

The Cosmic Mirage

Space, Time, and the Relative Age of the Universe

**The distinction between past, present and future is
only an illusion, even if a stubborn one.**

-- A. Einstein

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October 1999

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• **The Cosmic Mirage** •
Space, Time, and the Relative Age of the Universe
Bruce Schweigerdt, M.A.
October 1999

Introduction

It is not difficult for the serious and discerning student of science, Creation, and the recent origins of things to refute the doctrines of scientific naturalism (scientism) and Darwinian Evolution from a geological and biological standpoint. For scientism and evolution are founded on one basic and highly spurious assumption — the Uniformitarian Principle; namely "the present is key to the past." That is, the progress of time and events as we see, experience, and know them today is approximately the same as the historical progress of time and events since the onset of the universe.

The student of the Bible, however, has an entirely different understanding of this history; namely, that *two* dramatic and singular events have occurred since the genesis of the universe: The Creation Week (In The Beginning...), and the cataclysmic event known as the Genesis Flood. A proper understanding of these two events — both guided and controlled — is absolutely essential to a proper rendering of the flow of time and of history, and a correct understanding to the age of the universe.

Consider the following number sets:

The Progress of Time

It takes a clock 17 minutes to advance 1,000 seconds;

It takes a clock 3 hours to advance 10,000 seconds;

It takes a clock 1 day to advance 100,000 seconds;

It takes a clock 11 days to advance 1 million seconds;

It takes a clock 32 years to advance 1 billion seconds;

It takes a clock 32,000 years to advance 1 trillion seconds!

The Dimension of Distance

Light travels at the rate of 186,000 miles per second;

— That is 669,600,000 miles per hour.

— In one year's time, light travels 6,000,000,000,000 miles.

One Light-year is the distance it takes light to travel in one year,
i.e., 6,000,000,000,000 miles.

— The current theories of astronomy place the farthest galaxy
from the earth at 18,000,000,000 light-years.

— This means that the galaxy most removed from us is
108,000,000,000,000,000,000,000 miles away!

— That is 108,000,000,000 trillion, or —
108 BILLION-TRILLION miles distant!!

One park service naturalist at Arches National Park tried to demonstrate for his audience what 300 million years means in geological time by using this analogy:

- Suppose one foot-step to equal 100 years -
- Each mile walked would equal 560,000 years -

Question: How many miles then, to equal 300,000,000 years?

Answer: 535 miles - the distance from Arches National Park to somewhere in Idaho.

Implication: We can live with that! Most of us, if we had to, could walk that distance without too much difficulty.

Therefore a speculative abstract can be made to sound reasonable!

But the naturalist should be more honest with his analogies. We don't walk through life 100 years at a time, but instead one day — yes, even one step at a time.

Suppose each step then, to equal one second of time. Taking a leisurely stroll through life, averaging 15 miles per day, a person would need to walk around the world 10,500 times in order to equal 300 million years!

Now that thought is irrational and completely unrealistic; and that is *only* 300 million years! According to the Uniformitarian Principle and the doctrine of evolution, the earth is at least 4,600 million years old. It would take an extraordinary amount of *faith* to believe in such a notion.

We have been given tremendous mental faculties that allow us to speculate about things. However, in utilizing these abilities we must be rational enough to make *reasonable* assumptions that will lead us to realistic conclusions.

Now consider this vocabulary set:

TIME: **a.** A nonspatial continuum in which events occur in apparently irreversible succession from the future through the present to the past. **b.** An interval separating two points on this continuum; a duration.

Time is the direct result of motion in space. In time, events occur in succession.

ETERNITY: Infinite *duration*. "Events" occur simultaneously.

LIGHT: Electromagnetic radiation visible to the human eye. Also, electromagnetic radiation of any wavelength.

GRAVITY: The natural force of attraction exerted by a celestial body upon objects at or near its surface, tending to draw them toward the center of the body.

RELATIVITY: A theory in physics that considers mass and energy to be equivalent and that states that a moving object will experience changes in size and time which are related to its speed; however, these changes are only noticeable at speeds approaching that of light.

PARADOX: A statement that seems contrary to common sense and yet is perhaps true.

The Age of the Universe

It is a greater challenge — and one that has thus far received scant attention — to address the inherent problems and resulting doctrines regarding the actual age of the universe, presently stated to be from 8 - 20 billion years old. This paper is addressed specifically to this concern and is intended to show how Einstein's Special Theory of Relativity, in particular, assists in providing a definitive answer relating to the Creation Week of Genesis 1 and the "young" age of the universe.

Time as we know and define it does not exist in the outer universe apart from our earthly frame of reference, and the projections we put to it. To the extent that assumptions are employed to chronological lines on earth by well-meaning seekers, these pretensions are also projected into the heavens with the wishful intent of finding and proving a billion-year-old universe, and thus the "Beginning."

