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Theory of Everything

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ABSTRACT

Our Theory of Everything is made possible by the discovery of a closed fluid dynamic principle, working in a closed fluid space-time system, (the universe). Through the principle of fluid space-time, almost all of the unexplained mysteries of the universe are revealed. How the universe came into being, with matter and the most basic force, Gravity. Newton's law of gravity in particular, the inverse square law with distance. (the reason is for appearance of the inverse square law, simultaneously in gravitation and electromagnetism, not a coincidence). Special Relativity is an account of how space contracts, time dilates and mass increases, with velocity. General Relativity is an account of how space-time curves. According to Muhammad's closed fluid dynamic principle, space actually consists of an extremely fluid substance which we call aether. It is therefore fitting that through the closed fluid dynamic principle, we can arrive at an explanation for one major thorn in the side of Special Relativity, the twin paradox. The problem is, it is the twin who accelerates that gets it wrong. Because his assessment of the age of his brother was done without consideration of the fact that when he turned around, made the return journey, he felt his acceleration but did not employ this in Einstein's time dilation, which was based on inertial reference frames. The task we are confronted with in this paper is to find out how the time dilation addressed in special relativity comes into proceedings in an accelerated frame. We achieve this.

Keywords: Aether, Reverse Higgs boson, wavefunction, time dilation, cumulative

INTRODUCTION

What is the origin of force? What is responsible for inertia? What is the origin and workings of Newton's (other) three laws, his laws of motion? And what modifications are needed for Newton's third law of motion, the law of action-reaction? Finally, what unifies quantum mechanics and the General Theory of Relativity?

The basic premise of the theory of Muhammad Aslam Musakhail is that there is a fluid throughout the universe that abhors a vacuum, to quote the ancient Greeks, and so much so that the resistance it provides to massive bodies is balanced by the tendency for the aether to fill in any void appearing behind the massive body as it moves, and that this tendency is sufficient that the restoring force created balances the resistive force, so no net force, the body moves according to Newton's first law. We start by postulating, for bodies of arbitrary mass, that the aether resistive force is equal to the total mass minus the rest mass. So, if the body is at rest, the aether force = rest mass – rest mass = 0, which is a sound enough hypothesis.

We deduce that Lagrangian dynamics is concerned with this force, the Lagrangian $L = T - V$ where T is denoted as kinetic energy and V is as potential energy, a difference, whereas Hamiltonian dynamics, as in Bohr and Schrodinger, is rather concerned with a sum, energy $H = T + V$, Schrodinger's equation of Quantum Mechanics.

That is the distinction, and it is the reason why three of the four fundamental forces are described with Lagrangians, and the fourth fundamental force, gravity, ultimately will be too. Therefore, the aether force is a different thing altogether from the quantum mechanics of Bohr and Schrodinger. If one studies physics at university, one is likely to encounter the twin paradox in second year, possibly in a tutorial, the way I did. It emerges that if two twins are together, initially, and then one goes on a journey, and returns, we can't work out which twin is younger when they are re-united. In Newtonian mechanics, there is nothing special about one inertial frame of reference over another. So according to twin 1, twin 2 has gone off on a journey, velocity v, therefore when he returns, he should be younger, according to Einstein and according to twin 1, by an amount,

$$\Delta t' = \Delta t \sqrt{1 - \frac{v^2}{c^2}} \tag{1}$$

But, according to Newtonian inertial reference frames, twin 2 concludes the same about twin 1. Well, when they re-unite, they cannot both be older than their sibling who has gone on the journey, and returned. We find a connection to special relativity. Indeed, we use the aether theory to solve the twin paradox that has baffled physicists ever since Einstein published his paper, On the electrodynamics of moving bodies. We postulate a wave function, ψ(twin 1 is getting younger + twin 2 is getting younger), drawing analogy to quantum entanglement, whereupon the correct one of these two options is decided by the act of measurement, i.e. the act of accelerating either twin 1 or twin 2. Invoking:

$$F(v) = \frac{m_e}{\sqrt{1 - \frac{v^2}{c^2}}} - m_e \tag{2}$$

the aether force equation, we develop a mathematical rigour to analyse the twin paradox, where v applies to the difference in speed between the two twins, and $2v$ applies to the difference between the initial speed of the moving twin and the final speed of the moving twin. It is not surprising, therefore, that the solution of the twin paradox lies in considering a difference in velocities, $\Delta v = v - (-v) = 2v$, as per difference in total mass and rest mass, (mathematical description of the aether force), again a difference, as opposed to the Hamiltonian, a sum, not a difference, $H = T + V$. At this point, let us note that special relativity involves, essentially, no calculus. Similarly, our aether theory of special relativity.

It is special relativity because it solves the twin paradox. A non-calculus mathematical apparatus is highly desirable, to be in accordance with Einstein's theory. Einstein did use Taylor Series to acquire the relativistic expression:

$$E = m_0c^2 + \frac{1}{2}mv^2 \tag{3}$$

from the expression:

$$E^2 = (pc)^2 + (m_0c^2)^2 \tag{4}$$

and Taylor series is based on calculus, however we have seen that a full relativistic interpretation is possible without this Taylor series analysis, [1, 2].

We need to consider something beyond Newtonian inertial reference frames. We need to find out that the whole process is not the same for both twins. One twin is special. One twin records the accurate result, that his brother will be younger than himself when they re-unite. This is the twin who does not accelerate. We call him twin 1. He observes his brother to go on a journey, accelerate, negatively, and then make the return journey. He knows that it is his brother who does the acceleration, because he did not feel any acceleration himself. If you are in an airplane, taking off, you feel the acceleration, right? As the plane speeds up, you are pinned back in your seat. It is twin 2 who experiences, feels this acceleration.

Now Einstein's result of special relativity is in consideration only of a constant velocity. It does not deal with accelerations. Only General Relativity deals with accelerations, most particularly gravitational accelerations, but in this paper, in analyzing the twin paradox, we shall achieve a unification of special relativity and general relativity, whereupon general relativity is in fact concerned with any acceleration, not particularly a gravitational acceleration. Most particularly, twin 2 gets it wrong, is erroneously of the opinion that his brother will be younger than himself when they re-unite. Because the time dilation formula above was derived in the absence of any acceleration, yet it is twin 2 who accelerates. He knows he does, he felt the force, therefore he gets the time dilation wrong, unless he includes the acceleration in his calculations. In this paper, we shall show twin 2 how to perform these calculations, of his acceleration, and what effect it has on his time dilation.

Trying to get this across to a correspondent on a physics website, probably a Facebook website. I struck at least two people, probably more than that, who refused to admit there was any problem that had to be explained and couldn't be by the available knowledge. One even took me to task for using the term twin paradox, because there is no paradox, she claimed. Like a multitude of physicists have talked about a paradox for the best part of 120 years, I imagine, and suddenly I'm not even allowed to use the word.

Another correspondent introduced a whole lot of advanced special relativity, that I'd never learned and did not understand. Einstein himself said at one point that he no longer understood the latest discussions in special relativity, physicists had brought SR way beyond the simple deductions he made in 1905. This guy, too, appeared to be of the opinion that it was no longer a paradox, and could be explained by modern advanced special relativity. But try as I could, and believe me I tried, I could not get this guy to agree with me that the younger twin, upon re-union, will be the one who accelerated.

And I know that is the solution to the problem. If for no reason other than my second-year tutor told us so. The guy would not agree with me on this point, yet he claimed the problem was fully comprehensible by the latest special relativity. Well, if, since 1985 there had been a breakthrough in relativity whereby the problem of the twin paradox was now solved, I imagine I would have heard about it!

LITERATURE REVIEW

I have done a lot of research in physics, most particularly since I moved to New Zealand from Sydney in November, 2019, during which period I have written four books, three of them self-published on Amazon, and the fourth book soon to be. They contain quite a bit of work that I did over in Sydney, along with a lot of new stuff I have been working on since I moved to Auckland. I will just give a summary of what parts of the three published ones and the one soon to be published are relevant to this paper.

Grand Unification of the Four Fundamental Forces of Physics

Most particularly, an account of how a massive fermion, electron or positron, can have its rest mass removed by an entity we call the Reverse Higgs boson, accelerating it onto an electromagnetic wavepacket, where it propagates, masslessly, (i.e. no rest mass), at the speed of light. In this book, we start working on the twin paradox, but the solution to the problem is far from complete until we introduce Muhammad's aether theory into proceedings.

Quantum Theory of Electrodynamics

To understand how a fermion, electron or positron, can be accelerated onto an electromagnetic wavepacket, losing its rest mass and becoming a (charged) photon, one needs to account for the fact that photons do not feel external electromagnetic fields. This is due to the negation of the Lorentz force:

$$F = q(E + v \times B) \to 0 \tag{5}$$

In addition to comprehensive treatment of the Lorentz force, in this book there is also material on the Lorentz contraction, (very relevant to special relativity), and the atomic duality, (we propose that there are two states of atomic existence, one as described by Bohr, the other by Schrodinger), see Introduction, above.

