APPENDIX VI

The Hypotheses of Fechner and Einstein

Readers will not be surprised to hear that upon reading through what I have written in this book about Creation, there are a couple of after-thoughts that warrant mention. Those who believe Einstein's theory will, no doubt, assume that my theory cannot explain the evidence of record deemed to support Einstein's hypothesis concerning 'time dilation'. Then there will be those who are a little bewildered by my reliance on Fechner's hypothesis to explain the electrodynamic action of electric current flow as arising from pairs of oppositely charged particles created in spaced relationship and then annihilating one another upon coming together by moving in opposite directions.

Surprising though it may seem, there is scope for challenging Fechner's hypothesis constructively and thereby overcoming a problem that it poses, but in so doing one finds that the experimental evidence relied upon as proving 'time dilation' may become instead proof that supports the theory presented in this work.

There is only one reported type of experiment which purports to support Einstein's 'time dilation' hypothesis. This is that indicating the enhanced lifetime of the muon as a function of its speed. I discount the idea that time dilation is inherent in Einstein's conception of distorted space as a valid means for explaining the null result of the Michelson-Morley experiment as already discussed in chapter 9. Also one can dismiss the evidence arising from an experiment which involves transporting an atomic clock in an aircraft flying around the world to see if it loses time or gains time relative to an atomic clock sitting at the base location. Here the question one faces is whether speed or acceleration or both, being different for the flying clock and

that at rest on body Earth, will affect the clock rate. You see, we are not here discussing time as such but are discussing an atom, meaning the change of energy states of electrons in motion around the atomic nucleus and this involves photons, the frequency of which depends upon energy, not time. The atomic clock rate is affected by change of gravitational potential and so altitude. It confuses the issue to imagine atomic clock rates as changing owing to so-called 'time dilation'. See the Section IV, 'Times Rates of Moving Clocks' of my paper: "Synchronous Lattice Electrodynamics as an Alternative to Time Dilation, (Hadronic Journal, **10,** 185-192; 1987). It is included as the fifth paper of the Appendix in my book *Aether Science Papers*.

Now I must digress just a little before coming to the detail of the theory of dilated muon lifetime, as I now perceive it in the light of the derivation of the muon rest-mass lifetime, as presented in chapter 3 of this work.

Imagine a lamp that runs on electricity from an electrically charged cell, a battery. It has a certain illumination lifetime, its light going out once the electric charge from that battery is all shed. Now imagine that the lamp is taken on a long journey accompanied by lots of charged cells. The lamp will glow for a longer period proportional to the number of cells and their total electric charge. Now, if you assembled such a device and observed the enhanced illumination lifetime of that travelling lamp, I believe you would think it a joke if someone said to you: "Ah yes, here is the evidence I have been seeking concerning Einstein's theory. You have proved that Einstein was right when he conceived the notion of 'time dilation'. Time itself really does alter its rhythm and extend itself, the faster the speed of the object under observation."

However, the comment may not seem quite so ridiculous if what you were observing was something rather elusive as seen in the microcosmic world within a high energy particle accelerator at CERN in Geneva, Switzerland. Physicists probing the darkness of the unknown by getting fundamental particles to move at very high speeds

are more closely tuned to think in terms of Einstein's theory than theory at the basic electrician level, and so, upon seeing something that lives longer, as its speed approaches that of light, Einstein's time dilation formula comes immediately to mind.

What they saw in that accelerator was a system comprising many muons, a muon being a charged electric particle that, apart from its much greater mass, has features resembling the electron, but those physicists had no idea why those muons had a fleeting existence as, once created, they survive for a brief period only and then all that is left is electrons, albeit moving at high speed owing to the energy shed by the parent muon. It is a great mystery as to how the muon comes into existence and the best reason I can offer is that it already exists everywhere in space and reveals itself as matter only when it (a) takes up position in the dynamic aether lattice and shares the rhythmic motion of that lattice rather than having the random motion in the aether underworld and (b) somehow attracts and becomes attached to two electrons or positrons and adjusts its resonant state in the manner I have described in my paper: The Muon g-Factor by Cavity Resonance Theory, Lettere al Nuovo Cimento, v. 39, 271 (1984). In saying it exists everywhere I am merely echoing the message of chapter 3 entitled 'The Ubiquitous Muon'. However, as to the electron itself, you may wonder how that is created. We have seen in chapter 4 the theory explaining how the proton is created from muons and we know from experiment that muons in matter form can decay into electrons or positrons, but surely that might only mean that the muon has shed its hangers-on. We are left with the puzzle of how, in theory, electrons are created. Well, I cannot answer that, except for noting that our theory in chapter 6 has explained how the photon is created in a space medium that has a characteristic frequency, that universal rhythm of space that leads us to the dynamics of gravitation by connecting the mass of matter with the gravitons. Surely the fact that a photon having that characteristic frequency defines an energy quantum which is precisely that of the electron rest-mass, is the clue