In essence, the heavens know nothing of time; clocks and calendars being based on the sun's "rising" and "setting" according to our unique orbit. All measurements of time — even those based on "cosmic clocks" and/or atomic clocks — use this basic standard.

Yet something — an Event — happened in the Beginning which commenced the process and progress of time as we commonly experience it. The Genesis account is clear that "In the Beginning God created..." an act and process that included all experiential entities including Time — "The Book of Genesis is a book of beginnings", as *The Torah: A Modern Commentary* introduces the text to us.

Light — its constitution and its inherent velocity — is both a standard and an enigma to the human mind. This comes from our intellectual limitations as a created and finite being.

We know light as both a wave and a particle (Einstein's *duality*, the *photon*), yet it is more than that. In its fullest (and original sense) light as it was created is an *essence*, — in the limited sense of that word — a fundamental nature and the standard by which we live and survive, and by which we attempt to measure things of vast distance. And we have a paradox, for God is Light (1 John 1:5), yet cannot be seen; even as within His Creation are things which cannot be seen (Colossians 1:16).

(This is a good place to present the Colossians 1 passage, for it is this profoundly insightful segment of Scripture that I will be using throughout this essay. Verses 15 through 17 are given here as rendered in the Living Bible paraphrase.)

Christ is the exact likeness of the unseen God. He existed before God made anything at all, and, in fact, Christ himself is the Creator who made everything in heaven and earth, the things we can see and the things we cannot; the spirit world with its kings and kingdoms, its rulers and authorities; all were made by Christ for his own use and glory. He was before all else began and it is his power that holds everything together.... ("... by him all things consist," King James; "... in him all things hold together," New International Version)

At what rate of speed does light travel in our common experience? Our understanding of the velocity of light is that it travels at the rate of 186,000 miles per second, or 669,600,000 miles per hour. We call this the speed of light.

According to the Special Theory of Relativity, the "speed of light" has two realities and is therefore paradoxical. The speed of light first has an experiential reality (clocked at 186,000 miles per second); but it also has an illusionary reality, resulting largely from attempts at measuring distance and time by light's inherent velocity. For Relativity dictates that at the speed of light distance and time become infinite; that is, without duration or dimension.

The Theory of Relativity does not permit things of substance to achieve the velocity of light; but obviously, a light pulse can and does travel at the speed of light. "From the point of view of the pulse, no time at all elapses as, in our frame of reference it sweeps across the solar system. It is here, then it is there — instantly" (Davies, 1995, p190).

Albert Einstein's math professor, Hermann Minkowski, attempted to supplant this paradox by combining these two realities (the experiential and the illusionary) and formulating the notion of "space-time." But the practical problem this concept presents is an outcome something like this: "New York City at 1:00 pm and New York City at 1:05 pm are separated in space-time by 90,000,000*i* kilometers [where *i* represents the square root of -1 in imaginary time]. Of what meaning is this?

It is this problematical notion of space-time that is the basis of the idea for using light-years to measure the universe, not just for distance but also for time. And this *time*, measured in millions and billions of years for the evolution of the universe, is the foundation for the astrophysical side of the Theory of Evolution itself.

This word play simply cannot be done, since in the first place it is a raw attempt to bring the illusionary (and imaginary) into the experiential; and secondly, the "light-year" is a measurement of distance only, and not of time! In fact, as Wood (1936) so eloquently surmised, the common light-year measurement of distance does not arise from the nature of distance or of space at all. *It arises entirely from the limitations of our minds!*

Because we cannot grasp more than a certain number of smaller units of distance, we combine them into larger units for our mental convenience. It is exactly as when, to avoid too great a number of inches, we say feet, instead of inches, or when, to avoid too great a number of feet, we say miles instead of feet.

In time-measurements, also, when seconds grow too many, we say minutes, and when minutes become too many, we say hours, and when hours multiply too largely, we say weeks, and when weeks add themselves into a great total, we say years.

We manufacture larger units to bring the total number better within the grasp of our minds. We manufacture light-years simply as a larger unit of measurement. If the use of time in measuring distance lay in the real nature of measurement of space, we should have to use time in all measurements of space. We should have to use it as a factor in measuring short distances. But we do not use it so at all.

We do not use time as a factor in measuring feet or meters, or in measuring miles on the earth. The only people who use it so are those whose mental ability is so low that they cannot compute space distances at all, and who say, "It is so many days' journey," or "so many hours' journey," or "it is as far as a horse would travel between sunrise and sunset...."

It is all a matter of constructing larger units of measurement so as to bring down the total number of units to the range of our comprehension. It does not at all show that time is a dimension of space. (pp149-150, emphasis added)

But more important than this most germane point, the Theory of Relativity provides us a completely different — and largely paradoxical — view of the nature of time relative to the speed of light.

Picture, if you will, the Creator of the Universe in the process and progress (the Creation Week) of His creative acts, stretching forth (expanding) the universe at near infinite speed (at 99.999...% the speed of light) during the fourth day, setting the stars in space while "switching-on" these luminescent objects in the process.