A Saucerful of Science

More material on the twin paradox, Bohr versus Schrodinger atoms, the Lorentz force, inverse square law as it occurs simultaneously in gravitation and electromagnetism, (see Abstract), and, introducing, Theory of Everything by Muhammad Aslam Musakhail.

Autobiography of James Russell Fields, A rock musician who knew something about electromagnetic fields and waves

More on special and general relativity. Description of how photons are affected by the aether of Musakhail. A lot more material on the aether, how it is resisted by protons, as opposed to how by electrons/positrons. Aether exists inside electrons and positrons too! But the external aether does not get inside, it does, to a degree, with protons. We find that, with photon propagation, the aether occurs in tubes, thus photons have a very orderly arrangement between one another, in a radiation stream.

METHODOLOGY

Muhammad Aslam Musakhail wants to work on his theories and wishes to work with the scientific community, in Pakistan. He doesn't have the facilities to do so. His theories took him years to formulate, just because of lack of opportunity, he could have done it in less time. He isn't funded for his experiments. All this he did alone. Back in 2005, James Russell Farmer had decided that the way ahead would be to pursue a PhD in Solar Flares, the topic of his honours project, at the University of Sydney. When the PhD review came around at the end of the year, Russell's supervisor made it clear to the review committee that he was totally unsatisfied with Russell's progress. He was particularly upset about an equation Russell had proposed, connected with solar flares, that was dimensionally inconsistent by one dimension, of length. The equation Russell proposed was,

$$J.E = |E \times B| \tag{6}$$

Russell had proposed the equation in view of the fact that both terms, LHS and RHS, dealt with an energy per unit time. Plugging the relevant solar flare variables into this equation appeared to result in some very interesting algebra.

After two or three attempts by Russell to at least get his supervisor's view on the resultant algebra, it had been made clear to Russell that his supervisor was going to refuse to discuss Russell's equation, point blank. So, Russell dropped the matter, but his supervisor proceeded to tell the Review Committee that Russell had tried to bully him, had not let the matter go. That appeared to be his largest grievance. That and that Russell had not made acceptable progress with the research.

Russell was left a bit bemused-how could he be expected to make progress if his supervisor was unwilling to discuss the research with him, when he made a breakthrough, of sorts?

After the PhD disappointment, Russell put the thought of official research out of his mind, and reverted back to being an undergraduate. By 2019 he had acquired MAgr, BSc, from the University of Sydney, to supplement the BSC (honours), MSc (Quantum Fields and Fundamental Forces, Imperial College, London), DipSustHort, (Diploma in Sustainable Horticulture, is an educational program offered by Unitec Institute of Technology in Auckland, New Zealand), that he had acquired up to the point of the PhD fiasco.

Over these years, subsequent to the PhD attempt, Russell did a lot of research, on his own, in physics and chemistry. Completing the final degree, Russell moved to New Zealand, and in the subsequent four and a half years has immersed himself in (private) research. At this point he has a very large quantity of research under his belt, including four publications on Amazon.

If the University of Sydney were willing, it would be no problem at all for him to put together a high-quality PhD thesis in Solar flares. The PhD Review committee had told Russell, the last thing you want to do is work for three years and get no PhD. Try 20 years, please! I can get a thesis together, but it is *not* going to involve me sitting in an office in the Department of Theoretical Physics for two years, pretending to be working.

Russell and Muhammad met on LinkedIn. Muhammad sent Russell a video in which he described his aether theory. Russell was impressed by Muhammad's confidence and conviction, and started working on Muhammad's theory. Starting with a proposal that the aether force, which impedes a massive body, (not a photon, or at least not a photon of the fundamental frequency), is described by F = Relativistic mass- rest mass. Because, then at rest, the aether force would be rest mass- rest mass = 0.

It didn't stop there, obviously. See the literature review above to get some idea of how far this aether theory has progressed, over the last couple of years. Russell and Muhammad are very pleased to work together, and at some time in the future Russell would like to work on the gravitational aspect of Muhammad's theory, there is in the new book, Autobiography, not yet published, a start to this area of future research, emerging from some discussions between Russell, Muhammad and another physicist on LinkedIn concerning possible extensions of Muhammad's theory to the physics of black holes.

In Investigation of The Twin Paradox of Special Relativity, Using the Aether Closed Fluid Principle

The proposal is that when a body is moving in space, as observed in an inertial reference frame, and $v \neq 0$, then that body is pushing against the aether, against that fluid that Muhammad is talking about. So why doesn't it slow down? Why is Newton's first law obeyed? The body just continues at that constant velocity, all by itself. The argument will be that the aether, or fluid, or whatever you want to call it, rushes around the body to fill the vacated space left behind the moving body. The rushing of the aether around the back of the moving body creates a force, pushing the body forward.

This force is equal in magnitude and opposite in direction to the reaction force on the body that arises from it pushing the aether forward. So, forces are balanced, the body continues moving through space at constant velocity, indefinitely. The ancient Greeks were onto it! Nature abhors a vacuum! How does the body get to velocity v, whereupon those two forces are instituted?

It must be pushed, right? The nature of the balanced force, reaction force backward and aether restoration force forward, is such that it is equal to the (additional) relativistic mass of the body, upon accelerating the body to velocity v, from velocity zero.

According to the non-Reverse Higgs boson aspect of special relativity, the body, say an electron, starts at rest, $m = m_e$ then accelerates to velocity v whereupon it now has mass $m = m_e/\sqrt{(1 - v^2/c^2)}$. The force to keep pushing it forward against the resistance of the aether is the *additional* mass acquired by the body in the acceleration, [2].

REVERSE HIGGS BOSON, LITERATURE OF JAMES RUSSELL FARMER

In these works, we find that there are two independent processes in special relativity:

(1) $E = m_0c^2 + \left(\frac{1}{2}m_0v^2\right)/\sqrt{(1 - v^2/c^2)}$ (see above), proposed by Einstein, we call this the energy input circumstance, or Non-Reverse Higgs boson process.

(2) The Reverse Higgs boson process, whereby a massive fermion, e^+/e^- has its rest mass removed, $m_0 \to 0$, and in the process it is accelerated to the speed of light.

$$E^2 = (pc)^2 + (m_0c^2)^2 \quad (7)$$

For $p \to 0$, is for a special case of (1) with $v = 0$, and for $m_0 \to 0$, is for case (2). So, we see that the force you use to push a massive body to speed (v) is in a sense preserved, in the aether force, after you stop pushing that body to get it to velocity v. That is, accelerating that body.

In situation (2), where a massive body is accelerated all the way to the speed of light, but losing its rest mass, entirely, this acceleration is enormous, but we end up with zero aether force! (For photons, $v = c$, but at critical frequency, $\nu_e = m_ec^2/h$, so that m_e is the electron mass).

So, whereas in circumstance (1), approaching the speed of light creates enormous masses, therefore enormous forces to increase velocity still further, in circumstance (2) not so, enormous forces are not required, because the rest mass, m_0 is progressively removed. The total mass therefore remains a constant, m_e, and the force required is $F = m_ea$, where the acceleration admittedly is enormous, but the force doesn't diverge as $v \to c$, in the manner it does in circumstance (1).

THE AETHER FORCE

The aether force can be defined as $F(v)$ and is proportional with Δm as

$$\Delta m = m_e\left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} - 1\right) \quad (8)$$

and therefore, can be define as,

$$F(v) = m_e\left(\frac{\frac{v^2}{c^2} - 1 + \sqrt{1-\frac{v^2}{c^2}}}{1-\frac{v^2}{c^2}}\right) \quad (9)$$

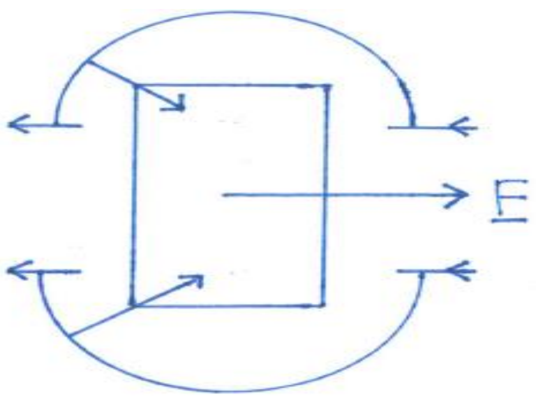

Figure 1: As massive body is pushed against the aether, there is a tendency for it to leave a void behind. There will be a rush of aether to fill that void, as indicated. This will result in a component of force oppositely directed to the reaction force from the aether. The two forces cancel, and the body moves at a constant speed, through the aether, indefinitely. The faster the body moves through the aether, the greater the tendency for a void to appear behind, the greater the rush of aether to fill the void, and the greater the pushing force to balance the greater reaction force from the aether, caused by the moving body pushing harder on the aether.

