Preprint paper for 15th Annual NPA Conference with Annual AAAS-SWARM Conference at Univ. of NM at Albuquerque, NM April 7-11, 2008

Simple Assumption Errors Invalidated Relativity And Some Related Areas

Neil E Munch
402 Russell Avenue, Gaithersburg, MD 20877-2864
phone (301) 987-6742, e-mail nemunch@cs.com

Abstract: Some critical flaws resulting from inadequate control of assumptions are:

a) Lorentz and Einstein inadvertently attributed the variability of an observed *light path* over some fixed length to the fixed length itself. That fixed length does NOT vary with observed velocity; it's the observed *light path length* which DOES vary per Lorentz-type transformations.. This critical error is irrefutably shown in a copy of parts of Einstein's own 1905 text in the appendix to this paper. That led to other critical errors in Special Relativity. When corrected, we see that light speed c is reasonably constant when measured in the frame of its source; however its speed really is ***seen*** to be different when measured by a moving observer. .The error in presuming variation in physical lengths resulted in incorrectly presumed increases in mass with velocity reaching infinity at light speed c. Those are also incorrect. It's the *light path length* which varies and that has no discernable influence on mass.

b) Einstein also assumed that elapsed time of that observed light travel varies; it does not, as explained here. So, there never has been a "twin paradox" once assumptions are controlled.

c) Minkowski based his *"Space-time"* on assumptions that zero can equal one. Also that light can arrive before it leaves. Both are incorrect and hence his space-time concepts can also be rejected.

d) Michelson-Morley's experimental equipment was unable to recognize variability of observed c'. That's because its round-trip travel of light beams obscured the measurement of comparative light speeds.

e) One simple method for improving assumption controls is suggested.

The assumptions used here are listed at the end of this paper.

1. Erroneous switch from variable light path s' to fixed length L:

1a. Background and description of this flaw:

A century ago, Lorentz [1], Fitzgerald [2], Einstein [3] and others incorrectly assumed that a physical length L varies with relative velocity v . It does not. Rather, it is the observed light path length s' of light passing over that length L which does vary with relative velocity v (per Galilean expectations [4. 5]) -- not the length L. Sadly, the resulting errors from this lack of assumption controls have endured for the past century without detection..

Consider the x- and x'-axes in Figs 1a and 1b, on which there are 2 observers P and Q respectively. Those axes are moving apart at velocity v. There is a fixed length rod of length L (with points a and b at each end) on the x-axis as shown.

In Fig. 1a, per Galilean relativity, observer P sees himself and length L as stationary and the x'-axis and observer Q moving to the left at v.

In Fig 1b, observer Q sees herself as stationary on the x'-axis and that the x-axis and observer P and length L are all moving to the right at v. This easily disregarded relativistic nature of observations by humans will be found to be of great importance here.

Now, consider Fig. 2a where a light flash occurs at time t_1 at point a on the x-axis. That marks point a' on the

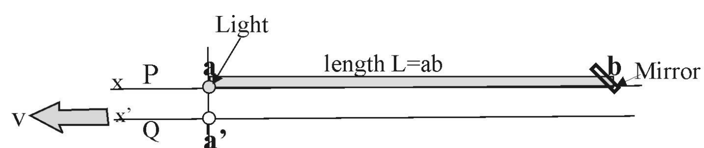


Fig. 1a. P on the x-axis sees Q and point a' moving to the left at velocity v along the x'-axis..

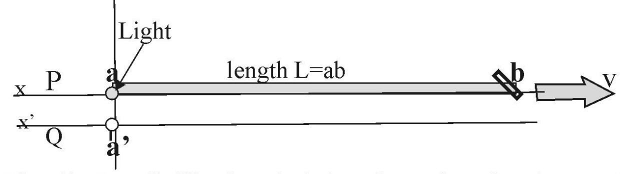


Fig. 1b. Per Galileo's relativity, Q on the x'-axis sees P and L, a and b moving to the right at v along the x-axis.

x'-axis also. An instant later, as shown in Fig. 2b, that light has passed over length L at speed c and arrived at point b on the x-axis at time t_2. At that instant, the arriving light beam also marks point b' on the x'-axis. The light beam over the x-axis has traveled at speed c, so path length s is:

$$s = L = c(t_2 - t_1) \qquad (1)$$

where $(t_2 - t_1)$ is the elapsed time of light travel. In Fig. 2b, P also sees that point a' on the x'axis has moved a small distance δ to the left during the time it takes for light to travel from point a to point b.