In the reference-frame of this dense and rapidly expanding universe there would be a huge time-dilation effect, which means that the time which our "clock" experiences would be a vastly extended measure of "real" cosmic time (i.e., reality), the actual "time" that is occurring.

To assist in understanding this phenomenon, I have constructed the following chart demonstrating relativistic time dilation. Notice in particular, that as distance increases exponentially (by the factor of ten in this example), and as velocity becomes substantial relative to the speed of light (at 10^{11} , that is 100 billion meters from earth), that time changes dramatically. Also, notice — as I indicate at the bottom of the chart — that this time/velocity scale must allow for acceleration due to the effects of gravity; and that the velocity cannot be equal to the speed of light.

The Time/Velocity Paradox Relativistic Time Dilation

METERS (10 power)	DISTANCE (in meters)	"ACTUAL" TIME	PERCEIVED TIME	% SPEED OF LIGHT	MILES PER HOUR
10 ⁵	100,000	50 sec	50 sec	----	----
10 ⁶	1 million	1 min 0	1 min 0	00.03	200,000
10 ⁷	10 million	1 min 10	1 min 10	00.30	2 million
10 ⁸	100 million	1 min 20	1 min 20	03.00	20 million
10 ⁹	1 billion	1 min 30	1 min 30	26.25	176 million

As velocity (speed) approaches a substantial percentage of the speed of light, it has an effect on our time scale. What seems a normal 10 seconds in traveling time ("actual" time) would be a much longer period in relative earth time.

10 ¹⁰	10 billion	1 min 40	1 min 40	93.89	629 million
10 ¹¹	100 billion	1 min 50	30 min	99.93	668 million
10 ¹²	1 trillion	2 min 0	1 hour	99.99	669 million
10 ¹³	10 trillion	2 min 10	10 hours	99.99	669 million
10 ¹⁴	100 trillion	2 min 20	100 hours	99.99	669 million
10 ¹⁵	1,000 trillion	2 min 30	1,000 hours	99.99	669 million

METERS (10 power)	DISTANCE (in miles)	"ACTUAL" TIME	PERCEIVED TIME	% SPEED OF LIGHT	MILES PER HOUR
10 ¹⁶	<u>1 light-year</u> (6 trillion miles)	2 min 40	1 year	99.99	669 million
10 ¹⁷	10 ly's	2 min 50	10 years	99.99	669 million
10 ¹⁸	100 ly's	3 min	100 years	99.99	669 million
10 ¹⁹	1,000 ly's	3 min 10	1,000 yrs	99.99	669 million
10 ²⁰	10,000 ly's	3 min 20	10,000 yrs	99.99	669 million
10 ²¹	100,000 ly's	3 min 30	100,000 yrs	99.99	669 million
10 ²²	1 million ly's	3 min 40	1 million yrs	99.99	669 million
10 ²³	10 mil. ly's	3 min 50	10 mil. yrs	99.99	669 million
10 ²⁴	100 mil. ly's	4 min 0	100 mil. yrs	99.99	669 million
10 ²⁵	1 billion ly's	4 min 10	1 billion yrs	99.99	669 million
10 ²⁶	10 bil. ly's	4 min 20	10 bil. yrs	99.99	669 million

Consider: This time/velocity scale must allow for acceleration (due to gravity) from 10⁰ to 10⁶ (% of speed of light = 00.03), to 10⁹ (% of speed of light = 26.25), to 10¹⁰ (% of speed of light = 93.89), to 10¹¹ (% of speed of light = 99.99), and cannot, by definition, advance to 100% the speed of light. And yet light's own velocity is "the speed of light".

— adapted from "Powers of Ten" (1968 version)
B. Schweigerdt, M.A., 1/2000

It is certainly reasonable to assume that during Day 4 of the Creation Week the Creator would have been forming and shaping the universe at velocities that were close to that of light. In fact, if He performed the creation at near light's velocity, then as my chart shows, it would have taken the light from the most distant galaxy but 4 minutes and 20 seconds to reach earth, while someone bound to think in earth time would be led to believe that it took 10 billion years for that light to reach us!

Had the Creator worked at the speed of light, then that light would have actually reached earth instantaneously! Indeed, that is precisely what is occurring today, for a light pulse traveling across the solar system at the speed of light (light's — and the pulse's inherent velocity) goes from there to here instantly!

The Paradoxical and The Profound

Although a paradox can be marked by intellectual depth and/or insight, it can also cause confusion, and be mentally disturbing. Yet paradoxes are an inherent part of our orderly existence.

In point of fact, the practical life of the Christian is (and should be) governed by paradoxical living; and it may well be, that in order to gain a deeper understanding of God's Creation, the Spiritually-minded and Scripturally-guided person will need to view life and existence through the experiential lens of paradoxical insight. Consider the following thoughtfully.