APPLICATION TO SPECIAL RELATIVITY

Consider the twin paradox. We have two twins moving apart, there is no particular reason why we choose one or the other's inertial frame, it is arbitrary as to who is actually moving. So, twin 1 sees twin 2's clock moving slow, twin 2 sees twin 1's clock moving slowly. Cannot both be happening at the same time, right? Well, recall that special relativity does away with simultaneity, there is no actual definition of at the same time. We are in a superposition of two states:

$$\psi = \psi_1(\text{twin 2's clock moving slow}) + \psi_2(\text{twin 1's clock going slow})$$

The measurement, i.e. the determination of whether it is twin 1 or twin 2 who, in due course, undergoes the acceleration, is akin to the measurement of the spin of a photon, outcome ±1, or of a fermion, e^+/e^-, outcome $\pm$½. As per investigations in quantum entanglement, [2].
We call the twin who turns around and makes the return journey twin 2, and the other, the stationary twin, who undergoes no acceleration, twin 1. You do not have the final result until you do the acceleration, until you make the measurement in the language of quantum entanglement, and our solution to it. So, it is when one or the other twin accelerates, such that he returns to the other twin, that the measurement is made, that it is decided which of the twins has the slow clock, which of the two will be younger when they re-unite.
The further apart are the two twins when the measurement is made, i.e. the acceleration occurs, the greater the discrepancy of the twin clocks that will have to be addressed – Twin 2's clock which says that twin 1 is younger will have to be re-calibrated such that twin 1 will be older. Indeed, twin 2's clock will have to tick very slowly for the return journey, so twin 2 doesn't age so much. So, the greater the discrepancy results the greater in the time travel before the acceleration and the greater the distance home, and the more opportunity to fix the discrepancy.
Twin 2's clock ticks slowly on the return journey, that solves a part of the problem. The full discrepancy can only be accounted for, however, by considering the acceleration phase as well. It is in this that General Relativity now plays a part; we are now in consideration of a unification of Special Relativity and General Relativity. The solution to the problem becomes accessible upon considering the fact that, from Einstein's GR, the greater the gravitational field strength is at the location of a stationary clock, the slower that stationary clock ticks. Similarly, in the twin paradox, the acceleration phase, akin to the force you feel from the seat you are sitting on in Earth's gravitational field, involves a pay-back, an (additional) rejuvenation of twin 2, as twin 2 sees it. And, crucially, that pay-back is not facilitated until the reverse journey, see below. Because, we are going to do an instantaneous reversal, acceleration effectively infinite. So, there is no time occurring in the acceleration period where that General Relativistic time dilation could be inserted to fix up the paradox.
As we've said, the acceleration phase solves half of the problem. The other half of the problem is solved insofar as twin 2 has accelerated, he has reversed direction. So, while he was, say, originally pursuing the photon, now he is running into it. Einstein only did his analysis insofar as the twin is pursuing the photon. One will find that if one considers the alternative hypothesis, that the twin is running head-on into the radiation, the time dilation will be reversed. Now, for the reverse journey, twin 2 is in agreement with twin one, that he himself, twin 2, is getting younger, twin 1 is getting older. So, excluding the acceleration phase, twin 2 expects himself to be the same age as twin 1 when they re-unite. He got older on the outward journey, and younger on the return journey. And when you account for the acceleration phase, we get a double quota of this, on the return journey, twin 2 receives an additional quota of youthfulness, such that his brother the same age becomes his brother older, in agreement with twin 1's assessment of the situation.
So, twin 2's clock cannot go backwards, to fix the discrepancy, can it! That is, no negative time dilation! Let's take the two twins, at the start of the journey. They are moving towards each other, relative speed v. At the instant they cross, set the clocks simultaneously to zero, and the journey begins. Then you begin the superposition of the two states, $\psi = \psi_1 + \psi_2$, (see above). Then proceed as above. So, both frames are inertial, to start with – it is equally valid for twin 1 to say twin 2's clock is going slow or vice-versa. Equivalently, it is equally valid for each twin to conclude that his electromagnetic apparatus is issuing electromagnetic waves at speed c.
Therefore, on the outward journey, twin 2 is pursuing the same photon that twin 1 is observing, pursuing at speed zero, we say that twin 1 is also pursuing, at speed zero. On the return journey, twin 2 is running into an oppositely directed photon.
Then the laws of time dilation, $\Delta t' = \Delta t\sqrt{(1 - v^2/c^2)}$, are no longer applicable to both twins. Einstein's special relativity is derived in consideration of one pursuing a photon, not running head on into it. Only twin 1 sees $\Delta t' = \Delta t\sqrt{(1 - v^2/c^2)}$.
Twin 2 has something else going on, in the return journey. Now in that initial frame, v, that is, the frame of twin 2 prior to his acceleration, we have an aether force required to set twin 2 on the return journey, speed $+v$ into speed $-v$, during the acceleration period, such that his clock ticks at the required slow rate, on the return journey, until the moment when the twins re-unite, whereupon, subsequent to the acceleration phase, and the return journey, they are in agreement about their respective ages, twin 2 is younger than twin 1.
Does something also happen to the clock of twin 2 in the acceleration phase? What about an instantaneous reversal, infinite acceleration? But is this force required to send twin 2 back, such that his clock ticks slowly all the way back, $F(v)$ or $F(2v)$. It would appear to be $F(2v)$, but subsequent deductions will appear to indicate that it in fact involves both, $F(v)$ and $F(2v)$.
Back to the twin paradox. Thus, the time dilation restoration to fix the clock of twin 2 is a function of v, $2v$, $F(v)$, $F(2v)$. What about the time t ? The further twin 1 goes before the acceleration, the more time dilation restoration will be required. But we are in consideration of constant t.

Take t out of it. It doesn't matter what t is for the outgoing and return journey, because it cancels out, special relativity is reversed for twin 2, after he accelerates. But the time dilation associated with the acceleration phase does depend on the time of the journey, $2t$, as well as the speed, v.
We'll find that the acceleration phase just duplicates the time dilation for the outgoing journey, t, v, and the return journey, $t, -v$. And at the end of this paper, we'll address how t is related to the acceleration phase. But for now, we are only concerned with v. Now is $F(v)$ likely to be the right mathematical solution?

$$F(v) = m_e \times \left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} - 1 \right) \quad (10)$$

where the second term in the bracket is time dilation term

$$= m_e \times \left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} - \frac{\sqrt{1-\frac{v^2}{c^2}}}{\sqrt{1-\frac{v^2}{c^2}}} \right) \quad (11)$$

since $\Delta t'$ can be define as

$$\Delta t' = \Delta t \sqrt{1 - \frac{v^2}{c^2}} \quad (12)$$

Thus $F(v)$, $F(2v)$ take the acceleration out of it, including the acceleration in the twin paradox, such that it is no longer a paradox.
But the source of the twin paradox is the acceleration! Most particularly, we take acceleration and time out of it. We take the acceleration out of it by making it infinite. Instantaneous reversal! Versus $a = 0$ then no twin paradox, because the twins never re-unite, the measurement is never made, the wave-function, ψ, never collapses. Subsequently, the twin paradox is not just a curiosity, it is a fundamental piece of physics, (as concluded in previous works), which Einstein wasn't able to analyse, other than to appreciate it was a paradox, in the same manner as he wasn't able to fully analyse $E^2 = (pc)^2 + (m_0c^2)^2$.
He got the energy input variable part, (1), correct, (m_0= constant), but not the alternative Reverse Higgs process, (2), $m_0 \to 0$. Supposing we go into the frame of the moving twin, twin 2, and stay in that frame as and after twin 2 accelerates, the frame $v_{\text{init}} = v$, and staying there. According to this observer, firstly twin 1 has a speed v, and $F(v)$, up until time t. And at time t, twin 2 receives a boost, $2v$ and $F(2v)$, he is no longer stationary.
The twins re-unite at time $2t$. So maybe it is $F(v)$, and not $F(2v)$ that we are concerned with! It's good enough just to consider proceedings up to time t, whatever happens after that is implied.
That is, $(v, 2t)$ is equivalent to $(2v, t)$. As twin 1 sees proceedings, he is only concerned with the modulus of the speed of twin 2, $|v| = |v_{\text{init}}|$, not $\pm v$, or $\pm v$. So, in the chosen reference frame, $v = v_{\text{init}}$, and staying there, the distance travelled by both twins is the same, $d = v(2t) = (2v)t$.
Don't worry about the acceleration! We are just concerned with speed, and we might as well consider v(Twin 1) rather than $2v$(Twin 2). There is nothing to differentiate between Twin 1 travelling at v for $2t$, or twin 2 travelling at $2v$ for t which is the significant event?
So in respect of this analysis, such that the two twins meet again, and in the reference frame moving at constant speed v_{init} and staying there, we take time out of it, as per our previous discussions, and infinite acceleration, so that in this reference frame, v_{init}, the stationary twin is described by $F(v, 2t)$, and the moving twin by $F(2v, t)$, and time does not come into it, so the moving twin is younger when they re-unite, because the force $F(2v)$ is greater than the force $F(v)$.
In the frame $v = 0$, the frame of twin 1, twin 2 has a boost $F(\pm v) = F(v)$, and in the frame v_{init}, twin 2 a boost $F(2v)$, so twin 2 is younger when they re-unite. Because he receives the larger boost, $F(2v)$. The twins re-unite requirement is equivalent to taking time out of it, we consider only v, $2v$, $F(v)$ and $F(2v)$.
That is if you bother with $2v$, $F(2v)$, if you choose that reference frame v_{init} and stay there. But if you choose the stationary frame, this is equivalent to choosing v_{init}, but only on contemplation of twin 1's observation of twin 2's journey, 2t, not twin 1's journey, t. When twin 2 returns, when they re-unite, this $F(v)$ becomes a description of his journey. Hence his clock is behind. Therefore, twin 2 is younger by $F(v, 2t) \neq F(v, t)$. That is the benefit we get by considering v, not $2v$, as per the beginning of this discussion, $1 - v^2/c^2$, and not $(1 - (2v)^2/c^2)$.
That is, $F(v)$ is a description of the clock of twin 2, as observed by twin 1, the acceleration of twin 2 is not a matter of consideration for twin 1, it doesn't come into calculations for twin 1, he is only concerned with v, $F(v)$.
Now if we want to account for how twin 2 sees twin 1's clock, on the return journey, it is clearly accounted for by $F^{-1}(v)$. Now to calculate this with Newtonian mechanics, i.e. considering the acceleration and time, then how do we find out what is happening in the acceleration frame? The onset of General Relativity! Well, as twin 2 sees it, (not $v = v_{\text{init}}$, and staying there). Constant velocity region, $F(\pm v)$, versus acceleration region, $F(a)$.

