Cambridge Philosophical Society on the 'curved space' concepts of Riemann, and included speculation on the bending of space by gravity. Clifford's translation of Riemann's paper was published in *Nature* in 1873. His report at Cambridge, On the Space-Theory of Matter, was published in 1876, anticipating Albert Einstein's General Relativity by 40 years! Clifford elaborated 'elliptic space geometry' as a non-Euclidean metric space. Equidistant curves in elliptic space are now said to be Clifford parallels. He published papers on a range of topics including algebraic forms and projective geometry and the textbook *Elements of Dynamic*. Although Clifford never constructed a full theory of space-time and relativity, there are some remarkable observations he made in print that foreshadowed these modern concepts. In his book *Elements of Dynamic* (1878), he wrote an expression for a parametrized unit hyperbola, which was later used by other authors as a model for 'relativistic velocity'. The book continues with a chapter *On the bending of space*, the substance of *General Relativity*. In 1923 Hermann Weyl mentioned Clifford as one of those who, like Bernhard Riemann, anticipated the geometric ideas of Relativity. In 1960, John Archibald Wheeler (1911 – 2008) introduced his geometro-dynamics formulation of General Relativity by crediting Clifford as the initiator. In 1970 Cornelius Lanczos summarized Clifford's relativistic premonitions this way: *"*Many of Clifford's were later realized by Einstein's Gravitational Theory.*"* Some later mathematicians came to the conclusion that 'it was Clifford, not Riemann, who anticipated some of the conceptual ideas of General Relativity'.

Be that as it may, German mathematician **George F. B. Reimann** (1826 - 1866) was the inventor of one of the most important works in geometry. The subject founded by this work is 'Riemannian geometry'. Riemann found the correct way to extend into (*n*) dimensions the differential geometry of surfaces, which the great German mathematician Karl Friedrich Gauss (1777-18550), proved in his *theorema egregium*. The fundamental object is called the 'Riemann curvature tensor'. For the surface case, this can be reduced to a number (scalar), positive, negative or zero; the non-zero and constant cases being models of the known 'non-Euclidean' geometries. It was **Marcell Grossmann** (1878 – 1936) who emphasized the importance of a non-Euclidean geometry called 'Riemannian geometry**'** (also elliptic geometry) to Einstein, which was a necessary step in the development of the General Theory of Relativity. Dutch-born American Physicist Abraham Pais (1918-2000), suggested that Grossmann mentored Einstein in 'tensor' theory as well. Grossmann introduced Einstein to the absolute differential calculus, started by Christoffel and fully developed by Ricci-Curbastro and Levi-Civita. Grossmann facilitated Einstein's unique synthesis of mathematical and theoretical physics in what is still today considered the most elegant and powerful theory of gravity: the General Theory of Relativity. The collaboration of Einstein and Grossmann led to a ground-breaking paper: *Outline of a Generalized Theory of Relativity and of a Theory of Gravitation,* which was published in 1913 and was one of the two fundamental papers which established Einstein's theory of gravity. (As it is the case with some of the other mathematicians and theoretical physicists mentioned above, Einstein did not created the 'theory of gravity' by himself, but he rather refined and co-ordinated it, as he did with almost all other relativity theories.)

Like his friend and colleague Gregorio Ricci-Curbastro, **Luigi Bianchi** (1865-1928) studied at the Scuola Normale Superiore in Pisa. He was greatly influenced by the geometrical ideas of Bernhard Riemann. Through the 0influence of Luther P. Eisenhart and Abraham Haskel Taub, Bianchi's classification later came to play an important role in the development of the Theory of General Relativity. In 1902, Bianchi rediscovered what are now called the 'Bianchi identities for the Riemann tensor', which play an even more important role in General Relativity. (They are essential for understanding the Einstein field equation.) According to Tullio Levi-Civita, these identities had first been discovered by Ricci in about 1889, but Ricci apparently forgot all about the matter, which led to Bianchi's rediscovery.