- A paradox is an apparent contradiction, which in reality may conceal a profound truth.
- A paradox is something which seems to be true, but which contradicts what is commonly taught.
- A paradox is a perplexing and a profound truth.
- A paradox is essentially something that transcends common sense.

Practical Paradoxes of the Christian Life

It is difficult for the analytical, logical, mathematically-inclined mind to reason the paradoxical; and it is hard for any of us to imagine things that are not of "common sense" value. Yet the Christian Scriptures are replete with paradoxical principles meant as guides for Christian living:

- See unseen things (2 Corinthians 4:18)
- Conquer by yielding (Romans 6:16-18)
- Find rest under a yoke (Matthew 11:28-30)
- Reign by serving (Mark 10:42-44)
- Made great by becoming small (Luke 9:48)
- Exalted by becoming humble (Matthew 23:12)
- Become wise by being fools for Christ's sake (1 Cor. 1:20,21)
- Made free by becoming bond-servants to Him (Romans 6:17-20; 8:2)
- Possess all things by having nothing (2 Corinthians 6:10)
- Wax strong by being weak (2 Corinthians 12:10)
- Triumph by defeat (2 Corinthians 12:7-9)
- Find victory by glorying in our infirmities (2 Corinthians 12:5)
- Receive by giving (Luke 6:38)
- Live by dying (John 12:24, 25; 2 Corinthians 4:10, 11)

It is as one discerning soul so eloquently put it:

FAITH is —

**Seeing the unseeable;
Knowing the unknowable;
Believing the unbelievable;
So that we can —
Achieve the impossible!**

Universal Paradoxes of Cosmic Existence

Modern astrophysics and quantum mechanics deal in paradoxical matters on a continual basis. The literature addressing these realms is filled with references and titles (some rather quaint) of theoretical paradoxes which allow for speculative advancement in these areas of investigation. Among these are —

- The Twin Paradox — A pair of twins, one stationary on earth, the other more adventurous twin traveling through space. The latter will return home younger than his homebound brother. Less "proper" time will have elapsed in his case.
- The Grandmother Paradox — Suppose a time traveler were to go back into the past and murder her grandmother. As a result, the said traveler would never have been born. But then she could not have carried out the murder after all, in which case she *would* have been born.... Either way, there is a mind-jolting contradiction.
- The Cosmic Age Paradox — According to new findings from the Hubble Space Telescope, it would appear that the universe is *only!* eight billion years old, placing the galaxies observed under uniformitarian light-years assumption at 18 billion years old in some jeopardy, to say the least. (cf. Davis, 1995, p.162)
- Non-local Reality — In spite of local appearances of phenomena, our world is actually supported by an invisible reality which is unmediated and allows communication faster than light, even instantaneously. (McEvoy and Zarate, 1996; cf. [Colossians 1:15-19](#))

This "Locality Principle," as it is known, stems from the EPR paradox (in which Einstein — thus the "E" of EPR — had a part), and is an attempt to account for the Heisenberg Uncertainty Principle of quantum physics. As it presently stands in the scientific community, the EPR paradox presents a conundrum in the field of quantum physics since the outgrowth of quantumness leads to a non-local reality; however, an invisible reality that allows communication faster than light violates the Special Theory of Relativity.

What Then Do Astronomers "See?"

Unfortunately, today most scientific investigations of life and the universe begin from the point of *reason* and not from the insights faith provides. In this regard, to *reason* is to lead to confusion; and faith leads to rest. Yet most scientists seek after the same outcomes that faith can and does produce: *Seeing the unseeable, knowing the unknowable, believing the unbelievable, so that they can achieve the impossible.*

But to whose glory would such accomplishments be attributed in today's world of scientism, naturalism, and paganism? Is there any wonder then that those on such a quest also find paradoxes and know not what to do with them. The understandings of these seekers is based on the shaky grounds of theory, mathematical equations, and imaginary wonderings only, while lacking the ability to gain clear insight into the workings of God's Creation. Einstein — who in fact considered relative time to be a property of the way in which God made the world (Clark, p.90) — had the same quest. He declared,

I want my peace. I want to know how God created this world. I am not interested in this or that phenomenon, in the spectrum of this or that element. I want to know His thoughts, the rest are details. (Clark, 1971, p19)

The astrophysicist who is today searching the universe observes a mirage, a literal optical phenomenon that yields an erroneous perception of reality, a veritable PHANTASM of wonderful sights, a *cosmic mirage* of time-warped brilliance, not to be thought of within the broader context of the cosmogony (origin) of the universe. To be pitied is the ever-longing soul who peers through his scope and declares that the universe is 18 billion years old, and that he is actually observing the creation of the universe in progress. They fail to enjoy and appreciate the real wonders of God's Creation, ever driven to ascertain its workings and its beginning.

He (and we) may in fact be seeing the actual luminescence of the distant galaxy, but that light is instantaneous to us and did not take billions of years to arrive within our sphere. The mechanical universe of Newtonian Theory does not apply to the relative things of the Cosmos, or the quantum world of the "infinite" particle for that matter. Indeed, we are in the age of Einsteinian Theory where all seems paradoxical!