$$F(\pm v) + F(a) = F^{-1}(\pm v). \quad (13)$$

Note that the return journey includes the acceleration contribution. So we have a contribution of special relativity being backwards for twin 2 on the return journey, because he has unconsciously reversed direction of the photon, by reversing his direction, and also we have a time dilation term associated with the (infinite) acceleration, and both of these time dilation terms are paid back in the reverse journey. For the return journey, $v \to (-v)$, we need an alternative special relativity to describe the experiences of twin 2.
And $F(v) = F(-v)$, in the acceleration realm special relativity holds, it does not hold in the force realm, where for twin 2 the propagation of the electromagnetic wave reverses direction. So:

$$F(a) = F^{-1}(\pm v) - F(\pm v), \quad (14)$$

$F(2v)$ associated with v_{init}.

$$F(\pm v) = m_e\left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} - 1\right) \quad (15)$$

The thing that's good about $F(\pm v)$ is that you don't have to worry about a, t this makes things much simpler. Let's try:

$$F(2v) - F(v) = \alpha(v)F(v) \quad , \ (2v \to v_{\text{init}}) \quad (16)$$

the proportionality term $\alpha(v)$ instituted such that we have a proportionality $\Delta t' \propto \Delta t$, for v constant. (varies according to the acceleration).

So v is constant and then $\Delta t' = \Delta t\sqrt{(1 - v^2/c^2)} \propto \Delta t$. Thus,

$$\alpha(v) = \frac{F(2v)-F(v)}{F(v)} = \frac{F(2v)}{F(v)} - 1 \quad (17)$$

which appears to correspond to:

$$F(v) = m_e \times \left(\frac{1}{\sqrt{1-\frac{v^2}{c^2}}} - 1\right) \quad (10)$$

above. The two, $F(v)$ and $\alpha(v)$ go into $F(2v) - F(v)$ on equal footing, as they have an equal correspondence in the $F(2v) - F(v)$ equation. Which gives us some confidence that we are on the right track. Finally, $F^{-1}(v)$ describes twin 1's clock speeding up rather than slowing down, as twin 2 sees it, recording a larger quantity of time. Now we introduce F^{-1} being what twin 2 makes of proceedings on the return journey. He sees it the same way as twin 1 sees it, on this portion of the journey, twin 1 is getting older. Because he is in the anti-special relativity phase. So F^{-1} (twin 2) = F(twin 1). Twin 1 and twin 2 are in agreement, for the return journey. And so, doing things in the manner of twin 1:

$$F^{-1} = \frac{F(2v)}{F(v)} \quad (18)$$

(agrees with twin 1's view of things, double v is logically equivalent to increase F and also is logically equivalent to increase (relativistic) mass (of twin 2) is logically equivalent to time dilation, twin 2 is getting younger). Therefore,

$$F(a) = \frac{F(2v)}{F(v)} - f(v) \quad (19)$$

the masses cancel in $F(2v)/F(v)$, we require $-f(v)$ rather than $-F(v)$ because otherwise there is a dimensional inconsistency, because $F(m,v)$ has mass in it, whereas $F(m,2v)/F(m,v)$ and $f(v)$ do not. Re-define, $F(v) = mf(v) \to f(v)$, then equation (19) is not inconsistent dimensionally because $f(v) = F(v)/m$, $F(2v)/F(v)$ are dimensionless. Or, simply re-do the whole analysis, using $f(v)$ instead of $F(v)$. So, let's try to pull everything together. Consider equation (16), above. $\alpha(v)$ and $F(v)$ go in on equal footing.

Therefore, we should not be surprised when we see an equivalence in terms of between $F(\pm v) = F(v)$ in equations (10) and (15) above and $\alpha(v)$ in equation (17), above. Most particularly if we remove m_e from equation (15), fixing up the dimensionality, in accordance with our discussions above and below. That's a multiplicative m_e. We'll be all done when we also remove an additive m_e. Finally bringing us to F^{-1}. So $F^{-1} = F(2v)/F(v)$, (see above). Thus, equation (17) becomes:

$$\alpha(v) = F^{-1}(v) - 1 \quad (20)$$

Note that $F^{-1}(v) = F(2v)/F(v)$ because v_{init} is a non-accelerating frame, an inertial frame, just as is the frame of twin 1. Therefore, the observer in the frame v_{init} sees things the same way as twin 1 sees things. Most particularly, he sees things the way Einstein describes them in special relativity. Twin 2, on the other hand, from the moment he begins to accelerate, sees things oppositely by comparison with twin 1 and the observer, v_{init} and the (accepted) laws of special relativity. In fact, he sees special relativity backwards, and once he appreciates this fact, he will be able to make the correct calculations concerning the relative ages of his brother and himself, at their re-union. Why does $F(v)$, $F(2v)$ solve the problem of the twin paradox? Most notably, the matters around the time dilation of the twins, that yields the twin paradox. In the frame v_{init} an inertial frame, one that does not accelerate, the key to the solution of the problem is that the twin 1 is described by $F(v)$, and the twin 2, the accelerating twin, is described by $F(2v)$.

Because at time t, twin 2 reverses his velocity with respect to twin 1, in the v_{init} frame, the twin 2 embarks on his own journey, at time t, velocity $2v$, completing the journey at time 2t, when he is re-united with his brother. Well, $F(2v)$ gives a larger aether force is logically equivalent to larger mass consideration than $F(v)$, hence smaller time consideration, (compare equation (31) below with the time dilation equation (1)). So, reducing everything to this simple equation, equation (18), we have the necessary result that twin 2 will be younger than twin 1, when they re-unite.

But isn't it the case that the twin 1 journey, according to v_{init}, $F(v)$, occurs in a longer time frame, twice the time frame in fact, than the twin 2 journey? So how can you just compare $F(v)$ and $F(2v)$, in this manner, without bringing time into it? Well consider the nature of the time dilation. It is cumulative.

The age of twin 2, as he nears re-union with twin 1, is dependent on what happened before, earlier in the journey. The Lorentz contraction, or the mass escalation, (equation (31)), does not depend on what happened before. The youthfulness of twin 2 depends on all aspects of the preceding part of the journey. In the same manner, the aether force, $F(v)$, or $F(2v)$, depends on all the increments of force that were involved in getting the massive body to speed v, or speed $2v$. It incorporates all that went before, without having to have regard for the time it took to get there. The time is not important, just the various increments of force are.

So, in what manner does time come into consideration, in the matter of the twin paradox, in the matter of its solution by means of the aether theory, (Musakhail)? The outgoing journey lasts for time t, the return journey for time t, the journey in its totality for time $2t$. In the v_{init} frame, twin 1's journey lasts for time $(2t)$, and twin 2's journey lasts for time t. Time, t, has to have some relevance. Indeed, accounting for what relevance time has to the paradox is the purpose of equations (26), (27), (28) and (29) below. We find a solution to the paradox without reference to $t, 2t$, and infinite acceleration, so no time involved in the acceleration phase either, but time has to come into consideration somewhere, therefore one is referred to Back to the twin paradox and fluid theory, below.

We want to equate this, equation (20), with the first term in equation (15). But, $F^{-1}(v)$ is the same as $F(v)$, it has two terms, a total mass minus a rest mass. Well, consider how we acquired $\alpha(v)$. We subtracted $F(v)$ from $F(2v)$. The spare m_0 terms just went out in the subtraction! Then the multiplicative m_0 terms went out in the division, $F(2v)/F(v)$. Just as in our discussions below, whereupon the multiplicative terms go out naturally, we can leave $F(2v)/F(v)$ as is, we don't need to specify $f(2v)/f(v)$, but the additive term must be specifically addressed, in order to get the dimensions right. But that is just turning $(a{+}m_e \rightarrow +m_e)$ into $(a + 1 \rightarrow +1)$ it is not removing the additive term altogether. Similarly, however, note what we do if we remove the subtraction from the α equation, equation (16). That is, add $F(v)$ to both sides:

$$F(2v) = \alpha(v)F(v) + F(v) = (1 + \alpha(v))F(v) \qquad (21)$$

We reinstate $+1$, to make a complete analogy with the question of the dimensionality inconsistency, discussed below.