David Hilbert (1862-1943) is known as one of the greatest mathematicians of the 19th and early 20th century. His first work was about the 'invariant theory' which led the way to the proof of the renowned 'finiteness theorem'. Also, his famous '23 problems' were the most effective and profoundly deliberated set of problems ever presented by a mathematician. In 1920 Hilbert launched what became to be known as 'Hilbert's Program' which was based on principles that made mathematics a more logical based subject rather than tasks determined by randomly postulated rules. This great mathematician did a lot of work for mathematics in various branches of the subject such as invariants, functional analysis, algebraic number fields and the calculus of variations. His work in the branch of integral equations in 1909, was the basis of the research carried out in the 20th century in functional analysis. It also lay a foundation for his own work on infinite dimensional space known now as Hilbert's Space; a notion which is used in quantum mechanics. Although Einstein was (and still is) credited with finding the Field Equations of Gravitation - which gave the correct field equations for General Relativity - **Hilbert** published them in an article shortly before Einstein did. This resulted in an accusation of plagiarism against this scientist, and suggestions that the field equations should be called 'Einstein-Hilbert Field Equations'. However, Hilbert never pressed his claim for priority.

James Clerk Maxwell (1831-1879) was a Scottish scientist in the field of mathematical physics. His most notable achievement was to formulate the 'classical theory of electromagnetic radiation', bringing together for the first time electricity, magnetism, and light as different manifestations of the same phenomenon. Maxwell's equations for electromagnetism have been called the 'second great unification in physics' after the first one realized by Isaac Newton. With the publication of *A Dynamical Theory of the Electromagnetic Field* in 1865, Maxwell demonstrated that electric and magnetic fields travel through space as waves moving at the speed of light. Maxwell proposed that light is an undulation in the same medium that is the cause of electric and magnetic phenomena. The unification of light and electrical phenomena led to the prediction of the existence of radio waves. His discoveries helped usher in the era of Modern Physics, laying the foundation for such fields as Special Relativity and Quantum Mechanics. Many physicists regard Maxwell as the 19th-century scientist having the greatest influence on 20th-century theoretical physics. His contributions to science are considered by many to be of the same magnitude as those of Isaac Newton and Galileo Galilei.

George Francis FitzGerald (1851-1901) was an Irish professor of 'natural and experimental philosophy'. (i.e., physics). FitzGerald is better known for his conjecture in his short letter to the editor of Science titled *The Ether and the Earth's Atmosphere* (1889) that if all moving objects were foreshortened in the direction of their motion, it would account for the curious null-results of the Michelson–Morley experiment. FitzGerald based this idea in part on the way electromagnetic forces were known to be affected by motion. In particular, FitzGerald used some equations that had been derived a short time before by his friend the electrical engineer Oliver Heaviside. The Dutch physicist Hendrik Lorentz hit on a very similar idea in 1892 and developed it more fully into Lorentz transformations, in connection with his theory of electrons. In 1883, following from Maxwell's equations, FitzGerald was the first to suggest a device for producing rapidly oscillating electric currents to generate electromagnetic waves, a phenomenon which was first shown to exist experimentally by the German physicist Heinrich Hertz in 1888. The Lorentz–FitzGerald contraction (or FitzGerald–Lorentz contraction) hypothesis became an essential part of the Special Theory of Relativity, as Albert Einstein published it in 1905. He demonstrated the kinematic nature of this effect, by deriving it from the 'principle of relativity' and the 'constancy of the speed of light'. Along with Oliver Lodge, Oliver Heaviside and Heinrich

Hertz, FitzGerald was a leading figure among the group of 'Maxwellians' who revised, extended, clarified, and confirmed James Clerk Maxwell's mathematical theories of the electromagnetic field during the late 1870s and the 1880s.