Conclusion

Now that I have elucidated this response to the issue of starlight travel-time, and the billions of years as the age of the universe using the Special Theory of Relativity, allow me to briefly share some of the interesting work that is occurring in the field of gravity research and the effects of gravitational time dilation.

Beyond the effect that the velocity of light has on time (and distance), gravity too affects time. Gravity works instantaneously (infinite time) as does light, and is ubiquitous (omnipresent, if you will) in the universe, just as light is.

There are really two issues addressed by relativity theory in reference to the expanding universe and time dilation: Special Relativity which theorizes the speed-of-light to be constant, and the dramatic effects that velocities approaching that speed have on time relative to the earth-time reference frame; and General Relativity which deals with the striking effects that gravity has on time (clocks) as they accelerate ever farther (and faster) from earth's reference field.

It is the Theory of General Relativity that initially predicted the phenomena we refer to today as black holes. Black holes occur when the core of mass at the center of an object becomes so dense — and therefore the gravitational force so immense — that nothing can escape; neither matter, time, or light. In other words, for all practical purposes, matter, time, and light do not exist, at least from our perspective. All that "exists" in a black hole is gravitational energy.

In order for a black hole to exist it must have an outer "surface" which separates it from the remaining universe, and which prevents matter, time, and light from escaping into the beyond. This outer "surface" is known as an *event horizon*. The diameter of an event horizon is proportional to the amount of mass contained within it.

It is at an event horizon that time is massively distorted. In fact, according to general relativity, time effectively stands still at the event horizon (Humphreys, p.28).

Gravitational Time Dilation actually has the reverse effect from the Speed of Light Paradox, — time actually *slows* dramatically as it approaches an event horizon when viewed from earth's time frame — yet it is interesting to note that both gravitational effects and light speed effects, when taken to their logical conclusions, reach the point of infinity — that is, the absence of time.

Russell Humphreys notes that from a General Relativity perspective, while a few days were passing on earth, billions of years would have been available for light to travel here (p.13). On the other hand, from the Special Relativity perspective, time on earth would appear to have advanced by billions of years while, in actuality, objects (stars) being stretched (or expanding) in space at near the speed of light would have arrived at their destinations in a matter of minutes (ratio = 10 billion years / 4 minutes, 20 seconds).

And of course, were the Creator to have performed His work at the point of infinite gravity, and done so at the speed of light, — a possible/likely scenario — than distance would have been relative and infinite, even as light would have been relative, traveling at speeds instantaneous from there to here.

The main problem I have with gravitational time dilation (GTD) as opposed to the speed of light paradox (SLP) is that GTD requires the use of some effect on some sort of real "mechanical clocks." The SLP on the other hand, deals with the actual issue of starlight travel, and only uses "clocks" in a comparative sense to demonstrate the speeds involved. In other words, there remains only one "real time," that being the time of our daily experience relative to the actual velocity of light travel.

The GTD, though no doubt correct, necessitates the posing of a difficult question: If clocks in different places can register time at drastically different rates, which set of clocks do you suppose the Bible is referring to in Genesis 1? Humphreys — the main proponent for applying General Relativity to the recent creation model — feels that God's intention was to define time in terms of the *earth's* rotation and the *earth's* motion around the sun, thus speaking of periods of time in our own frame of reference (p.29).

This is good, but not necessary when using the SLP model, since only our frame of reference is involved, with an understanding that our time scale changes dramatically as velocities get to be a substantial percentage of the speed of light relative to an object moving at that velocity. A star "set" in motion as the Creator "stretched forth" the universe, done so at the speed of light, would have, by definition, emitted its light particles from there (whatever its location) to here instantaneously.

And consider for a moment that there were no *clocks* present during the Week of Creation. Indeed, it was a significant part of the Creator's labors to establish a time-frame for earth-bound experience by means of "... the evening and the morning were the ... day;" and that seven days constituted the Creation Week, a calendar period that was to remain constant throughout the years to follow.

It has long been known that the human intellect is capable of formulating questions that cannot be answered. We tend to plant stepping-stones from the shores of the river into the ever-deepening flow. The further and deeper we go the more perilous our journey. The theories of relativity have not been adequately understood and applied to the question at hand (the relative age of the universe), and as such represent a stepping stone, which may in fact be a stumbling block to many who seek, as Einstein did, to know the mind of God.

The problem for Einstein, Minkowski before him, and most of the community of science even today, is Time. Instead of appreciating the past, the present, and the future (the *HisStory*) as attributes of the finite (and created) life experience, Einstein was unsettled about time. I am sure that he saw the future conundrum posed by

uniformity-based astrophysics, as well as the challenges of quantum mechanics, but he was unable to find a solution prior to his death. The Unified Field Theory, or "The Theory of Everything" eluded — and haunted — him throughout the last thirty years of his life. To a large extent it eludes, puzzles — and haunts — seekers today.

