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Letters to the Editor

EINSTEIN'S CONTRIBUTION TO RELATIVITY

Dear Editor,

David Malcolm's discussion of the Twin Paradox[1] brought back an idea of my own from my earlier reading on the subject. If we assume that the travelling twin's slower aging process depends on his outward velocity, then he will for sure be younger than his brother as he reaches the end of his outward-bound travel. But velocity is a vector quantity and can be fully described only by noting both magnitude and direction of motion. When the direction changes 180°, the velocity takes on an opposite algebraic sign. When the travelling twin, therefore, turns back toward Earth he begins to age **faster** than his home-loving brother and when the traveller reaches Earth they will be the same age again! So where's the paradox?

I am not a scientist. I am merely a civil engineer, and civil engineers, of course, are very ignorant. (If you doubt that, just ask any architect.)

M. K. Harris,
Atascadero,
California, USA.

The Author Replies ...

I agree with Mr Harris, and appreciate this opportunity to explain my thoughts. I must point out that I too am an engineer. Velocity is certainly a vector and time dilation effects should depend on the direction of travel. Mr Harris and I can draw support from another quarter for this idea. The following dialogue is from the Australian film **Young Einstein.**

Marie: *O Albert, if only this moment would last forever.*
If only time could stand still.
Albert: *That's it! That's the theory of relativity.*
Marie: *What?*
Albert: *Light travels to us from the hands of that clock.*
To tell us the time.
If we could travel away from that clock at the speed of light . . .
Marie: *Then the hands of the clock would appearto have stopped.*
Albert: *Time would standstill.*
This moment would last forever.

Albert observes that a movement 'away' from the reference frame in which the clock is located will result in a slowing down of observed time. It is self-evident that movement 'towards' the clock would have the opposite effect.

Two Observers

Let's start off with Einstein's classical situation. Consider two observers in two separate reference frames, each with his own clock. These two reference frames are initially at the same location, and each observer looks at the other clock and ascertains that it is keeping correct time, and is in fact, synchronized with his own. Then suddenly the two reference frames (complete with clocks and observers) move apart from each other at a speed of half the speed of light. They travel apart at this uniform speed for 10 years. Then they suddenly reverse their direction of travel, and come back towards each other for the next 10 years. The situation is depicted in Figure 1.

In the diagram (Figure 1), the dashed lines at 45° represent transmissions at the speed of light which enable the travelling observer A to 'see' the stationary clock of B. From the diagram it is clear that during his outward journey (lasting 10 years) A sees B's clock advance only five years. Then on his return trip (also lasting 10 years), A sees B's clock advance by 15 years. During the outward journey B's clock ran 50% slow, while during the return journey, it ran 50% fast, as observed by A.

The diagram also explains other effects: if A had suddenly ceased his relative motion when he was five light years away, he Would have observed that B's clock was now keeping correct time, but was running five years slow. And when they get back together again after the 20 years of travels, each will again observe that the other's clock is now keeping correct time, and is in fact keeping the same time as their own. This is a problem to Einsteinian purists, who maintain that each clock should be slow as compared to the other. To get around it, they usually try to say that it is actually impossible for the two reference frames to come together again so that a comparison can be made, after the travels.

Further, if the traveller had travelled away at the speed of light instead of half the speed of light, each would see that time had stopped in the other reference frame. Just as the Young Einstein from Tasmania says to his girl-friend Marie Curie in the film, *'time would stand still'*.

All these observations can be concluded from the Doppler effects evident in the construction in Figure 1, or from very similar constructions.

Our Coordinates

Now the (perhaps) surprising thing is that these relationships have been proved using old-fashioned, absolute