Hendrik Antoon Lorentz (1853-1928) was a Dutch physicist whose experimental and theoretical work was honored with the Nobel prize in physics in 1902. Lorentz' name is now associated with the 'Lorentz-Lorenz formula', the 'Lorentz force', the 'Lorentzian distribution', and the 'Lorentz transformation'. Lorentz' main articles are: *Lorentz ether theory, History of special relativity, History of Lorentz transformations - Lorentz 1,* and *History of Lorentz transformations - Lorentz 2.* In 1892 and 1895, Lorentz worked on describing electromagnetic phenomena (the propagation of light) in reference to frames that move relative to the postulated 'luminiferous aether'. He discovered that the transition from one to another reference frame could be simplified by using a new time variable that he called 'local time' and which depended on universal time and the location under consideration. Although Lorentz did not give a detailed interpretation of the physical significance of local time, with it, he could explain the aberration of light and the result of the Fizeau experiment. In 1900 and 1904, Henri Poincaré called local time Lorentz's 'most ingenious idea' and illustrated it by showing that clocks in moving frames are synchronized by exchanging light signals that are assumed to travel at the same speed against and with the motion of the frame. In 1892, with the attempt to explain the Michelson-Morley experiment, Lorentz also proposed that moving bodies contract in the direction of motion (see length contraction; George FitzGerald had already arrived at this conclusion in 1889).

In 1899 and again in 1904, Lorentz added 'time dilation' to his transformations and published what Poincaré in 1905 named 'Lorentz transformations'. It was apparently unknown to Lorentz that Joseph Larmor had used identical transformations to describe orbiting electrons in 1897. Larmor's and Lorentz's equations look somewhat dissimilar, but they are algebraically equivalent to those presented by Poincaré and Einstein in 1905. Lorentz's 1904 paper includes the covariant formulation of electrodynamics, in which electrodynamics phenomena in different reference frames are described by identical equations with well defined transformation properties. The paper clearly recognizes the significance of this formulation, namely that the outcomes of electrodynamics experiments do not depend on the relative motion of the reference frame. The 1904 paper includes a detailed discussion of the increase of the inertial mass of rapidly moving objects in a useless attempt to make momentum look exactly like Newtonian momentum; it was also an attempt to explain the length contraction as the accumulation of 'stuff' onto mass making it slow and contract. In 1905, Einstein would use many of the concepts, mathematical tools and results Lorentz discussed to write his famous paper entitled *On the Electrodynamics of Moving Bodies,* known today as the Theory of Special Relativity. Because Lorentz laid the fundamentals for the work by Einstein, this theory was originally more correctly called the Lorentz-Einstein Theory.

'The Lorentz Transformations' relate the space-time coordinates, which specify the position x, y, z and time t of an event, relative to a particular inertial frame of reference (the "rest system"), and the coordinates of the same event relative to another coordinate system moving in the positive *x*-direction at a constant speed *v*, relative to the rest system. It was devised as a theoretical transformation which makes the velocity of light invariant between different inertial frames. The coordinates of the event in this "moving system" are denoted *x′*, *y′*, *z′* and *t′*. The rest system was sometimes identified with the luminiferous aether, the postulated medium for the propagation of light, and the moving system was commonly identified with the earth as it moved through this medium. Early approximations of the transformation were published by Voigt (1887) and Lorentz (1895). They were completed by Larmor (1897, 1900) and Lorentz (1899, 1904) and were brought into their modern form by Poincaré (1905), who gave this formula the name of Lorentz. Another version referring to the Lorentz Transformation still states that it was invented by Voigt in 1887, adopted by H. Lorentz in 1904, and introduced by H. Poincare' in 1906. According to some sources, Einstein picked it up directly from Voigt. Whatever really happened, it wasn't certainly Einstein or any other person alone who invented Special Relativity. Be that as it may, without the following two basic equations there wouldn't have been any such a theory:

$\boldsymbol{\beta = \sqrt{1 - (v^2/c^2)}}$ *(Lorentz Factor)*

and $\gamma = 1/\sqrt{[1 - (v/c)^2]}$ *(Lorentz Transformation)*

where (**v**) is the speed of the moving body and (c**)** is the speed of light

Albert A. Michelson (1852-1931), American physicist. In 1881 he tried to measure the relative motion of the Earth and aether, as it was expected in Fresnel's theory, by using an interferometer. He could not determine any relative motion, so he interpreted the result as a confirmation of the thesis of Anglo-Irish physicist and mathematician **Sir George Gabriel Stokes** (1819-1903). However, in 1886 Lorentz showed Michelson's calculations were wrong and that he overestimated the accuracy of the measurements. This, together with the large margin of error, made the result of Michelson's experiment inconclusive. Following the work of British mathematicians and physician Thomas Young (1773-1829), and French civil engineer Augustine-Jean Fresnel (1788-1827), it was believed that light propagates as a transverse within a medium called 'luminiferous aether'. To check this belief again, Michelson and **Edward W. Morley** (1832-1923), performed a repetition of the experiment in 1886. Fresnel's dragging coefficient was confirmed very exactly on that occasion, and Michelson was now of the opinion that Fresnel's stationary aether theory was correct. To clarify the situation, in 1887 Michelson and Morley repeated Michelson's 1881-experiment, and they substantially increased the accuracy of the measurement. However, this now famous Michelson–Morley experiment again yielded a negative result, i.e., no motion of the apparatus through the aether was detected (although the Earth's velocity is 60 km/s different in the northern winter than summer). So the physicists were confronted with two seemingly contradictory experiments: the 1886-experiment as an apparent confirmation of Fresnel's stationary aether, and the 1887-experiment as an apparent confirmation of Stokes' completely dragged aether. A possible solution to the problem was shown by Voigt, in 1887 and FitzGerald, two years later.

In 1887, German physicist **Woldemar Voigt (**1850-1919**)** formulated a form of the Lorentz Transformation between a frame of reference at rest and a moving frame with speed (V) in the (X) direction. Voigt's 1887 paper *On Doppler's Principle* is a very remarkable work. It is remarkable because it contains several original and fundamental ideas of Modern Physics. Hermann Minkowski said in 1908 that the transformations, which play the main role in the 'principle of relativity', were first examined by Voigt. Also, in 1909, Hendrik Lorentz said he could have taken these transformations into his theory of electrodynamics, if only had known them, rather than developing his own. In 1887, Voigt investigated the Doppler effect for waves propagating in an incompressible elastic medium, and deduced transformation relations that left the wave equation in free space unchanged, and explained the negative result of the Michelson–Morley experiment. The Voigt-transformations include the Lorentz factor $\mathbf{1/\sqrt{1 - V^2/C^2}}$ for the y- and z-coordinates, and a new time variable $t' = t - vx/c^2$ which later was called 'local time'. However, Voigt's work was completely ignored by his contemporaries.

Jules Henri Poincare' (1854-1912) was a French mathematician - who in 1905 -1906, was the very first to clearly formulate the Special Theory of Relativity, according to which space and time were connected. Subsequently, his ideas were developed by other scientists - notably, Joseph Larmor, and later on, Albert Einstein. The former published the *Lorentz Transformations* in 1897, some two years earlier than Lorentz, and eight years before Einstein. However, Einstein soon realized that the Lorentz mathematical equations could be used to explain physical phenomena as well, and promptly included them in his version of Special Relativity. Some people have been claimed that Poincare' and Lorentz are the true founders of Special Relatively. U.S. mathematician, Roger Schlafly for example, cites the 2005 book *Henri Poincare' and Relatively*, by Russian physicist A.A. Luganov, complains about how Einstein's acolytes have repeatedly over-praised Einstein while over-looking Poincare's great contribution to both Special and General Relativity. British philosopher, logician, mathematician, and Nobler Laureate, Earl Bertrand Russell, called Poincare' 'the greatest man that France ever produced.'