True science seeks a measurable substance; at these levels a power with velocities that can be calculated. The speed of light seems to block any advancement in this regard and the Theory of Relativity cannot go beyond it. Could it be, as Wood (1936, p.127) suggests, that velocity beyond the speed of light is simply that speed ". . . at which the outspread power of God, — the reality of space, and the true norm and basis of the universe, — passes everywhere into energy and action;" giving added meaning to the phrase, "God is Light?"

It is my belief that we have been created and placed between two infinities: That of the astro-universe, and that of the sub-atomic realm; the cosmic and the quantum; the macrocosm and the microcosmic. Consequently, we exist in a state of *ordered relativity and randomness*. Such a notion is highly paradoxical. But how else is *created* Man to reason and meditate on things ultimate, in an intellectual state positioned between two infinities?

Physicist David Bohm attempted to take up the concern where Einstein had left it on his deathbed. Bohm sought a theory in which the apparently random and unpredictable aspects of quantum phenomena had their origin in some deeper-level deterministic process.

Such a quest would, of course lead us closer to the events of the Creation Week. Bohm's idea was that although some features of the world might look complicated, or even random (and paradoxical), that beneath it all there lays a hidden order. This thought takes us back to Colossians 1:16: "... it is his power that holds everything together;" "... by him all things consist."

That surely is the most fundamental, the greatest foundational, and the highest profound Truth that the entire universe could contain. Let us continue our journey towards insight and understanding with that Truth in mind, and offer glory where honor is due.

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Addendum to...
"The Time/Velocity Paradox
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How close to the inherent velocity of light do we need to consider in order to arrive at the relative time dilation comparison I propose on page five of "The Cosmic Mirage...?" I would suggest that one *attosecond* to be a sufficient finite rendering for our consideration. Using high-speed lasers, pulses of light have actually been created lasting just 250 attoseconds in duration.

If we were to juxtapose the familiar time duration of one second to that of one attosecond, the formula is one billionth of a billionth of one second compared to a single second duration. Events occurring at this velocity are the swiftest that scientists can presently measure.

But this unimaginably brief interval is an aeon compared with the theoretical notion of Planck Time — about 10^{-43} second —, which is believed to be the shortest possible time-framed event. This may be, in fact, the actual speed at which the Energy/Mass Conversion Continuum (E/MCC) occurs; or it may, in fact be the velocity (at rest) of the point immediately preceding the Singular moment of Creation. That ratio (sub-second duration/over light-year dimension) is no doubt the true manner by which to measure time across the universe.

Were one to measure (distance) an 18 billion light-year universe (108^{21} miles) dividing this by 186,000 mps, and dividing by a sub-second duration, I would suppose that a more precise comparison than that provided in my chart could be rendered.

Recall that the speed of light, which we can tangentially measure, is not the inherent velocity of light (IVL) as the universal constant in Einstein's theory of Special Relativity. At 100% the IVL there is zero dimension and zero duration. This is manifestly light at rest where distance is not traveled and time is not counted (or comprehended).

But when *Beginning* is established (the point of time's initial being), and light is commanded its function, the Energy/Matter Conversion Continuum (E/MCC) is established, and the $e=mc^2$ formula applies. This c^2 velocity formula provides a clue as to something of the actual velocities that occur *within* the beam of light as it travels across the universe.

So what are velocity calculations within the beam of light where time and distance are relative? What is, in fact, the time interval of the E/MCC that occurs continually, on a moment-by-moment basis?

We surely know that it cannot be at 100% the IVL — the pure Inherent Velocity of Light — for at that point, in finite terms, all is at rest and literally nothing happens, at least in terms of our limited understanding. At that velocity, we simply have pure energy at rest and no matter present.

But when the command "Let there be Light..." is given, this at rest velocity is reduced from 100% to some lesser speed, say 99.999...%. It is this slight range (99.999...% to 100%) that we are dealing with when considering the Creation Singularity.

If, within that range, an *attosecond* (10^{-17}) is too rapid (even as the theoretical Plank time — 10^{-47} — may in fact be light at rest, the point of Creation) then a *femtosecond* may be a more realistic consideration. This is the realm-rate at which atoms within molecules operate and chemical reactions occur. It is reported that the interaction of light with pigments in the retina — the process that permits vision — takes around 200 femtoseconds.

Considering then, femtoseconds to be the rate at which the E/MCC to occur, and using the calculation of miles (divided by) the observed speed of light (equals) seconds (divided by) a femtosecond, this should mean that it would take the photon of light 10 minutes to travel from the distant galaxy (18 billion light-years) to our own eyes.

Notice: Guidance for this addendum came from "A Matter of Time," a Special Issue of "Scientific American," 9/2002, specifically page 56, by David Labrador.

