Synopsis of *Relativity Trail* © relativitytrail.com
(210 pages, 140 illustrations.)

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In *Relativity Trail*, Einstein's special theory of relativity is diagrammed against an absolute frame of reference, more specifically -- the universal frame of reference. This treatment should not be called "relativity in absolute space" or "relativity of absolute space", as the structure of space is actually evolving. "Relativity in absolute terms" is preferred here. *Relativity Trail* addresses issues which have been widely discussed among students of relativity for its entire history.

It is frequently asked whether clock rates and lengths of rods actually contract, or if these are simply measured effects.

Special relativity, as developed by Einstein and Minkowski (and as almost universally taught today), address only predicted measures (identically -- observations or perceptions) of events (phenomena). (This is also true of general relativity.)

It does not address the nature of the phenomena being measured. To address such actuality lying beneath the predicted observations, one must take the God's eye view, meaning the view from one dimension higher.

This latter approach subsumes the former approach. They are completely compatible. Einstein's treatment of special relativity can easily be diagrammed against a stationary frame of reference from the God's eye view. Such frame of reference (the sum total of the cosmos) , of course, cannot be experimentally detected by entities in the universe (disregarding the three degree background radiation, which not only lies outside the topic of relativity, but which may turn out to not be a universal constant.)

Einstein's definition of what constitutes a synchronization of two spatially separated clocks of the same inertial frame amounts to a disregard of an analytical incorporation of an absolute frame of reference. The two treatments (Einstein's and *Relativity Trail's*) ultimately vary only by the manner in which two spatially separated clocks of the same inertial frame are set.

Paragraph 2 of *Relativity Trail*:

"Any book about relativity that doesn't clearly state that the slowing of clocks and contraction of rigid bodies is a reality which goes beyond our mutual measurements of these things is not only giving the reader half the story, it is giving the reader a confusing story. Without a recognition of this reality, such a book's author is also forcing himself into a mathematically impossible task - that of resolving a clock paradox of his own making. Such impossibility generally does not keep him from trying, and later in this book, we'll check and see how he's fared."

A fundamental error almost every relativist makes, is that the Twins Paradox can be resolved without acknowledging an actual difference of clock rates between two clocks in uniform motion relative to each other. (Einstein himself did not seem to commit that error. He never attempted any explanation of the apparent paradox.) Because spacetime is dependent on Einstein's clock synchronization, the popular "jump in time" spacetime diagram argument as relates to the Twins Paradox is nothing more than a repetition of Einstein's original *prediction* of an ultimate time differential, devoid of any *explanation* of where the missing time has gone. Using a rational measuring paradigm, whereby the two parties check each other's clock status with the regular sending of radio pulses, a noted asymmetry in time keeping differences between A and B builds *incrementally* beginning at the moment of B's turn-around. For further commentary, see: http://relativitytrail.com/twinparadox.pdf

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Implicit in Einstein's assignment of "stationary" to a reference frame, is that there is an actual difference in clocks rates between two inertial frames. However, Einstein considers such assignment merely arbitrary, and once he utilizes his definition of what constitutes clock synchronization, the actuality becomes obscured. Hence, officially at least, Einstein's treatment does not address the question of which clock is actually running slower or faster over any interval of the analysis, nor, identically, the question of which entity's rod is actually shorter. Only mutual assessments of each other's properties are addressed. In the course of Einstein's derivation, certain measures must simply be assigned to the entities involved for the sake of satisfying the postulates of *measure*.

In the end, Einstein concludes that there is a time differential between reunited clocks, but with the meaning of "stationary" and "moving" neutralized by Einstein's clock synchronization, he cannot explain the missing time.

Why is it called a paradox? Apparently, it is because Einstein's relativity is almost universally treated as though it precludes any actual difference of length and clock rates between different inertial frames. This leads immediately to the state of mind that "there is no truth of the matter" concerning inertial frames. That in turn, creates a seemingly paradoxical situation -- two reunited clocks do show an actual difference in recorded time, as if there must have been a "truth of the matter" regarding their clock rates as they moved uniformly. (And you can forget about considering acceleration effects. Such effects are trivially dispensed with by virtue of simple transfer of clock information from one inertial frame to another. In fact, one cannot legitimately analyze problems in special relativity without making use of the transfer of information between objects in different inertial frames. Acceleration is strictly forbidden.)