Sir Joseph Larmor (1857-1942) was a physicist and a mathematician. He proposed that the 'aether' could be represented as a homogeneous fluid medium which was perfectly incompressible and elastic. Larmor believed the aether was separate from matter. He united Lord Kelvin's model of spinning gyrostats (see Vortex theory of the atom) with this theory. Larmor held that matter consisted of particles moving in the aether. Larmor believed the source of electric charge was a 'particle' (which as early as 1894 he was referring to as the electron). Larmor held that the flow of charged particles constitutes the current of conduction (but was not part of the atom). Larmor calculated the rate of energy radiation from an accelerating electron and explained the 'splitting of the spectral lines in a magnetic field by the oscillation of electrons'. Parallel to the development of Lorentz ether theory, Larmor published an approximation to the 'Lorentz Transformations' in the *Philosophical Transactions of the Royal Society* in 1897, some two years before Hendrik Lorentz (1899, 1904) and eight years before Einstein (1905). Larmor, however, did not possess the correct velocity transformations, which include the addition of velocities law, which were later discovered by Henri Poincaré. Larmor predicted as early as 1897 the phenomenon of time dilation, at least for orbiting electrons, by writing "... individual electrons describe corresponding parts of their orbits in times shorter for the [rest] system in the ratio **$(1- V^2/C^2)½$".** He also verified that the FitzGerald–Lorentz contraction (length contraction) should occur for bodies whose atoms were held together by electromagnetic forces. In his book *Aether and Matter* (1900), he again presented the 'Lorentz Transformations', 'time dilation' and length contraction (treating these as dynamic rather than kinematic effects). Larmor was opposed to the space-time interpretation of the Lorentz transformation in Special Relativity because he continued to believe in an absolute aether. He was also critical of the curvature of space of General Relativity, to the extent that he claimed that an absolute time was essential to astronomy (Larmor 1924, 1927).

Olinto De Pretto (1857-1921) was an industrialist, geologist, and a rather clever amateur astronomer from Vicenza. In 1903, he published the equation **$E=mc^2$** in the scientific magazine, *Atte*. There have been many claims that he was the first person to discover the famous 'energy-mass equivalence', generally attributed to Einstein. Allegedly, Einstein used De Pretto's discovery in a major paper published in his name in 1905. According to Professor Umberto Bartocci of the University of Perugia, De Pretto was never acclaimed, for his important discovery. "He did not discover relativity but there is no doubt that he was the first to use the equation," said Prof Bartocci, who has written an entire book on the subject. Apparently, this amateur astronomer had stumbled on the equation, while speculating about the existence of the medium called *aether,* that was once supposed to fill all space and to support the propagation of electromagnetic waves. De Pretto's equation was published again in 1904 by Veneto's Royal Science Institute, but its great significance was not understood. "As it happened, a Swiss-Italian named Michele Besso alerted Einstein to the discovery, who in 1905 published it as his own work,'' said Prof Bartocci. It took years for his breakthrough to be grasped. When finally it did, De Pretto's contribution was overlooked while Einstein went on to become the century's most famous scientist.

Max Bohr (1882 – 1970) was a German-Jewish physicist and mathematician who was instrumental in the development of quantum mechanics. He also made contributions to solid-state physics and optics and supervised the work of a number of notable physicists in the 1920s and 1930s. Born won the 1954 Nobel Prize in Physics for his "fundamental research in quantum mechanics, especially in the statistical interpretation of the wave function". Born entered the University of Göttingen in 1904, where he met the three renowned mathematicians Felix Klein, David Hilbert, and Hermann Minkowski.

Niels Henrik David Bohr (1885 – 1962) was a Danish physicist who made foundational contributions to understanding atomic structure and Quantum Theory for which he received the Nobel Prize in Physics in 1922. He was also a promoter of scientific research. Bohr developed the 'Bohr model of the atom', in which he proposed that energy levels of electrons are discrete and that the electrons revolve in stable orbits around the atomic nucleus but can jump from one energy level (or orbit) to another.

The above list shows many of the mathematicians and theoretical physicists who contributed to Relativity and Quantum Theory. Here are a few more names: Paul Langevin; Max Von Laue, Walter Kaufmann, Max Abraham, Hermann Minkowski, Felix Klein, Karl Schwarzschild, Wilhelm Wien, and Sir Arthur Stanley Eddington.

Apart from physicist and mathematician Joseph Larmor (mentioned above) but who eventually rejected the tenets of Relativity, all the others were staunch relativists and proponent of Quantum Theory. The truth is that no mathematician and/or theoretical physicist should have called any of the theories of Modern Physics his/her own, because they consisted of the many results and empirical findings obtained by Albert Michelson, James Maxwell, Hendrik Lorentz, Woldemar Voigt, Henri Poincare', Albert Einstein, Max Plancks, Hermann Minkowski, and others. Incidentally, I listed all the above men of science, not because I agree with any of them, but simply to show that the concepts and axioms of Modern Physics have generally been invented by various mathematicians and theoretical physicists, supported by proponents of philosophical idealism and theism. In conclusion, in view of all the above, I think the title-question *Did Einstein Invent Relativity* should be answered with an emphatic No! Einstein was a very good mathematician but not a multiple genius like, for example, Leonardo Da Vinci—who was an outstanding painter and sculptor, as well as an inventor, engineer, botanist, mathematician, writer, etc.—and neither were the other scientists who contributed to the invention of Relativity and Quantum theories. However, Einstein was a great mathematician and, as I have already said above, he deserves credit for refining and coordinating other scientist's ideas and theories. For example, in his paper ***On the Electrodynamics of Moving Bodies,*** Einstein derives the 'time dilation' effect by considering the origin of the moving frame X' = 0.