The Paradoxical Nature of the Speed of Light
©Bruce Schweigerdt, MA
(Addendum to "The Cosmic Mirage")
June 2001

On the one hand —

(In the abstract sense), light — its velocity — can be measured. Olaus Roemer (1644-1710), through observations of the eclipses of Jupiter's satellites, discovered that when viewed in the abstract, light travels through space at a finite (non-instantaneous — measurable) velocity. From his detached perspective, Roemer was able to quantify his measurement giving us an approximation of the current accepted value for the speed of light at 186,283 miles per second. It is this fixed, constant velocity that provides a method for expressing distances in the outer cosmos.

Now a practical example and a relevant question:

If it takes light eight (8) minutes to travel from our sun to the earth, if the sun were to instantly extinguish, would it take us eight minutes to go dark?

On the other hand —

(In the concrete sense), a particle of light, traveling at light's inherent velocity moves instantly from point A to point B, since at the speed of light space is without dimension (infinite), and time is without duration (instantaneous). This is clearly demonstrated by Einstein's Special Theory of Relativity. Therefore, to face the sun directly, in a concrete way (as we all experience it — directly, not abstractly), if the sun were to stop shining in a moment of time, we would become dark instantly.

An application to the galaxies:

It is said that the farthestmost galaxies from earth are 18 billion light-years distant. This is a measurement of distance, not time.

In an abstract sense — supposing that you could remove yourself to a third-point position detached from the earth and the most distant galaxy, it is certainly possible to calculate this measurement, and state it within the language of light-years.

But in a concrete sense, were you to actually travel from earth to the farthest star in the universe at the velocity of light, you would, from the moment of departure, arrive at that star instantly, since at light's inherent velocity, distance is infinite (without dimension) and time is instantaneous (*present* only, without duration).

Most persons think of the term *light-year* in terms of *time*, today more so even than *distance*. But consider this rather significant conundrum: If the farthestmost galaxy is 18 billion light-years away, and if time is the issue; and if then, it takes a beam of light to travel 18 billion years from that galaxy to the earth so that when we today look at the galaxy seeing it as it was then and not as it is now, then where do you suppose that galaxy *actually* is today!?

Ponder this:

Light's velocity, when used as an abstract expression of distance, can be quantified, and, in this sense, is a legitimate use. However, in order to fathom the time, or speed of light, one must first know the distance separating the two objects to be measured.

It is not possible to arrive at a speed-of-light formula without the essential factor of distance: even so, it is not possible to extrapolate measurements of time using this formula since you cannot pinpoint location and velocity at the same instant at this cosmic level, even as you cannot do this at the quantum level according to Heisenberg's Uncertainty Principle.

Looking at the puzzle in a more traditional sense, if you chose to travel from planet earth to the farthest star some 18 billion light-years away at the speed of say 1,000 miles per hour, or 10,000 miles per hour, or even 1,000,000 miles per hour, it would indeed take you (considerably more than) 18 billion light-years to reach that star.

But if you traveled at the speed of 99.999...% of the inherent velocity of light, you would no longer be traveling in "stationary time" where velocity (motion) is measured by distance \times time; you would actually have "collapsed" (experienced) the dimension of space between the earth and the star to the infinitesimal degree, while at the same time "reduced" (experienced) time to the infinite degree (without duration).

In other words, without space with dimension, and time without duration, you will have traveled from earth to the star instantaneously! (One word of caution: Do not strive to travel at the actual speed of light, for should you do so you would then dematerialize, becoming pure energy without substance, and no one yet knows the consequences of such a state of being!)

Now for a practical understanding (the "Clock Paradox")

Nearly all astronomers peer through their scopes into the vast reaches of the universe from a time-frame of our common experience, harboring clocks that have a standard and predictable rate of passage. And as they gaze into the cosmos, they are limited by this uniformitarian bias in formulating a chronological history for the cosmos. In constructing such a history on this basis, they commit a serious error in understanding the nature of the *HisStory* of God's Creation.

Experiments conducted even within our own time-frame show that any clock (i.e., measurement of time) which is moved through space at an accelerated rate will slow down, and how much it slows depends on the rate of acceleration. In other words, the faster an object moves through space — especially when approaching the velocity of light — the more time it *appears* to take in its journey. When applied to the Creation event — the heavens stretched forth, the stars hung in place — supposing the Creator were to proceed in motion (enter a tangible universe) at a velocity consistent with His being ("Let there be light...", "God is light"), a velocity approaching that of light, one would think the process to take billions of years, where in reality (our reality, our time-frame) mere minutes would elapse.

This is precisely why God could create the universe of stars, from our sun to the outer galaxies, in a matter of one day (day 4), an accounting of time He gave us at the beginning of *HisStory*; while those who fail to give credence to this account find themselves dealing with billions of years for this happening. Those of that mindset fail to recognize — and are ill equipped to understand — the paradoxical nature of the speed of light and its effects on time, and therefore history.