In this example, there is only one single light beam. But, observers P and Q have a slightly different view of it-- just as they have a slightly different view of what's happening to each other in Figs, 1a and 1b. In Fig.2b, P sees that a' has moved to the left so he correctly says that the light beam length a'b' on the x'-axis has *dilated* .

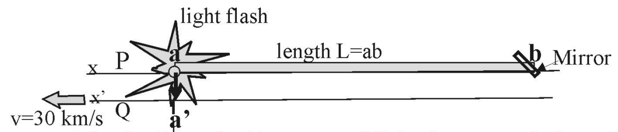


Fig. 2a. View by P at start of light from a and a'.

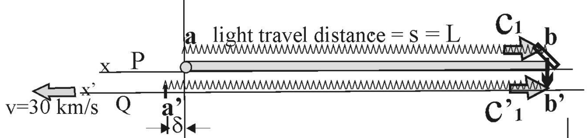


Fig. 2b. View on x by P when light reaches b and b'.

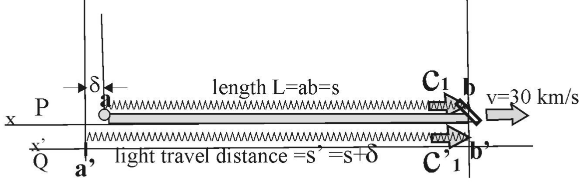


Fig. 2c. View on x' by Q when light reaches b and b'.

. In Fig. 2c, the observer Q sees the length ab of the light beam is shorter than light beam length a'b' and says that length ab has *contracted.* The c*ontraction* of moving lengths was predicted by both Lorentz and Einstein. But, contrary to those predictions, it's the light paths s or s' which vary and not the length L over which light travels. Sadly, that difference results in a critical failure of Special Relativity and much of what was derived from it. -- assuming that this paper is correct.

In either figure (Fig. 2b or 2c) , BOTH P and Q (with proper instruments) can measure and agree that

$$c' = c +/- v \qquad (2a)$$

$$|s'| = |s| +/- |\delta| = |L| +/- |\delta| \qquad (2b)$$

where $$|\delta| = |v| (t_2 - t_1) \qquad (2c)$$

1b. Some impacts of this flaw:

This rejects Lorentz's and Einstein's concepts that physical lengths contract (or dilate) with relative speed. To this author's knowledge, there has never been an experiment proving that rigid physical lengths of intimate objects change length (nor rate of time passage) just because they are moving or because some moving person looks at them. On the other hand, accurate direct measurement of variable speeds of light from moving high-speed sources, including astronomy, has been a very difficult type of experiment. When assumptions are controlled, the Michelson-Morley (MMX) type of tests would not have been accurate enough to confirm or reject that -- for reasons discussed in Section 7 of this paper.

With the recognition that physical lengths do not change with relative speed, the assumption that mass of a moving object also increases can be rejected. Contrary to text-books for a century, mass does not increase to infinity when relative speed equals light speed c. Hence the assumption that objects cannot travel faster than light speed remains unproven and can also be rejected. The "super-luminal" speeds observed in astronomy throughout the past century (and always rejected) can now be considered and studied scientifically.

1c. Clear confirming evidence of Einstein's critical error in assumptions control (i.e., switching the types of lengths which vary with observed velocity) is shown in the exact copy of a portion of his [translated] 1905 words in the Appendix of this paper. In his 2nd principle, he correctly wrote the equation for light velocity in terms of *"light path"* length. In the next sentence, he has shifted from light path length to a *"rigid rod at rest whose length is l* …" which was then presumed to be that which varies with speed. This is an insignificant-appearing error at first -- but one which has had deleterious consequences in theoretical physics for the past century.

That same error was likely made by Lorentz and Fitzgerald before Einstein. The tragedy is not so much that the error was made -- but that few if any bothered to check the underlying assumptions of this work. And, this author-engineer can testify that such disregard for assumptions control has continued by some scientists in theoretical physics to this date.