Einstein's doubts

In a letter to Einstein, physicist Max Born wrote: "When average people try to get hold of the laws of nature, by thinking alone, the result is pure rubbish." This is not surprising, as most physicists assume that the members of the general public are incapable of logical reasoning, because they don't possess their superior education and intelligence—and that make them dumb. This could be true in some cases, but my experience in life has convinced me that advanced colleges and universities are generally not the best places to learn true rational and logical thinking. Proof of this fact is that many theoretical physicists and/or mathematicians believe the absurdities, impossibilities, and nonsense I named in the Introduction section of this essay. In the early 1900s most physicists didn't accept Special Relativity. This is not surprising, as to the dismay of some of his colleagues, Einstein himself started having serious doubts about the veracity and physical value of this theory; also he reached a time when he couldn't understand why so many people kept him and his work in such a high esteem. Here are a few examples which show how sometimes Einstein felt about mathematics, Special Relativity, and Quantum Theory. Here I am saying 'sometimes' because of his inconsistency of opinion.

As I have already mentioned above, in an address to the Prussian Academy of Science in 1923, Einstein stated: "As far as the propositions of mathematics refer to reality they are not certain; and as far as they are certain, they do not refer to reality.” But in 1933, he contradicted himself by saying: “It is my conviction that ‘pure’ mathematical construction enables us to discover the concepts and the laws connecting them, which gives us the key to the understanding nature.”

“Special Relativity has no practical validity. It is purely a mathematical concept that will never take place in the physical universe.”

“Mathematics and physical reality are often two different things

“The Special Theory of Relativity and the ‘law’ of the constancy of light speed are nothing more than mathematical propositions.”

“Quantum Physics is not the real thing after all.”

“We can only conclude that the Special Theory Relativity cannot claim any unlimited validity.“

In his 1905 article *On the Electrodynamics of Moving Bodies* Einstein wrote: “Light is always propagated in empty space with a definite velocity (c).” But 10 years later he declared: “The principle of the constancy of vacuum speed of light requires modification.”

“Two things are infinite: the Universe and human stupidity; and I am not sure about the Universe.”

This last quotation is an indication that Einstein wasn’t even sure whether the Universe is infinite or finite. This despite the fact that, from a philosophical and religious points of view, both Relativity and Quantum theories reject the infinite model of the universe! I am wondering how many other tenets of Modern Physics did Einstein doubt or disagree with! Be that as it may, it shouldn’t be hard to understand why some of his colleagues didn’t like his deviations from orthodox physics. In fact, Einstein’s closest friend, Max Abraham, criticized him in a very unfriendly manner!

I for one think that there are more concepts in Relativity and Quantum theories which Einstein wasn’t quite sure about their validity both mathematically and as physical realities. But obviously, he didn’t wish to upset some other of his academic friends—not to mention losing universal fame and riches by recanting his relativistic views of the Universe. This is exactly what Irish physicist and mathematician, Joseph Larmor, did when he rejected both the ‘curvature of space’ and the whole Special Relativity Theory—as was shown in the previous section of this work.