Another possibility: $m = m_0/\sqrt{(1 - v^2/c^2)} = 1$ Then we don't have to worry about any dimensional inconsistency in the proposed equation: $F(a) = F(2v)/F(v) - F(v)$, because we take the dimension of mass out of it. But preserving the requirement that the aether force depends on the mass, too, aether force is equal to $F(m, v)$. So, now we have $F = ma = 1$, infinite force is logically equivalent to facilitates instantaneous reversal, where that is possible. The force is not infinite, it is just as large as it needs to be, the larger v, the larger is the necessary reversal force, but approaching infinity in the limit of instantaneous reversal. If, however, you go all the way to $v = c$, reversal is not possible, even with an infinite force. If reversal is possible, then it can be made to any degree instantaneous, by increasing the reversal force without bound.

Qualification: m in the $F(m, v)$ equations is actually the rest mass. It cannot be zero. So, in the energy input situation, which is what we are concerned with here, the total (relativistic) mass, $m = m_0/\sqrt{(1 - v^2/c^2)} \rightarrow \infty$, $(v \rightarrow c$, m_0 = constant). And we are in consideration of infinite acceleration and therefore force. This infinite force will institute reversal, indeed instantaneous reversal, for anything but $v = c$, that is, for any $v < c$. Refer to discussions about the various behaviours of m_0 versus m $(= m_0/\sqrt{(1 - v^2/c^2)}$, in this paper.

The reason this force cannot institute instantaneous reversal, indeed any reversal, for $v = c$, is because it is a single infinity, $F = 1 \times \infty \neq \infty \times \infty$, which would be a double infinity. And dealing with a single infinity, $m \rightarrow \infty$. Single infinities play different roles in physics to double infinities, as we have discovered previously, and you can substitute m for m_0, $m_0 \rightarrow m$, but if you do, you need to fix it up by employing a different mathematics, a different consideration of infinities.

This is in agreement with the fact that in the Reverse Higgs process, rest mass, m_0, becomes a total (relativistic) mass. That is, we are making the Reverse Higgs process equivalent to the energy input process. Energy input is the same as Reverse Higgs, but with the fermion, e+/e-, having a different kinetic energy, (±), from zero, prior to jumping aboard that wave, [1-3] such that the photon energy is different from the fundamental frequency $\nu_e = m_e c^2/h$. where m_0 here is a constant, (Energy input), versus m_0 vanishes, $m_0 \rightarrow 0$, (Reverse Higgs process).

So what about photons? Not $F(v) \rightarrow F(c)$ = infinite force! In the Reverse Higgs boson process, the mass $m = m_0/\sqrt{(1 - v^2/c^2)} = m_e$ remains a constant, [1, 2], is logically equivalent to $F(c) = 0$, zero aether force, despite the fact that $v = c \neq 0$. And this is in agreement with $E = -v \times B$ for photons, zero Lorentz force [2, 3] But what about weak-strong gauge bosons in an electrical circuit? [1, 3]. No $E = -v \times B$ (Singular wavepacket, not a dual, not oscillating fields E, B at right angles.

Because the mass of the weak-strong gauge boson is changing as it travels axially in the circuit, has to be a force on it, even though the speed is not changing. But the mass $m = h\nu/c^2$ is decreasing, not increasing, $\nu_e \rightarrow \nu_{vis}$). That is, a deceleration, $m_0/\sqrt{(1 - v^2/c^2)} \rightarrow m_0$, as opposed to $m_0 \rightarrow \sqrt{(1 - v^2/c^2)}$. Just on the matter of zero Lorentz force, for photons. Photons are charged, because they involve the propagation of e^+/e^- onto a photonic wavepacket, speed (c), whereby its rest mass is removed, $m_0{:}\, m_e \rightarrow 0$.

So why are photons not deflected by electromagnetic fields, if they are charged? Because the Lorentz force is zero. The Lorentz force as mentioned in equation (5), $F = q(E + v \times B) = 0$.

Since $E/B = c$, the ratio of the amplitudes of an electromagnetic wave, speed c, [4]. Just to check that we have the direction right, consider the Poynting vector, $P = (1/\mu)\,(E \times B)$. Thus, if the radiation is coming out of the page, E is the x-axis, B is the y-axis, does $E = -v \times B$, where v is also coming out of the page? Confirm it for yourself,[1, 3]. $v \times B$ is to the left, the $-ve$ x-axis, and E is to the right, the $+ve$ x-axis. So $E = -v \times B$, as required. So we have the required result, a photon experiences no electromagnetic force, therefore it experiences no aether force. But only for Naked Reverse Higgs, (2), not the more general Energy input situation, (1).

Indeed, a photon whose frequency is given by $m_e c^2 = h\nu$ experiences no aether force, this is the ideal Reverse Higgs process, it propagates forcelessly on the aether. (Reverse Higgs process where $v_{init}(e^+/e^-) = 0$), whereas photons of energy less than or greater than that do experience an aether force,[1, 2], same as above).

NEWTON'S SECOND LAW

But is not the aether force in proportion to the surface area of the moving/accelerating object? The same way air resistance is in proportion to area, or at least increases with area, such that the bigger your parachute, the better job it does. Well, consider an assembly of objects, e.g. electrons, moving through the aether. Because the aether is so sensitive, it goes around them all individually, not collectively. So insofar as we had an aether force in consequence of a single massive entity, with the aether going around and closing up behind, it is important to realize that the aether is in fact doing that for each individual electron or positron proton or atom – which? (We see later).

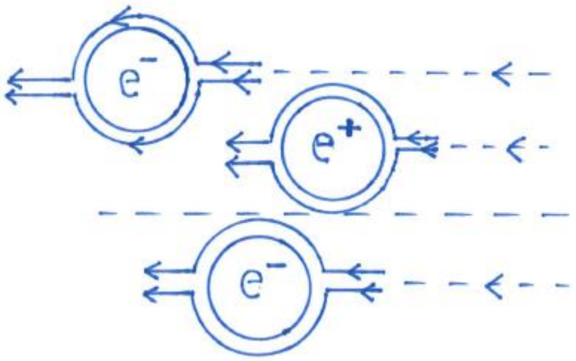

Figure 2: The Aether doesn't pass around the body as a whole, it does it individually for every solitary massive electron or positron. What about nuclei (protons) or massless fermions in atomic orbits? [2]

So we do the aether resistance for each individual electron.

$$f(v) = \frac{\left(\frac{v^2}{c^2}-1\right)+\sqrt{1-\frac{v^2}{c^2}}}{\left(1-\frac{v^2}{c^2}\right)} \quad (22)$$

$$F(v) = mf(v) \rightarrow F(v) = m_e f(v) \quad (23)$$

and $F(v) \rightarrow \sum_1^n m_e f(v) = mf(v)$, for n electrons. When we introduce Newtonian mechanics, the equivalent description, we find that the smaller m, the larger $a = F/m$, the easier it is to get to speed v, aether force $F(v)$. You keep adding increments of force until you get to $F(v)$. So the aether force is not just a function of speed, $f(v)$, it is in proportion to the mass, or total number of (massive) fermions in fact it is in proportion to the total rest mass of the moving/accelerating body.
Which is, of course, what we need for Newton's second law, $F = ma$, to be satisfied. $m_0 \rightarrow m_0/\sqrt{(1-v^2/c^2)} \rightarrow F(aether) = \Delta = F(v)$, as we have seen, at length. Note that $\Delta = m_0\left[\left(1/\sqrt{(1-v^2/c^2)}\right)-1\right]$ is in proportion to m_0, not $m = m_0/\sqrt{(1-v^2/c^2\,)}$. ((1), Energy input situation, not (2) Reverse Higgs process). This is as opposed to the Reverse Higgs process, $v: 0 \rightarrow c$, $F(c) = 0$. No aether force and it happens regardless of m_0. The same thing happens whether we are accelerating e+/e-, $m_0 = m_e$, or a neutrino, $m_0 << m_e$. No aether force! So the fluid theory accounts for Newton's three laws of motion:

(1) In the absence of a force, a macroscopic body continues to move at constant velocity, (aether restoration force matches aether reaction force).
(2) $F = ma$
(3) Every action has an equal and opposite reaction, such as the reaction force in consequence of our moving body pushing aether.

And we might sub-divide (2) in three cases as:
(a) Newtonian, $F = \left(m_0/\sqrt{(1-v^2/c^2\,)}\right)\, a = ma$.
(b) (b) Aether force, $F(v, m_0)$ and not $F(v, m)$.
(c) (c) Photons, very large acceleration to get there, possibly a limiting acceleration it is of such magnitude, and $m_0 \rightarrow 0$, and no aether force in the photonic state, possibly even no force in the acceleration period, the acceleration is just acquired by progressively removing the rest mass, $(m_0: m_e \rightarrow 0)$.