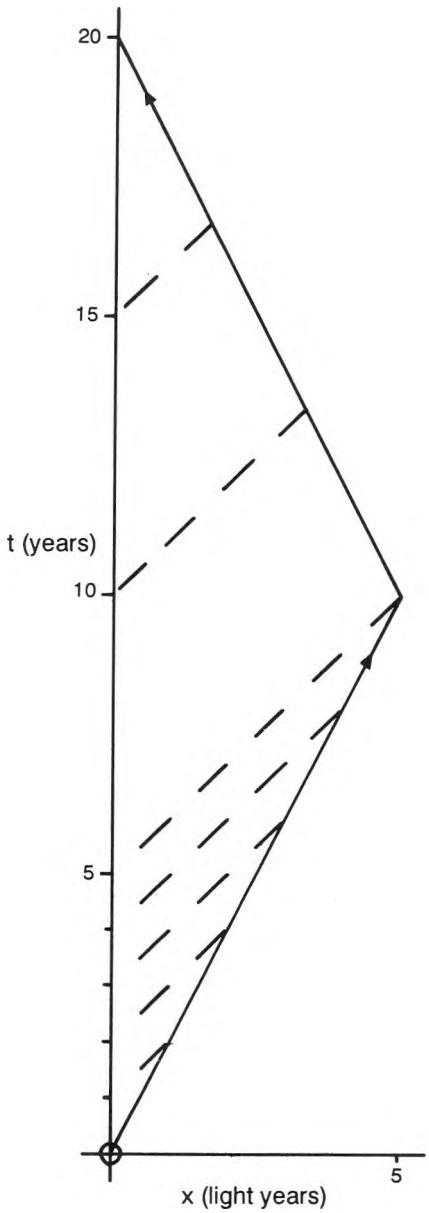

Figure 1. *Two observers in two separate reference frames travel apart for 10 years then return to each other.*

Newtonian time and space; not the variable and curved space-time continuum of Einstein-Minkowski. In our diagram (Figure 1), the horizontal direction represents absolute (albeit one-dimensional) space, and the vertical direction represents absolute Newtonian time. Time for any observer in any reference frame is simply his y coordinate, as implied by our axis labelling in the diagram.

Another Traveller

Figure 2 is a different example. This is taken from Brillouin.[2] Brillouin is critical of certain aspects of Einsteinian relativity, as quoted in my original article, but this diagram is taken from a section where he agrees with the predominant interpretation of Einsteinian relativity, that is, that asymmetrical time-dilation is real. More specifically, that time slows down for the travelling observer only, and that this effect is not related to the acceleration that an observer experiences. To leave out the complicating acceleration, he postulates triplets, one who stays at rest, one who travels out only, and one who returns only, all at constant velocity.

This time the travelling observers (two of three triplets) move at 0.6c for 10 years, so the numbers shown in