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But Einstein's treatment does not preclude such actual differences of clock rates. In fact, his postulates demand it, as he should have noted at the conclusion of his derivation. By extension of logic, the famous experiments performed around the turn of the century which drove Einstein's postulates also demanded it. At the conclusion of Einstein's kinematical section, where he noticed the "peculiar" result of a time differential between reunited clocks, he should have realized that his assignments of "stationary" and "moving" had meaning beyond their characteristics of certain mutual effects.

That does not mean that Einstein's special relativity is not valid or valuable. Einstein's treatment succeeds in predicting observations of electrodynamical phenomena.

When presenting relativity from the God's eye view, it is obvious that there is no clock paradox. From the God's eye view, light is seen to have a constant speed in an actual, not merely measured, sense. Thus Einstein's second postulate is so replaced.

An actual difference in clock rates follows immediately from this postulate of the absolute nature of light, provided of course, that one assumes that photons are the maker of every relationship (specifically here, the regulators of atomic functioning; but also the carriers of force information and our means for perceiving events).

The consideration of photons being massless particles, along with the consideration that mass and energy are interchangable, serves as the basis for postulating that light has an absolute speed and is also the limiting speed, with the photon having the property of existing in the form of pure energy. The basis for both the preceding considerations actually predates Einstein's theory. Einstein himself introduced the notion of light existing in the form of a quanta of energy.

POR = Principle of Relativity
EM = electromagnetism
MM = Michelson - Morley

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Einstein's first postulate, which itself pertains only to *measures* of properties, is the POR extended to EM. As seen in the MM experiment, as well as in Galilean mechanical demonstrations, the POR is inextricably bound with synchronization of motion along different axes. It is replaced, in the Gods' eye view, with the requirement of actual synchronization at the base of our physical structures, for the sake of their stability. The Machian notion of a particle's relationship to totality, along with absolute light speed, combine with the need for atomic synchronicity to explain actual length contraction of rigid bodies. This is because photons (or virtual photon events) are considered to be the fundamental agent of communication within atoms, maintaining the organized structure of the atom. It is the equivalent of the Michelson-Morley paradigm, but on the atomic scale. Implicit here, is that particles have both a translational and rotational/orientational relationship with their environment, in the Machian sense.

When light rays and the motions of objects, along with their photon clocks, are charted out against the stationary reference frame of the God's eye view, all the mutual effects of special relativity fall into place, including of course, consistently measured light speed in all directions, in all inertial frames. There is no clock paradox from such a vantage point. It is seen with clarity, why it is that the clock whose change of inertial frame brings the clocks back together is the one that records the lesser time over the course of the round trip.

No aether need be considered in such a treatment, rather a structure which is made up of an evolving set of relationships between all elements of the universe, in keeping with the nature of general relativity. Light is the maker of every relationship in this structure. The photon (or virtual photon event) is the agent of communication, both of forces, and of positioning information. This structure is not fixed, rather evolving. The sum total of the structure, identically with its point or points (as in the inflation case) of departure is regarded as being at rest.

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The description of this structure most simply incorporates the notion of a point of departure (the Big Bang) within the spatial dimensions of an euclidean universe. No meaning can be attached to any movement of such a point of departure. But in the context of the notion of a universe of inflation, euclidean or non-euclidean, the description is fundamentally the same. In this latter case, the origin of the universe lies outside its spatial dimensions, and the membrane of space expands due to inflation along that other dimension. There are then any number of points of departure for motion with respect to the membrane of space. In this latter case, it is obvious there would be no single center point of the universe within its own spatial dimensions. But even in the former simple case, such an actual center point would be experimentally undetectable. This is detailed in *Relativity Trail*.

The relativity of *Relativity Trail* is fundamentally different from the relativity of Lorentz:

> Lorentz embraced a fixed structure of space - the aether.
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> Lorentz did not define time-keeping (clock functioning). (Neither did Einstein.)
>
> No clear basis was provided for why clock rates or rods should contract, let alone contract the needed amounts to satisfy the Principle of Relativity.

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See also: relativitytrail.com

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relativitytrail.com/twins_paradox_explained.htm