by which to solve the puzzle. One is merely left with a chicken-and egg type of problem, as to whether the electrons are created ab initio and somehow then regulate the oscillations of the underworld of space or whether the universal oscillations and ordered structure of space set in first and so determine the form of the electron.

Here we will confine our attention to the question of the muon and its extended lifetime at speed as determined by those experiments at CERN. Yes, indeed, particle physicists could measure the lifetime of the muon just as an electrician can time the illumination of that lamp mentioned above, and they even found that, the faster the muon travelled, the greater its lifetime in proportion to its overall energy, including its rest-mass energy. Yet somehow they missed seeing how, just as for that lamp, the muon in motion needs an entourage of energy cells which is greater in number, the greater that speed.

They were well aware that Einstein had, some 65 years earlier, supposed that the dimension of time is woven into the fabric of space, a fabric which can be stretched and twisted, with the result that space can be curved (whatever that means in non-mathematical terms) and time can be dilated (whatever that means in non-mathematical terms). So, when the muon at speed was found by experiment to have a longer lifetime, one proportional to its increase in energy, that was said to be 'proof' that Einstein's theory was right. Quoting the very words used at page 62 in the paper by Bailey and Picasso (Progress in Nuclear Physics, v. 12, Part 1, pp. 43-75; 1970):

> 'To conclude, the CERN Muon Storage Ring group has proved that the "clock paradox" is established as an experimental fact (at the level of approximately 1.2%).'

Well, enough of this, the task here, after some further 33 years from the publication of that paper, is to explain the extension of muon lifetime to those of you who prefer to live in the same three-space dimensional world as those of pre-Einstein times.

Firstly, you must understand what governs the lifetime of the muon at rest. As we saw in the latter part of chapter 3 it was determined by the simultaneous hit of the two electrons or positrons (those hangers-on to the muon in its matter form) by two virtual muons from the aether background medium. Secondly, you must understand that when that muon moves it acquires kinetic energy which takes the form of an accompaniment of muon charge pairs borrowed as needed from that aether background medium. Their presence is transient and regulated by statistical factors subject to the overriding control parameter, the energy momentum of the system. In a sense the muon, being a lepton can be part of a charge system in which pairs of opposite charges are constantly being created in the forward field followed by their decay, but ever subject to the need to preserve energy. Inevitably, however, the ultimate decay event occurs and the muon suffers demise as its energy disperses with the creation of a residual electron or positron.

A point of importance here is that the muon that we see as matter has somehow been conditioned to have a core mass that is an odd integer multiple, 207, times that of the electron, whereas by its coupling with two electrons or positrons it adds a mass of two electron units as offset by approximately 2.25 such units owing to the negative electrostatic interaction energy of this combination. [See the author's paper: *'The Nature of the Muon'*, Lettere al Nuovo Cimento, v. 37, 210 (1983)]. In contrast the virtual muons that become associated in pairs and add kinetic energy to the muon when it moves at speed have a mass-energy that is 206.3329 units of electron rest-mass energy. So, there are two kinds of core muons present, the primary μ–207 form and the virtual μ -206.33 form.

The muon lifetime is determined by virtual muon hits arising from the quantum electrodynamic fluctuations of the energy represented by the 'ubiquitous' muon field. A single virtual muon hit of a target electron or positron, which occurs some 10^7 more often than a dual muon hit, will merely rupture the composite three-charge

muon in a transient sense and cause the electron or positron pair to resettle with a muon. However, there can be charge inversion in this process, by which it is meant that a positive muon and an electron in contact can exchange energy to become a negative muon and a positron. In any event there is an equal chance of the resettling electrons or positrons adopting any one of the residual muons as the core muon, whether it be a muon of the 207 form or one of the 206.33 form.