The Speed of Light and the Distance Between Objects:
Explaining the Fallacy of Using Star-Light
Travel as an Indicator of the Age of the Universe
©Bruce Schweigerdt, MA
April 2000

When science tries to measure the speed of light, the essence of light must be reduced to the sensory level, and the *whole* broken into its component parts: Motion and velocity; duration and distance; time and space. Beyond that, the fundamental issue and the absolute essence (purpose?) of light – that being the conversion of energy to matter and *visa versa* – must be compromised for purposes of tangible, finite investigation.

Mathematics, on the other hand, does not need to compartmentalize light, but instead seeks to understand the *whole* (or essence) of light. Therefore the formula $e = mc^2$, and the theory of Special Relativity (Einstein).

At the level of light's essence (its state of absolute equanimity, or rest), as well as light's inherent velocity – a finite scientific understanding – there is no duration or distance, there is no time or space, and in fact, there is no motion or velocity since light travels from “there” to “here” instantly (cf. Davies, *About Time: Einstein's Unfinished Revolution*, 1995, 190).

The Heisenberg Uncertainty Principle of quantum mechanics applies here. Since a *quanta* is a packet of energy at some basic level (?) – is it matter or is it energy? – the Uncertainty Principle states that one can never ascertain the location and the velocity of a quantum particle at the same time. Once you cite its location, you cannot measure its velocity. And if you measure its speed (velocity) then you cannot specify its location.

Therefore, from a pure mathematical perspective, there is not a *speed of light*, and Einstein's formula and theory apply; and Heisenberg's Uncertainty Principle governs. At the point of light's creation, to the moment of its observation, there is no distance and there is no time. This mathematical finding produces a profound paradox for those accustomed to finite investigation, as well as the limited notion of reality.

This paradox occurs because the *distance* between two objects – the star (or galaxy of stars) and the observer – can be measured with some degree of certainty; however the element of velocity cannot apply. In other words, the object observed is not its light, but in some sense its cosmic mirage.

Our eye experiences the sensation of the light, but that sensation is far removed from the object sighted. We know intuitively that there is distance involved. It is logical for us to think that we can measure the time between the observed and the observer as well. To think (and measure) in terms of distance is finite reality. But to think distance in terms of time – especially where speeds at or approaching those of light are concerned – is speculative and presumptive fantasy.

To think of time in terms of the speed of light – or the speed of light in terms of time – is to initiate, foster, and promote a scientific (and cultural) mythology. Science should recognize its extraordinarily limited role here. For mathematics alone in human reasoning can deal with the paradoxical.

Consider, for example, the simple problem involving three (3) abstract entities when one enters into the realm of the paradoxical? Is it possible for three distinct and separate numbers to be as one number? NOTE: Scientifically (and experientially), this is not possible. However, mathematically it is not only possible for three (3) figures to be as one (1), it is demanded when a certain formula is applied.

When one abstract number – the number one (1) – is added (+) to a second number one (1), and then added (+) to a third number one (1), the common formula used demands a sum of the ones, the number three (3): $1+1+1=3$.

However, when the mathematical process of multiplication is applied, a single abstract number one (1), times (x) another single number one (1), times (x) a third single number one (1) equals a numeric whole of one (1): $1x1x1=1$.

We find the notion of *three* distinct numbers *as* being *one* to be highly paradoxical, yet think nothing of it, applying the rules of multiplication in countless applications throughout the day. Mathematics can deal in – and help us in living with – the paradoxical in the finite world. Science, on the other hand, has no ground in this realm (except in its use of mathematics as just enumerated).

The scientific disciplines of astronomy, cosmology – and especially cosmogony – seek evidence about the beginning of the universe (or *all* really!), and fancy the seeming ability to place time constraints – a *history*, if you will – on the universe by appealing to measurements of the *speed of light* as the formula.

Such efforts impose a spurious and dubious mythology on the discipline of science; and in a culture steeped in scientific endeavors, and a society increasingly dogmatized to subscribe to the scientific orthodoxy of the moment, all sorts of false realities are promulgated. Not the least of these is the understanding of history from the moment of Creation to the present.

There are no historical records or documentary evidence of any sort that provide a billion(s) year history for the universe; or an earth that is 4.5 billion years old; or large reptiles covering the planet 300 million years ago; or

man descending from lower life forms some 3 million years past. All of these notions are intellectual constructs that have been built on a foundation of starlight travel, as well as uniformitarian geology. If the foundation is flawed (in this case, “the sands of time”) then the structure that is constructed on that foundation of “sand” is faulty, even dangerous.

It is time that our culture was freed from these spurious underpinnings. The quest for the beginnings of all things (and the universe) is clearly delineated in the first verse of the Judeo-Christian Scriptures. And at the point that God said, “Let there be Light” the energy/matter interchange – the essence of all things material – was initiated. In day four of the Creation Week, God created the luminescent bodies as engines to carry on this interchange, among other things. A correct understanding of these issues is essential for a healthy worldview.