2. Elapsed time of light travel:

We next ask the question, "Does elapsed time of light travel (t_2 - t_1) vary with relative velocity v as predicted by Special Relativity?" In the above, time t_1 is the instant that light leaves points a and a', and time t_2 is the instant the light beam arrives at b and b'. Using the same logic and assumptions as above, the answer is "No" . As above, the length L is constant and invariant with velocity. Observer P, who is on length L,sees light travel along that constant length L at constant speed c. The elapsed time measured by by P over the single length L (or s) would be;

$$(t_2 - t_1)= L / c = s / c \qquad (3a).$$

Observer Q (on another frame moving relative to the length) would see light travel over s' in (2b) at speed c' in eq. (2a). So the elapsed time $(t_2 - t_1)'$ seen by Q is:

$$(t_2 - t_1)' = s' / c' \qquad (3b)$$

If we substitute (L + δ) for s' , per (2b),and (c + v) for c'. per (2a), we have:

$$(t_2 - t_1)' = (L + \delta) / (c + v)$$

If we recognize that L equals $c(t_2 - t_1)$ by definition and $\delta = v((t_2 - t_1))$ per eq. (2c), then

$$(t_2 - t_1)' = \frac{(c(t_2 - t_1)) + (v((t_2 - t_1))}{(c + v)} = \frac{(c + v)(t_2 - t_1)}{(c + v)}$$

Or simply, $(t_2 - t_1)' = (t_2 - t_1)$, (3c)

So, elapsed time of light travel, like the length L, remains constant as seen by all observers--whether moving or not.

In summary, the physical length L and the rate of passage of elapsed time (sometimes called Universal Time [6]) remain constant no matter who is observing them and from what relative speed of observation.. On the other hand, the perceived path lengths of light (and perhaps other emissions) and observed speeds of those emissions would be expected to vary with the relative speed of observers.

Assuming it's correct, this refutes Einstein's century-old supposition that elapsed times (as well as physical lengths) physically change with velocity of the observer. With that rejection, his basic concepts of special relativity crumble before your very eyes…..all due to a simple lack of rigor in assumption controls.

3. Properties of light (and emission) waves

Assume the above analyses, based on Galilean relativity, are correct. Let's return to the observation that a SINGLE light beam (not a physical length) can indeed be seen in different lengths by observers at different relative velocities. That's because there is only a single light beam. And, because there is only a single beam of light, each of the various views of that single light beam will therefore have exactly the same number of light waves in the length ab or a'b' . That single light beam is viewed (and can be measured) as being stretched out or contracted in the view by Q in Fig. 2c. Consequently, there would be slightly longer (or shorter) wave lengths, but each with exactly the same periodicity between waves. And, the same total elapsed time of travel of that single light beam seen by both Q on the x' axis and by P on the x-axis in Fig. 2c.

That constant number of light waves (or quanta) might possibly be a worthy subject to consider for possible future laboratory experiments IF instrumentation could be found or developed) which is sufficiently accurate to quickly count a huge number of light waves (or quanta).

4. Other related flaws in Special Relativity -- also due to inappropriate shifts in assumptions.

John Paul Wesley [7] once said to this author, "*When you don't control assumptions, you can prove or disprove anything you like.*" And so it has been in some areas of theoretical physics. In 1905, Einstein inadvert-ently accepted the erroneous switch to presumed changes in presumed physical length rather than changes in the light path s' over the fixed length L. Then, he made another erroneous shift away from Galilean logic by assuming his 2nd postulate that light speed is measurably a constant c regardless of light source speed. To make that error sound somewhat logical, he also presumed [without basis] that the rate at which time passes and/or clock rates change just because someone at a different speed looks at them.

Then, in 1908 [8], Einstein's math teacher, Minkowski, shifted further from defendable assumptions in his "*Space Time*" by assuming that "A" in

$$(s - c(t_2 - t_1)) = A \quad \text{and} \quad (s' - c'(t_2 - t_1)') - A$$

could be equal to a non-zero number such as the number 1 in a simplified version of his example. The term A in both of those equations must equal zero in Galileo's logic. That was assumed, even though Galilean velocity concepts were used in early parts of Einstein's 1905 derivation of Special Relativity. Then, those Galilean concepts were dropped [9], even though this type of Galilean relativity has never been dis-proven. All of which confirms Wesley's comments at the beginning of this paragraph.