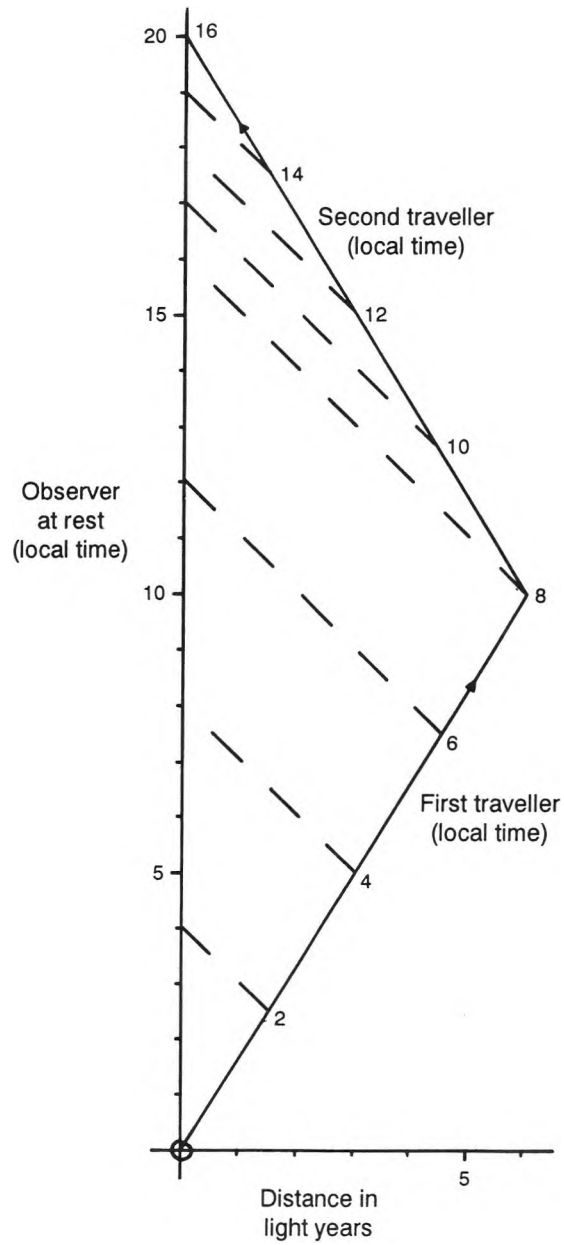

Figure 2. *The example used by Brillouin.*

Figure 2 differ slightly from the numbers in Figure 1. Actually this diagram (Figure 2) tries to prove that the travelling observers experience only 16 years of elapsed 'time' during the time that the stationary observer experiences 20 years. However, the reasoning is seriously flawed.

The Fallacy

We ask the question: Where did the numbers come from which indicate 'time' for the travelling observers? The numbers 2, 4, 6, 8, 10, 12, 14 and 16 have been listed along the travellers' time-path, but how were they obtained?

At the start of the discussion the author says,

'Let us assume v = 0.6c, hence

$$(1 - \frac{v^2}{c^2})^{0.5} = 0.8\text{'}$$

With no further explanation he arbitrarily places the numbers he wants along the time path. On the next page he comes to the conclusion, *'The dissymetry between the one at rest and the two others travelling in opposite directions is now obvious.'*

The conclusion obtained comes about because the author has sneaked something into the diagram, according to his preconceived ideas, which produces the result he is wanting. There is no justification for the times written along the path of the travelling observers. They are certainly not proved from the diagram.

There is however, an even more serious problem with this diagram. If Einsteinian relativity is correct, what do the axes mean? Surely they are completely meaningless. Having rejected absolute space and time, followers of Einstein have no right to draw straight line axes, that are supposed to represent something. It is only in a Newtonian system that we can draw a rectangular grid of absolute time against absolute distance, as we did in Figure 1.

Doppler and Lorentz Effects

My perception, and Mr Harris' perception, is that the effects should be reversible with direction of travel. However, this is contrary to Einstein. Einstein actually used light transmissions in both directions to get rid of the sign.

In this section of Brillouin's book we see that he approves of what Einstein has done in eliminating the direction of travel.

> *'The condition that every part of the circuit of light beams must be travelled in both directions if we want to eliminate the details of the Doppler effect and keep only the Lorentz transformation.'*

Summary

What we are saying here is:—

(1) That time dilation effects do depend on the direction of travel, and are observer-apparent only.

(2) That to prove that time dilation is a real observable phenomenon, we have to accept absolute Newtonian space and time.

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REFERENCES

1. Malcolm, D., 1991. Einstein's contribution to relativity. CEN Tech. J., 5(1):58–69.
2. Brillouin, L., 1970. Relativity Re-examined, Academic Press Inc., New York, pp. 70–72.

Dear Editor,

I refer to previous articles on relativity[1] and the speed of light.[2]

It is appalling that the media gives Einstein the credit for the equation $E=mc^2$ (energy = mass x speed of light^2), when this equation was originally proposed by Poincare, Hasenörhl and others before Einstein.

It seems that there is general agreement on this equation. However, if light travelled at an infinite speed (c), some thousands of years ago and then subsided very quickly, does that carry the inference that mass (m) was infinitely small and increased very rapidly?

If the light then decreased gradually to its present level, does that infer that mass (m) slowly increased at the same time?

How does that tie in with the Bible statement that in the beginning God created the heaven and the earth?[3]

Of course the assumption is that energy (E) has been constant from the beginning.

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REFERENCES

1. Malcolm, D., 1991. Einstein's contribution to relativity. CEN Tech. J. 5(1):61.
2. Norman, T., 1991. The velocity of light decay debate: the mathematician's response. CEN Tech. J. 5(2):108–112.
3. Genesis 1:1.

CREATION'S ORIGINAL DIET

Dear Editor,

In his interesting review of diet Stambaugh[1] has concentrated on teeth as the main evidence for a carnivorous diet, and argued that because such teeth are sometimes used for tearing tough vegetation their existence is no argument for obligatory carnivorism. Well and good,