Because, (see later), we conclude that the aether force is just a record of the forces that were applied to get to that speed, v, therefore, if there is no aether force, (photon, critical frequency), then no force was applied to get it there, the acceleration was just acquired by progressively removing the rest mass.
Further, quantum gravity and the Coulomb-Newton unification accounts for Newton's law of universal gravitation, $F = GMm/R^2$, see previous deduction whereby $1/R^2$ in Newton's equation arises in unison with $1/R^2$ in Coulomb's law, $F = (1/4\pi\varepsilon_0)Q_1Q_2/R^2$, [2].
So consider Newton's second law, and mixing up Newtonian force and aether force:

(i) $a = F/m$ = constant therefore $F(v)$, and you double m is logically equivalent to double the force required to get to v in time $t = v/a$.
(ii) $a = F/m$ variable, so (aether) Force constant and then halve m, double acceleration, get to $F(v)$ in reduced time, $t = v/a$, easier to get to $v, F(v)$.
(iii) F/m variable, mass constant, so double F we get to v, $F(v)$ in reduced time, $t = v/a$.

Note the distinction between mass and rest mass. If we are dealing with aether force, we are concerned with $f(v, m_0)$. If we are dealing with Newtonian force, well mass constant is impossible for an acceleration, because $m = m(m_0, v)$, but in the low velocity limit, say $v < c/10$, where Einstein's modification of Newtonian dynamics becomes trivial, (to say 3-4 significant figures), then we find $m = m_0$ and constant. In this respect, the aether force agrees with the Newtonian force, for small velocity. It is well worth noting that the electrons in a Bohr atom, satisfy $v < (c/10)$, in their orbits, so that Bohr atomic theory becomes a manageable theory by the proposition m = constant in the de Broglie expression, $mv\lambda = h$. Similarly, the Schrodinger atom becomes a manageable proposition by the enforcement, v is constant and equal to c, in the de Broglie expression. [2, 3].
And that is how we introduce time and acceleration to the equivalent fluid description of Newtonian mechanics, $F(v)$. The Newtonian force F, is the applied force, it vanishes when we reach $v, F(v)$. Just for reference:

$$F(v) = m_e\, f(v) = m_e \left(\frac{\frac{v^2}{c^2} - 1 + \sqrt{1 - \frac{v^2}{c^2}}}{1 - \frac{v^2}{c^2}} \right). \qquad (9)$$

Okay, so consider now $F(a) = F(2v)/F(v) - F(v)$. Consider $v \to 0$. Then $F(a) = 0$.
But all the terms in $F(a)$ versus $F(2a)$ are $(v/c)^2$ versus $(2v/c)^2$ is equal to 0. So $F(a)$, $F(2a) \to 0$ identically, therefore, here, $F(2v)/F(v) = 0/0$ and $F(a) = 1$ in the limit $v \to 0$. So $F(a)$ always positive and $F(a)/m_e = f(a) \geq 1$, always. Most particularly, we have $F(c) = m_e f(c) = m_e \times 0/0$, in this Energy input scenario, not the Reverse Higgs process.
We have determined, and see references, that a massive body accelerated from rest via the Reverse Higgs process, most particularly electron/positron/neutrino, will have zero aether force, at least when it reaches $v = c$. However, if we are talking about the energy input situation rather than Reverse Higgs, that 0/0 above will clearly be equal to ∞, infinite aether force. Well, infinite aether force is unphysical, a propagating mass cannot have infinite mass, it is impossible for a massive body to get to $v = c$ via the energy input process, it is only possible via the Reverse Higgs mechanism. This sits very nicely with our subsequent deductions that $0/0 = 0$, or some non-infinite, nonzero real number, is a physical possibility, but the option 0/0 = ∞ is *not* permissible physically, only mathematically. [2]. See below.

Consider, above, $f(v) = F(v)/m$ and $f(0) = 1 - 1 = 0$ and $f(c) = (1 - 1)/0 = 0/0$. So, as $v \to c$ then:

$$F(a) \to \left[\left(\frac{\frac{(2v)^2}{c^2} - 1}{1 - \frac{(2v)^2}{c^2}} \right) \Big/ \left(\frac{\frac{v^2}{c^2} - 1}{1 - \frac{v^2}{c^2}} \right) \right] - \left(\frac{\frac{v^2}{c^2} - 1}{1 - \frac{v^2}{c^2}} \right) \qquad (24)$$

then $-1/(-0/0) + 0/0$. Note we have introduced the concept of ± 0. For example, in the quantity $(v^2/c^2 - 1)$, and in the limit $v \to c$, we see the expression is negative, right up to the far limit, $v = c$. We call this -0, or negative zero. Conversely, the quantity $1 - v^2/c^2$ is equal to $0+$, positive zero, in the limit $v \to c$. We make something mathematically rigorous out of this proposition that zero can be positive or negative, just like any other number, in other works.

Let's try $0/0 = 1$ then $F(a)/m = 1 + 1 = 2$. Consider Newton's law $F = ma$ or $a = F/m$, and: F becomes the fluid force, the aether restoration force $F \to \infty$ as $v \to c$. (Non-Reverse Higgs process, Energy input scenario only). And the mass of the body $m(v) \to \infty$ as $v \to c$. So, the acceleration: $a \to \infty/\infty = 0/0$.
But for $v \to c$, $m \to \infty$, (Energy input scenario), Non-Reverse Higgs, $a = F/m = F/\infty$, even an infinite force will not result in a reversal of the motion of twin 2. And for any velocity $v < c$, it will be possible to effectively reverse the motion of twin 2 instantaneously, or approaching instantaneously, by an increasingly large but non-infinite force. So long as we do not have $v = c, m = \infty$, we can make twin 2 turn around arbitrarily quickly, by just introducing reversal forces of increasingly large, but non-infinite magnitude. So we had for $v \to 0$ that *0/0* = 1. For $v \to c$, there are two options:

0/0 = 1 then $F(a)/m = 2$, and $a = 1$ signifies infinite acceleration, instantaneous velocity reversal. The other extremity, as $v \to c$, is a possible reason why infinite acceleration is signified by a = 1, is more than likely because an actual acceleration $a = 0/0 = \infty$, such that the turn-around is instantaneous, is not a physical possibility, only a mathematical possibility, see above.
But, except in the instance $v = c$, $m = \infty$, we can make the accelerating force arbitrarily large, the velocity reversal approaches instantaneous, whereupon all the time dilation payback, owing to the acceleration, has to be facilitated on the reverse journey, $F(a) = 2$, see below,[2], 0/0 = ∞ not physical.
0/0 = 0 then $F(a) = \infty$, no reversal at all! The twins never re-unite, and the necessary restoration to get their clocks back in agreement, about who is younger or older, is infinite.
We have infinite acceleration is a possibility, (in a limiting sense), for speeds all to way to but not including c, and it is designated $a = 1$. Reversal is not possible at all for $v = c$, that is, the reversal of twin 2's trajectory. But as you decrease velocity from $v = c$, not only does reversal become a possibility, instantaneous reversal becomes a possibility, in a limiting sense, such that the time dilation associated with the acceleration has to be paid back entirely on the reverse journey. As $v: c \to 0$, instantaneous reversal is increasingly easy to facilitate, the force of reversal required goes to ∞, but at a reduced rate. Finally, you get to $v = 0$, whereupon you have instantaneous reversal, but for zero force! In this instance, it is simply the case that reversal time = 0. So in summary:
When $v \to 0$, then $F(a) \to 1$, and when $v \to c$, and $a: 1 \to 0$ logically is equivalent to $F(a): 2 \to \infty$. Moreover, when $0 < v < c$, then $1 < F(a) < 2$, and we'll find that in the limit of instantaneous reversal, $F(a) \to 2$, and is larger than that only for $a < 1$, and the problem of the twin paradox will be solved. So in the fluid theory, infinite acceleration is signified by $a = 1$, not $a = \infty$.
So a (instantaneous reversal) = 1, and a (zero reversal) = 0. So that means that a(instantaneous) is *not* infinitely greater than say a = 9.8 ms-2. *Because*, this is the $v \to c$ scenario, where the magnitude of that non-instantaneous reversal, $a < 1$, for a given turn around time, Δt, increases with v. But for the aether force, ultimately, we take time Δt out of it, to solve the twin paradox.
Now what is the meaning of this $F(a) = 2$? So twin 2, (the moving twin), (wrongly) observes twin 1 to be younger than himself, according to the combination of the outward journey and the return journey, $\Delta t' = \Delta t\sqrt{(1 - v^2/c^2)}$. So his clock has to be adjusted by $2\Delta t'$.

1-Move twin 1's clock ahead by $1 \times \Delta t'$, so the twins are the same age.
2-Move twin 1's clock ahead an additional $1 \times \Delta t'$, so that now he himself is younger than twin 1, by the appropriate amount of time. Therefore, he is younger

than his twin, by the same amount that he originally thought he was older.
Thus, the return journey is not a problem, both twins agree. But regarding the outgoing journey, where the two twins disagree, this is fixed up in the acceleration phase, and paid pack on the return journey, in the case of an instantaneous reversal. The quantity of time dilation associated with the acceleration is 2. The outgoing journey quantity of time dilation, and doubled, such that (i) twin 2 observes expects himself to be the same age as his twin at their re-union, and then (ii) he observes his twin to be younger by that amount of time dilation, thus fixing up the error that occurred in the outgoing journey. As for the return journey, that does not come into it, both twins are in agreement as to their relative aging in this part of the process. (Although they are in disagreement about the laws of special relativity).