5. Impact:

The important point here is that this was a critical error in assumption controls, undetected for a century. Switching the type of length which is assumed to vary with observed speed between light path length (which DOES vary) and the fixed rigid rod (which does NOT vary) invalidates the concepts by both Einstein and Lorentz that rigid lengths vary with observed speed.

If we return to the correct observation (that it's the light path length which does vary with observed velocity v) that corrects the above error in assumption use. But the recognition that it is observed path length s' which varies with speed v thereby invalidates Einstein's second principle that light speed c is independent of observers' speed. Instead, that returns us to Galilean observed light speed c' and eq. (2a):

$$c' = c +/- v$$

which clearly contradicts Einstein's 2nd principle.

This invalidates (or at least raises major questions about the remainder of) his 1905 and subsequent derivations. Those need to be rechecked to see which (if any) of his Special Relativity conclusions are correct. Section 2 here already raises serious questions about Einstein's concept of variable elapsed times on moving frames of reference.

6. Intention of this paper:

It is the intention of this author-engineer to point out the importance of assumption controls in theoretical physics and cosmology. Errors due to failed assumption controls have long been evident and should be a concern to all. Yet, requests for attention to such seemingly mundane issues has seemed to fall on deaf ears of the otherwise brilliant scientists in the past.

It is not the intention of this paper to attribute such errors to any single person (such as those mentioned here) or groups. There have been many very good scientists who have also missed or failed the opportunity to correct this and other important errors in assumptions control. In such a lax environment in this regard, this author suspects there may be other similar errors which could become evident if one only looked.

7. A few other examples of flawed assumptions:

7a.. Michelson-Morley's experiments (MMX): In 1881 and 1887 Michelson and Morley experiments [10] attempted to confirm the existence of an all-pervasive ether, such as predicted by Maxwell in electrodynamics. That implies measuring the effects in two frames of reference, one at constant c in aether and one moving at some velocity relative to the aether. But it's not known where or how to include measuring instruments in the aether (or even that it exists). So M&M *assumed* .(without proof) that an interferometer would show "fringe shifts' as observed light speed c' varied in various amounts along the two MMX arms as those arms rotated and moved relative to the aether.

In the following analysis, it is assumed that::

- o The Galilean-based analyses in early sections of this paper are correct, and
- o The 'fringe shift' occurs in the interferometer when there's a difference between the periodicity (or frequency) of the light waves returning from the two arms.

As will be seen, even if the one-way observed light speeds did change slightly, the round-trip of light over each arm cancels that velocity effect and the periodicity of the returning light waves would not change. So, the null 'fringe shift'(and hence non-meaningful results) could have been expected.

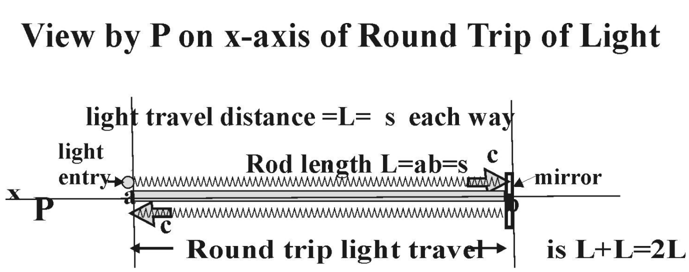


Fig. 3a P sees the total round trip light travel distance equal to 2L

To show that in a simple way, we look first at light travel over a single arm in Fig. 3a. That length could be either of the two MMX arms . In this first example in Fig. 3a, we presume constant c in all directions (as in the presumed aether). As in the early discussions in this paper, the light path length s equals length L in each direction. The round-trip light path is 2s which is the same as 2L. And, the elapsed time of light travel over the out bound trip is $(t_2\text{-}t_1)$ which is the same as the elapsed time of the return trip $(t_3\text{-}t_2)$. That is,:

$$(t_2\text{-}t_1) = s / c = (t_3\text{-}t_2) = s / c \qquad (4)$$

Next, in Fig. 3a , we look at an arm of the same length L, which is moving to the right at velocity v through the aether . This is the view that an observer would have if he were stationary in the aether. The observed light speed c' along this arm is:

$$c' = c +/- v$$

and as shown in Fig. 3b. The assumed speed of this apparatus, as seen from aether, is 30 km/s to the right.. In the middle picture of Fig. 3b, the light beam length s' is longer than L by delta length δ where $\delta = v(t_2\text{-}t_1)$. On the return trip the light beam length s' is shorter than L by delta length δ. So the total round trip travel distance is (L+δ) + (L -- δ) = 2L. So. if round trips over arms are used, the length of light travel is the same over each arm regardless of velocity v relative to the basis of constant c.