Unfortunately for the sake of scientific truth, Einstein’s ‘recantation’ of some main tenets of Modern Physics have been totally ignored and/or suppressed by the great majority of international theoretical physicists and cosmologists, who have based their professional reputation on the Black Hole concept, the Big Bang Theory, Special Relativity, and Quantum Physics. And there is no doubt that they will continue to do all that is humanly possible to protect their personal interests, by putting them well before scientific truth! There is no doubt that Carl Sagan was referring to this reprehensible behaviour, so common in the halls of orthodox science, when he wrote: *"*The suppression of uncomfortable ideas may be common in religion and politics, but it is not the path to knowledge: it has no place in the endeavour of science*."* A logical explanation for this is that 'others', having realized the potential for fame and fortune engendered by Einstein's relativity, started introducing their own ideas to it. Some people have been blaming Einstein for much of the science fictional nonsense found particularly in Special Relativity and Quantum theory, but I think it is those who latched on to these theories who actually added, and have fanatically retained, many of the irrational and illogical related ideas of Modern Physics. And, unfortunately for the advance of true science, they have been doing so for many decades, thus making a mockery of rational and scientific thinking and common sense. I think that if even half of the time and resources wasted on trying to prove the Big Bang and other modern theories of physics, had been used on an impartial and truly scientific research, most of these theories would have been abandoned many decades ago! In fact, in his book *Fiction Stranger Than Truth,* relativity expert N. Rudakov wrote: "Our assessment and criticism of Einstein's arguments has been expressed throughout this work whenever necessary. It should be clear to the reader that, in our opinion, the theory has no positive value and should be discarded."

Receding galaxies and the speed of light

Some time ago I read this few lines in the Internet, which stated: "The universe expands at about 70 kilometres per second per mega-parsec. This means that a galaxy 1 mega-parsec away from the Earth is receding at about 70 km/sec; while a galaxy 2 mega-parsec from Earth is receding at about 140 kilometres. Apparently, the members beyond the Local Group of galaxies (about 40) are receding from us, or more exactly, the distance between clusters of galaxies is constantly increasing." But, if this is the case —when, for example, a galaxy has receded for 14 mega-parsec away from Earth—its travelling speed has increased to 573,440 kilometres per second! By using the formula I invented, various speeds of light can be obtained.

(My own Formula)

$$S = (y \cdot x^{z}) / x$$

(*S*) ***indicates the galaxy's recession speed in km/sec.***
(X) ***stands for 2***
(y) ***stands for 70***
(^{z}) ***is the distance from Earth, in mega-parsec, reached by the receding galaxy****.*

<u>Testing Question:</u>

At what speed in km/sec is a galaxy travelling when it reaches the distance of 14 mega-parsecs from Earth?

Formula $(y \cdot x^{z}) / x$ should give the correct answer to this question.

Final calculation: $(70 \cdot 2^{14}) / 2$ $(70 \cdot 16{,}384) / 2$ $114{,}6880 / 2 = 573{,}440$

Answer: 573,440 kilometres per second.

The above calculations have proved that by the time a receding galaxy has reached the distance of 14 mega-parsecs from Earth, it is travelling at the speed of **573,440 kilometres** per second! This is a big problem, because Special Relativity states that *nothing can* travel as fast as, or faster then, the speed of light, which is 299,792 kilometres per second.

Relativists have been saying all along that "it would take only one piece of evidence against Einstein's relativity to invalidate it; but this evidence has yet to be found." This, of course, is not true! In fact, there is enough evidence—especially in Special Relativity! As I have already discussed above in this article, the insuperability of the speed of light is the linchpin that keeps Special Relativity together, despite the various experiments that have proved that the speed of light can be surpassed!

That is, as professor Isaac Asimov wrote: "It is not quite right to say that an object cannot move faster than light. It is only the *measured* velocity that cannot move faster than light. In fact, it is conceivable that there are objects in the universe which are travelling at velocities (relative to us) that are greater than the velocity of light, but we cannot measure see or sense them in any way, and therefore cannot measure their velocities." In a few words, Asimov has explained the fact about the speed of light much better than Einstein himself or anybody else!

In any case, to the dismay of all other relativists, Einstein himself doubted the veracity and validity of Special Relativity, which he called a "*purely mathematical concept that will never take place in the physical universe".* Be that as it may, I suppose this theory has some mathematical value, but not any practical one!

When I checked again the said writing in the Internet, I found out that it was still there, but its mathematical info had been deleted. This does not surprise me, as it contrasts with Special Relativity!

To Be Continued…