OTHER ASPECTS OF SPECIAL RELATVITY IN CONSIDERATION OF TWIN 2's VELOCITY REVERSAL

Now we appear to have opened a can of worms here. What about the Lorentz contraction, $\Delta L' = \Delta L\sqrt{(1-v^2/c^2)}$, and the mass variation, $m = m_0/\sqrt{(1-v^2/c^2)}$? It turns out, rather nicely, that on the return journey, where processes of special relativity have reversed, for twin 2, because twin 2 is now heading into the wave, rather than pursuing it, that they both agree about their masses.
They both conclude that twin 2 is heavier, twin 1 is lighter. And they both conclude that twin 2 is skinnier, twin 1 is fatter. But on the outgoing journey, they disagreed, both were of the opinion that the other was the heavier, and the other was the skinnier. It comes down to the same matter of the problem only being resolved when the wavefunction collapses, when the measurement is made, in the language of quantum entanglement, when the acceleration process is completed.
So finally, that is why $F(a) = 2$, in absolute units, because the aether force scenario eliminates both a and Δt from the Newtonian analysis, ($F = ma = m(dv/dt)$). Again, taking Δt out of it, for the constant velocity portion of the journey, the same way we took Δt out of it for the accelerated portion of the journey.
As $a = F/m$ approaches infinity, $a = 1$, then Δt, which applies only to the accelerated phase, vanishes, and the time dilation associated with the acceleration period has to be paid back on the return journey, and also the reversed special relativistic time dilation has to be included, these are added together, for the reverse journey.
So $F(v)$ gives us the time deficit, which must be restored two-fold, and $F(2v)$ gives us the process by which this occurs. $F(2v)$ is what the v_{init} observer records of twin 2, subsequent to his velocity reversal, $v \to -v$. So in the instantaneous reversal scenario, $a = 1$, only the v deficit has to be accounted for, not the additional deficit that would occur as twin 2 slows down, stops, reverses and speeds up again to v. For $a < 1$ there is this additional period of nonzero velocity that has to be accounted for, in getting the clocks of the two twins in unison upon their reunion. So, for $a \to 0$, we have an infinite additional velocity deficit, that cannot be accounted for, $F(a) = \infty$. The twins will never be reconciled, neither will twin 1 think twin 2 is younger, twin 2 thinks twin 1 is younger, be resolved into one outcome, (Twin 2 younger) or the other outcome, (Twin 1 younger). This is because neither twin accelerates, so you cannot rule out one twin's opinion or the other's, a superposition of dual opinions. The same as in Schrodinger's cat experiment, prior to the spin measurement, the cat is in a superposition of dead versus alive, we only get out of this superposition state by doing the spin measurement. In the twin paradox, you only get out of a superposition of states by accelerating one twin or the other.
Therefore, acceleration (non-instantaneous) introduces an additional time period, Δt, and when this $\Delta t \to \infty$, things cannot be properly accounted for anymore, you cannot get out of this superposition of states. In the fluid scenario description of physics, to account for the twin paradox, we put Δt a constant for the speed v portion of the journey, and vary v. For the acceleration period, we put Δt a constant for the acceleration period, see above, (but *not* the Lorentz factor $\sqrt{(1-v^2/c^2)}$ constant, see above discussions). For $v \to c$, and infinite acceleration, $a = 1$, we thereby acquire $F(a) = 2$, but only for $v \to c$. But it is surely desirable that we get $F(a) = 2$, for $a = 1$, in *any* scenario, not simply for $v \to c$. We'll sort that out presently. So for infinite acceleration, $a \to 1$, in the time period of the acceleration, Δt, it is a matter of how quickly that time interval $\Delta t \to 0$. And $v \to 0$, $\Delta t \to 0$, (see above).

$$a = \Delta v/\Delta t \to 0/0 \tag{25}$$

But $a = 1$ only works for $v \to c$, not $v = c$, in the hypothetical case, $v = c$, the trajectory cannot be reversed. Therefore F(a) logically equivalent to 2 is a description of the process in the limiting case in which the reversal is instantaneous, $a = 1$, which can be facilitated if arbitrary force, besides $F = \infty$, is a possibility.
When $\Delta t \to 0$, then $a = \Delta v/\Delta t \to 0/0$, for $v \to 0$, and subsequently we acquire $a = 0/0 = 1$ and logically we have F(a) = 2. And we evaluated $0/0 \to 1$ as $v \to 0$ already above! Such that $F(a)$ always positive and always ≥ 1. Now we have that for $a = 1$, (instantaneous reversal), then both in the limit $v \to 0$ and in the limit $v \to c$, but not including c, that: $F(a) = 2$.
So, for non-instantaneous reversal, $a < 1$, and $0 < v < c$, we have $1 < F(a) < 2 \to F(a) = 2$, as a becomes infinite, $a \to 1$, reversal becomes instantaneous.
So for $v \to 0$, not only is $F(a) \geq 1$, it in fact equals 2. So if $F(a) = 2$ for $v \to c$, (cf $[2, \infty]$ for $v \neq c$), and it also equals 2 for $v \to 0$, $\neq$ $[1, 2]$, then it equals 2 for any $0 < v < c$, if $a = 1$. And this is all consistent too with $v = 0$, but not $v = c$. This is in direct analogy to what we had in the Reverse Higgs process, $m = m_e$, $(v = 0)$, versus $m = m_e$, $(v = c)$ and therefore $m = m_e$ $(0 < v < c)$.
We find, $F(a) = 1$ (fix up the discrepancy for the twins in the outgoing journey, twin 2 expects to be the same age as twin 1, twin 2 believes the laws of physics are the same for him and his brother, and that they were the same for both in the outgoing journey) $+1$ (in fact the laws of physics were/will be not the same for both twins, owing to the acceleration of twin 2, such that twin 1, who doesn't accelerate, has the physics right, and so, we get a double dose

of that acceleration-rectified time dilation, such that twin 1 is correct, not only is he not the same age as his brother, he is older than his brother, twin 2) = 2.
The physics is fixed up on the return journey, both twins are in agreement that twin 2 is getting younger, so the acceleration phase time dilation is just added to the (correct) time dilation for the return journey. So, $F(a) = 2$ can be instituted by a sufficient accelerating force for any $0 \le v < c$. It is not possible for $v = c$, even an infinite accelerating force will not do it.

BACK TO THE TWIN PARADOX AND FLUID THEORY

Now $F(v)$ is what twin 1 makes of twin 2, or what twin 2 makes of twin 1 on the outward journey, in the frame v_{init}.
Recall how in the fluid analysis, one starts in the $v = 0$ frame, no radiation, then one can institute the radiation, and pursue it, either to the right or the left. In the twin paradox, similarly, we have these two opposite electromagnetic propagations, relative to twin 2, the radiation is going one way and then the other – he is pursuing it, and then he is running into it.
In the reference frame v_{init}, and staying there, we have $F(v, 2t)$ a description of twin 1, for the whole journey, and $F(2v, t)$ a description of twin 2, for the second half of the journey for the first half of the journey, twin 2 is stationary in the v_{init} frame. At the end, the two twins are re-united, and their clocks must be in agreement. Consider the fluid analysis.

Table 1

Pursuing the photon	Running into the photon
$\leftarrow \quad h\nu_e$	$h\nu_e \quad \rightarrow$
$\leftarrow \quad \frac{1}{2}(m_e v^2)\left(\frac{1}{\sqrt{1-\frac{v2}{c2}}}\right)$	$\frac{1}{2}(m_e v^2)\left(\frac{1}{\sqrt{1-\frac{v2}{c2}}}\right) \quad \rightarrow$
$\leftarrow \quad -m_e\left(\frac{\lvert v\rvert}{\sqrt{1-\frac{v2}{c2}}}\right)$	$+m_e\left(\frac{\lvert v\rvert}{\sqrt{1-\frac{v2}{c2}}}\right) \quad \rightarrow$

Consequently, the kinetic energy term KE is independent of photon direction. The momentum term is not, but we are only in consideration of KE terms, $(v/c)^2$.
Accordingly, in the twin paradox, reversing the photon direction is equivalent to reversing the direction of twin 2:

$\rightarrow h\nu_e$	
$\leftarrow -v$	$v \rightarrow$

Or equivalently: $(\rightarrow h\nu_e)$ then $(\rightarrow v)$ and for $(\leftarrow h\nu_e)$ we have $(\rightarrow v)$. But the way to do this is not in the frame $v = 0$, but in the frame $v = v_{init}$.
In the frame v_{init}, and staying there, twin 1 is observed at $F(v)$, twin 2 is observed at $F(2v)$, and the difference in their ages is accounted for, in the v_{init} frame, by $F(2v)$ versus $F(v)$, such that twin 2 is younger when they re-unite. But isn't it the case that twin 1 travel for time $2t$, and twin 2 travels for time t?
If that were the case, surely $F(v), F(2v)$ would not work, we do not have constant travel times Δt. But the $F(v)$, $F(2v)$ analysis appears to work, leaving times out of it-appears to work for a constant time interval Δt. We cease to bother about the time Δt, focusing rather on Δt, for the acceleration period.
But if we want to know what the significance of Δt in the process, mathematically, then consider the discussion below. The problem being that the whole analysis appears to work for a constant Δt. Yet we know that the time dilation deficit which must be paid back, upon instigating the acceleration, is going to have to be a function of the length of the journey, $t = \Delta t$. The longer the journey, the more the clocks of twin 1 and twin 2 get out of kilter with one another, on the outgoing journey. This is an unfortunate consideration, but we can get around it in spectacular fashion!
Consider v at, a constant equal to 1. So $v \rightarrow 2v$ and $2t \rightarrow t$. So $F(v)$, $F(2v)$ is a valid description, we don't have to worry about time, Δt. Where here Δt is a constant, regardless of v versus $2v$. And we have complementary scenarios in Newton/Einstein versus fluid theory treatments. In fluid theory, we have Force a complicated function of v, $F(v)$:

$$F = m_0/\sqrt{(1 - v^2/c^2\,)} - m_0 \qquad (26)$$

Conversely, in fluid theory, we have time a simple function of v: $t = v$, $(a = 1)$. Thus $\Delta t'(2v) = \Delta t'(v/2) = \Delta t(v) = k/v$. And larger v will give larger acceleration required. Because, if you double v then halve Δt for a given twin separation distance $d = \Delta t v$, i.e. d just prior to the acceleration. Moreover $\Delta t'(v) = 2k/v$ and $t' - t'(0) = 2k/v$, or

$$t' = t'(0) + 2k/v \quad (27)$$

Now consider the Newtonian/Einsteinian. Now we have t a complicated function of v as $\Delta t' = \Delta t\sqrt{(1 - v^2/c^2\,)}$ that is equal with $(k/v)\sqrt{(1 - v^2/c^2\,)}$ and therefore,

$$t' = t'(0) + (k/v)\sqrt{(1 - v^2/c^2\,)} \quad (28)$$

Finally, we have F a simple function of v, for Newtonian/Einsteinian we have $F = ma = m(\Delta v/\Delta t)$, and $\Delta v = v — v = 2v$. Therefore,

$$F = 2\left(\frac{m}{\Delta t}\right)v \quad (29)$$

where as

$$\Delta t = \frac{k}{v} \quad \text{and} \quad \frac{mv}{k} \quad (30)$$

Note the pleasing symmetry between the four equations. For equations (26) and (28), we have a reciprocal arrangement, $\sqrt{(1 - v^2/c^2\,)}$ versus $1/\sqrt{(1 - v^2/c^2\,)}$.
Similarly, for equations (27) and (29), we have a reciprocal arrangement, $1/v$ versus v. So, we insert Δt and we get a factor of 2 then give F in (26) two terms, as per (27), (28).

DISCUSSION

Infinities have played a major part in Russell's research. In particular, the following identities: $k/\infty = 0$, where k is any nonzero, non-infinite real number, and: $k/0 = \infty$, and: 0/0 $= \infty/\infty = \ 0 \times \infty = 0$ or k or ∞. It would appear, at the current state of research, that all of this hold mathematically, but that the option $0/0 = \infty$ is not a physical option. In online conversations about the matter, it becomes obvious that physicists and mathematicians are not willing to accept these equations as valid mathematical and physical options, any more than Russell's PhD supervisor was willing to discuss the equation $J.E = |E \times B|$ with him. Most of them cannot get beyond division by zero is undefined, which they read in some mathematics textbook somewhere.
There was even a person who denied the validity of k/∞ = 0, a standard tool in high school calculus. Russell first got onto the matter of infinities through his investigation of the proposal, in special relativity, that the mass of a photon can be acquired by the following simple analysis:

$$m = m_0/\sqrt{(1 - v^2/c^2\,)} \quad (31)$$

and it is equal to $0 \times \infty$, (m_0: $m_e \to 0$, m_e being the rest mass of electron/positron, and $v \to c$), and then it is equal to $k = m_e$. So, the mass of a photon, at the critical frequency, is m_e, and that critical frequency is obtained by putting Einstein's two most famous equations together: $h\nu_e = m_e c^2$, where ν_e is the critical frequency. Therefore, a photon is actually the carrier of a fermion, e^+/e^-. Thus, if photons are electrically charged, in this manner, then why are they not deflected by electromagnetic fields? See Results, above.
Having become very conversant with infinities, in this manner, they have been applied in this paper to the solution of the twin paradox. When, in physics, one comes across $0/0$, or $0 \times \infty$, it is a fair bet that there is some interesting and useful physics, hovering on the horizon.
This simple identity tells us that photons have mass, and the Lorentz force takes care of the consequence that photons carry electric charge, too. In this paper, we have used infinities to simplify the mathematics, while still preserving some very valuable physical consequences. In particular, we have hypothesized an infinite acceleration, whereupon twin 2, the moving twin, reverses his direction instantaneously, on account of an arbitrarily large reversing force.
This being the case, the time dilation correction that results in the two twins being in agreement about their relative ages, upon re-union, and which is a consequence of the acceleration, occurs entirely on the return journey, and *not* in the acceleration phase, because the time period in the acceleration phase is $\Delta t = 0$.
Presumably, if we made the mathematics and the physics more complicated, by instituting a non-instantaneous reversal, non-infinite acceleration, then at least some of that time dilation correction would occur in the acceleration phase, and the moreso, the less the acceleration. It is physically unpalatable, one would imagine, that the time dilation correction occurs instantaneously, in the case of a very fast reversal. That twin 2 receives an instantaneous correction to his age, that he instantaneously loses a couple of years, as he sees it.

CONCLUSION

It is clear that we have the correct result, that the time dilation correction arising from the acceleration is given by $F(a) = 2$. There is no physical inconsistency between the two twins on the reverse journey, as we discussed. So, regarding the outgoing journey, where the clocks of the two twins get out of kilter, we have $F(a) = 1$ (to fix twin 2's clock such that he expects to be the same age as his twin upon re-union, time = t not $2t$) + 1 (to get to the correct time, that of twin 1's clock, whereupon twin 2 is that quantity younger rather than that quantity older, again, time = t not $2t$) = 2.
The central premise of our discussions is that Einstein's theory of special relativity does away with simultaneity. So, on the outgoing journey, it is impossible for, at one instant in time, twin 1 to be saying twin 2 is getting younger and twin 2 to be saying that twin 1 is getting younger, they are both in dis-agreement, because there is no such thing as absolute simultaneity, there is no instant in time at which the two twins can confer with one another.
$F(a) = 2$ is the correct result. It is just a matter of exactly what part of the journey that the time dilation deficit is rectified. The exact matter of what is simultaneous for a particular instant in the journey, indeed for all instants in the journey, is clearly going to play a crucial part in sorting out this problem. For the time being, we are making the conclusion that the time dilation deficit is fixed up on the return journey, we feel compelled to make that assumption in consequence of the fact that we have considered an instantaneous reversal, an infinite acceleration.
Thus, the position we have taken is that, on the reverse journey, you have the correct time dilation going on for both twins, they both agree that twin 2 is getting younger, because twin 2 is experiencing a reverse special relativity, because he

is now heading into the radiation rather than being in pursuit of the radiation. And then you have an additional time dilation, the correction $F(a) = 2$, superimposed on top of that. That is our conclusion, because an instantaneous time dilation correction appears unpalatable. Even if an instantaneous reversal, to make the mathematics easier, seems like a good idea!

Accordingly, what is the reason for the aether theory being necessary to solve the twin paradox? Simply, because of cumulative effects. When the twins re-unite, their Lorentz contraction or their respective relativistic masses only depend on what is happening at the instant of their reunion. It has nothing to do with what went on previously in the journey. In particular, because twin 2 has accelerated in order to turn around, on the return journey, including at the destination, both twins are in agreement about their relative masses and skinniness. But as for their relative ages, that is a function of the entire journey.

A record of the journey is kept, such that at the destination, this record of the entire journey is available, in the relative ages of the two twins. Not the case for the Lorentz contraction and the relativistic mass variation! But as they re-unite, the two twins are in agreement about their Lorentz contractions and their relativistic mass alterations, because twin 2 has suffered a special relativistic reversal, owing to his velocity reversal with respect to the photon.

Similarly, the aether force is cumulative. Supposing you want to accelerate a body, from rest, say, to speed v, whereupon you will have an aether force $F(v)$. Well, that aether force, $F(v)$, contains a record of what went before the instant in time at which speed v was reached. Various increments of Newtonian force were added, until the body acquired an aether force $F(v)$.

The aether force $F(v)$ keeps a record of all these various increments of Newtonian force. When you get to speed v, no more increments of force are added, and the aether force $F(v)$ ceases to increase.

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