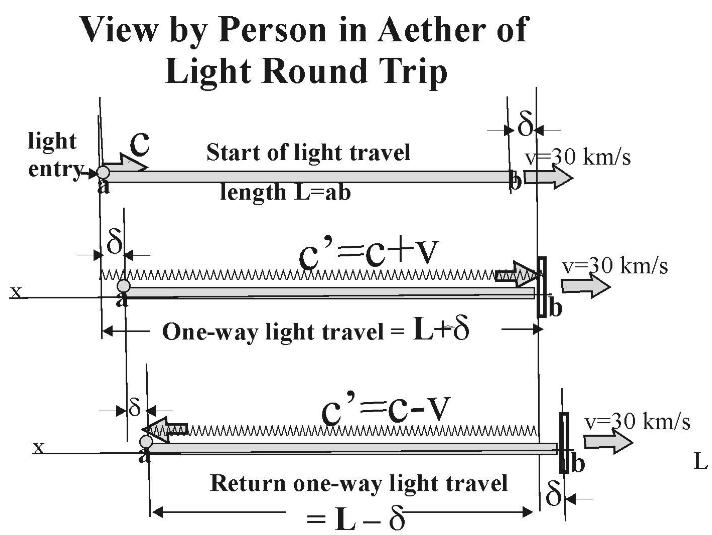


Fig. 3b Person in aether sees the total round trip light travel distance equal to 2L or = (L + δ) + (L – δ) = 2L

And, as described in Section 2 above and [11], the elapsed times $(t_2\text{-}t_1)$ and $(t_3\text{-}t_2)$ are equal. So the round-trip configuration of much of the MMX construction was probably one reason that nothing other than the "null result" has ever been experienced in the MMX tests.

Looking back (which is always easy) the MMX null results are what prompted attempts by Lorentz, Fitzgerald, Einstein and others to support the *assumed* all-pervasive aether by supposing length contraction. That, in turn, led to the many errors in relativity-related areas of theoretical physics during the past century.

7b. Finite universe assumptions:

There were a number of un-substantiated assumptions which resulted in the supposition that our universe had a specific beginning about 14 billion years ago. Included in that logic were the measurements by Penzias and Wilson [12] that the 'empty-space' temperature was 2.7^o K. The supposition by some scientists was`that temperature indicated the "Big Bang" beginning of our universe [13]. Another supposition was that Hubble's "law" [14] could be extrapolated to much greater distances than warranted by reasonable proof. More recently, the Hubble space telescope provided a picture of the cosmos 14 billion light years away which contradicted the Big Bang concept. And so, scientists are now making new suppositions. But, most of those seem to ignore the concept that our universe might be infinite in both space and time. And their assumed 'finiteness' is a neither warranted nor verified assumption. How many more centuries will be wasted before theoretical scientists recognize the need for rigor in assumption controls?

8. One suggested improvement method:

One simple way to improve the cognizance of assumptions would be to include a section specifically on assumptions somewhere in every book or paper on theoretical physics and cosmology.-- just as there is usually a section on references or bibliography. That's a more difficult task that one might think -- but it's potentially very rewarding. And, that process might encourage authors and reviewers to question use of the listed (and by implication, the unlisted) assumptions.

9. Assumptions used in this paper:

- Galileo's observation that all velocities are relative. Each observer at a different velocity see himself as stationary and velocity of a moving object or a light beam adjusted by his own velocity.
- Rectilinear motion of light and objects (e.g., no Sagnac effects).
- Universal time (UT), i.e., time passes at the same rate everywhere in the universe
- This paper deals only with light and other emissions, not with electrodynamics -- because the nature of electromagnetic emissions (with their orthogonal magnetic and electrical waves) seems more complex than simple light-like emissions.
- Light speed c is reasonably constant at values near the CODATA value [x] once it leaves its source There is no other (all pervasive) ether -- only ejection of emissions at constant c from their source. That constant speed of light quanta or waves continues at constant c throughout the life of that emission.
- There are no environmental obstructions or other external influences on motion of light, once it leaves its source.

10. References and notes:

[1] Lorentz, H.A., *"Michelson's Interferometer Experiment,"* pp. 5-7 in the book, "The Principle of Relativity" by Perrett & Jefery, publ by Dover Publ, 1952. There, Lorentz is clearly talking about the physical arms changing length (rather than light travel distance) as the apparatus rotates, to explain why the MMX "null" result occured.

[2] Fitzgerald (who also proposed that physical lengths change with velocity) is mentioned in a footnote by Lorentz on p.4 of the above book, saying, "Fitzgerald tells me that he has for a long time dealt with [this] hypothesis in his lectures." Lorentz then refers to a 1893 reference of Fitzgerald's work.

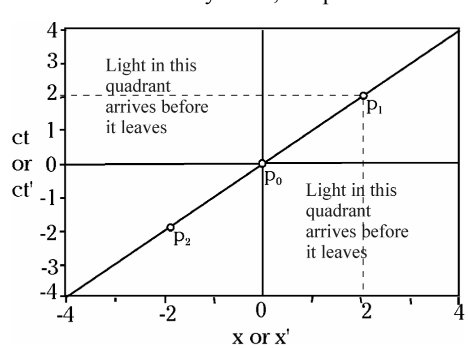
[3] Einstein, A., *"On the Electrodynamics of Moving Bodies"* on pp 41 in Ref [1] above, repeats the same words as in the Appendix on p. 6 of this paper, saying ''…velocity = light path / time interval, " and in the next sentence talking about "..a rigid rod.." having variable length rather than the light path length.

[4] Munch, Neil E.*,"Overlooked Implications of Galileo's Relative Motion"*, in "Proceedings of the Natural Philosophy Alliance", Vol.4 [in press] including papers presented at NPA's 14th Annual Conference at University of Connecticut at Storrs, Connecticut, May 21-25, 2007.. [Copies available on request to the author.] This paper shows why Galileo's 400 year-old observations are as applicable today as they were 400 years ago. And, how those details aid in understanding today's errors in modern physics in more detail than permitted in this paper.,

[5] Munch, N.E., "*How Radiation Wavelengths can vary by 16 Orders of Magnitude while Speeds of those Emissions Remains Constant",* a pape*r to be* presented at this conference of NPA and AAAS_SWARM organizations at the University of Albuqueque, New Mexico, April 7-11, 2008. Working backward to atomic sources of emissions and then outward to the wide variety of those emissions, concepts are developed as to how such a wide range of power in emissions can be achieved. If proven correct these concepts might replace prior suppositions of an all-pervasive aether.[6] Universal time (UT), defined here as "time which passes at the same rate everywhere in the universe" is used and referenced in thousands of internet astronomers' websites. The common reason for its use is that no other concept has been found which is more accurate than UT. And it is the most practical . Can the reader imagine the difficulty in astronomy if the local time at every viewed planet or star had to be corrected by the relative velocity of the viewer. An excellent discussion of Universal Time is found in Philosophy os Science, Vol 23, No.3., 3 July, 1956, *"On the Establishment of a Universal Time" by Parry Moon and Domina Eberle Spencer..* This addresses questions of synchronization of various clock-times and finds universal time to be the recommended postulate.

[7]Personal communication with Paul Wesley inCologne, Ger. in 2000.

[8] Minkowski, H., "Space and Time" pp. 75-91 in Perret and Jeffery's Dover Publ. book "The principle of Relativity" cited in ref. [1} here. Minkowki accepted Einstein's erroneous conclusions that space and time physically vary with observed velocity Then, he predicted his well-known version of a space-time continuum which was plotted in his one example on p.84 as a family of hyperbolas. None of those touch the Galilean straight-line variation of Galileo's simple equations x=ct and x' = t' shown in the inset figure -- except the trivial case at infinity.. The only valid points per Galilean eqs. lie along the single straight line of $p_2p_0p_1$ One of the numerous flaws in Minkowski's space-time is that any



points in the two (so-noted) quadrants must have negative elapsed time. That is, light must arrive before it leaves its source. And those 2 quadrants have half of all of the possible points..

[**What better illustration could there be for the need for better assumption controls?]**

[9] Einstein, A. & Lawson, R., *Relativity--the Special and General Theory"*, p.34, Crown Publ, {1916, 1961]

[10] See MMX discussions, e.g., 21-23 in Miller, A.I. *"Einstein's Special Theory of Relativity"* Publ. by Addison-Wesley [1981]

[11] Munch, N., *"Flawed assumptions in Michelson-Morlev experi-menss prevented detection of aether."* In Proceedings of NPA's annual conference 3-7 April 2006 at U. of Tulsa, OK., ISBN 1555-4773

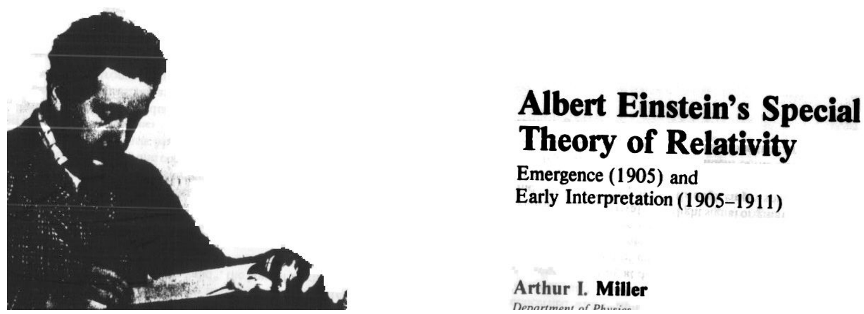
[12] Abell, G.O., "Exploration of the Universe". Publ by Saunders .1991. Penzias and Wilson's results and implication for the older "Big Bang" theory is on p. 615.

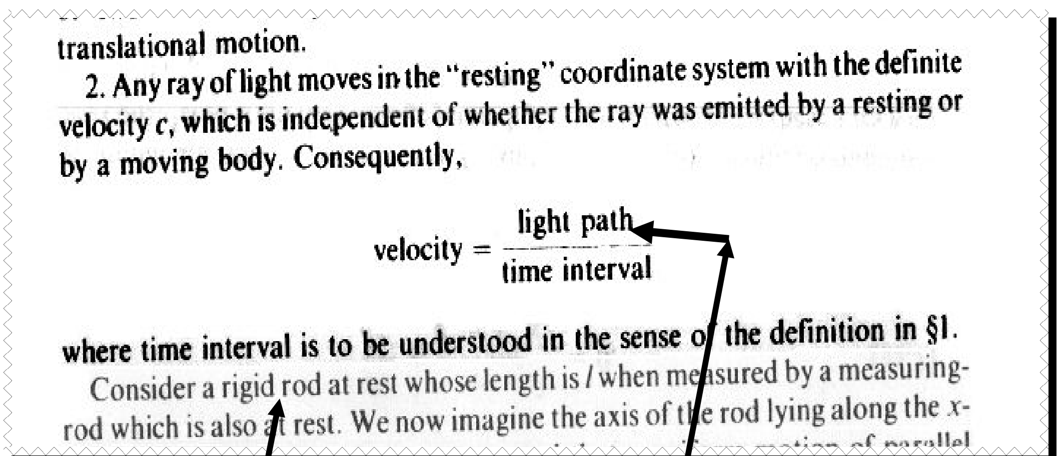
[13] See also [12] Chap 35 for the many other assumptions used in reaching the Big Bang hypothesis as of 1991. All of these assumptions were that the universe is finite and they never seemed to consider the possibility that the universe might be infinite in spaced and time.

[14] See also [12] pp. 608-611 for examples of the extrapolation of Hubble's Law far beyond any reasonable limits.

Appendix

Exact copy of Einstein's [translated] words on p. 395 in A.I. Miller's book , Publ. byAddison Wesley [1981]





translational motion.

2. Any ray of light moves in the "resting" coordinate system with the definite velocity c, which is independent of whether the ray was emitted by a resting or by a moving body. Consequently,

$$\text{velocity} = \frac{\text{light path}}{\text{time interval}}$$

where time interval is to be understood in the sense of the definition in §1.

Consider a rigid rod at rest whose length is l when measured by a measuring-rod which is also at rest. We now imagine the axis of the rod lying along the x-

"light path" assumed here

was correct, but was switched in the next sentence to

"a rigid rod" assumption here

Author's note: A "light path" can easily contract or dilate when viewed by a moving observer (as discussed herein). A "rigid rod" neither contracts nor dilates when someone looks at it -- no matter how fast that person or rod is traveling.