The result of this is that when the eventual dual hit occurs, if that event is for a composite muon form having the 207 muon as a core then that means muon decay, but, if that dual hit has as target the composite muon with a 206.33 muon core, then that merely frees a virtual muon which can find a partner in the virtual muon field and recycle its existence as part of the quantum-electrodynamic activity. The 207 muon is the misfit and it cannot survive this event and so combines with one of its associated electrons or positrons to decay and shed energy to the aether, the neutrino process, whilst freeing the other electron or positron which takes with it its substantial share of the energy released as the decay product of the muon.

One can then understand why it is that the chance of muon decay in relation to the decay lifetime of its rest-mass state is diminished in inverse proportion to the ratio of overall energy to muon rest-mass energy. This latter ratio is the total statistical number of those muons, virtual plus primary, to the primary muon component. This is why the CERN experiment involving many thousands of muons moving at speeds which increased their mass more than twenty fold did reveal evidence of the so-called time dilation of the muon. All that the experiment proved was that the 'genie in the lamp' was spreading its influence equal amongst all the energy components of the system, thereby sustaining their energy state for a longer period in proportion to the energy present.

The above discussion has concerned the muon and attributed its kinetic energy to its accompaniment in motion by the statistical

presence of virtual muon pairs. The so-called relativistic mass increase of the muon arises from the mass added by the presence of those virtual muons. The electron, therefore, ought to conform in the same way, by having an induced electron-positron accompaniment and one can assume that it too would have an extended lifetime at high speed, matching its increased energy, if such a lifetime were to be recognized as something we can measure. Apart from the inference to be drawn from electron tunnelling through potential barriers, however, the electron's lifetime is elusive, because the decay does nothing other than recreate the lowest form of matter, the electron.

The question of interest then is whether the electron moving as a carrier of electric current is accompanied solely by other electrons or whether they share the task of conveying current with a flow of positrons moving in the opposite direction. This brings us to that problem posed by Fechner's hypothesis. I know it is easy to say that the electrons will annihilate the positrons but it is equally easy to say that, if the current circuit element they represent is suddenly switched off, so electromagnetic inductance will respond to set up a pulse of EMF which creates another such current element by a quantum-electrodynamic process involving electron-positron creation. Such a debate can lead nowhere, but there is an interesting history pertaining to this problem, albeit going back many years before the electron was discovered by J. J. Thomson.

One may refer to pages 201 to 208 of volume 1 of a book written by Sir Edmund Whittaker entitled: *History of the Theories of aether and Electricity*, published by Thomas Nelson and Son Ltd in 1951. After referring to Fechner (1845) and a similar hypothesis posed by Weber (1846) and then discussing these in some depth, Whittaker on page 206 states:

> "It has been shown (reference to H. Lorberg, Journal f. Math. lxxiv, p. 305; 1878), indeed, that the assumption of opposite electricities moving with equal and opposite velocities in a circuit is almost inevitable in any theory of

> the type of Weber's, so long as the mutual action of two charges is assumed to depend only upon their relative (as opposed to their absolute) motion."

Now, here I must confess that, even up to the stage where I had written chapter 9 of this book, being well satisfied at having derived the relative velocity formula from first principle analysby starting from time differentiation of energy according to Coulomb's law [equation (9.2)], I was content to move on by relying on the assumption just mentioned (Fechner's hypothesis) to come to the derivation of the Neumann Potential. This was a logical step given my knowledge of what Sir Edmund Whittaker had written. Also I can see that I may have brushed over an important issue by talking about electron-positron pairs or muon pairs having a 'statistical' presence in accounting for kinetic energy. For some reason, however, while relaxing on vacation after having compiled the first draft of this book The Physics of Creation, I began to wonder about the Fechner hypothesis and what the analysis would reveal if those two 'opposite electricities' moved with opposite velocities at different speeds.

To my great surprise, the analysis now to be presented at the end of this Appendix proved that the same result would be obtained whatever the difference in speed magnitude of the two oppositely-charged electric particles. Indeed, one of those particles could be at rest. The essential point, however, is that, for every unit charge of one polarity in motion there has to be another unit charge of opposite polarity at rest, which assures us that the flow of electrons in a conductor can suffice to set up the Neumann Potential, provided there is an atom somewhere in that conductor that is left positively ionized by having shed that electron. Such a result challenges that conclusion above quoted by Whittaker. However, it puts in issue the very basis on which I have just explained the enhanced lifetime of the muon, given the well-known analogy between of the physical properties of muons and electrons. My theory seems to require kinetic energy to be

that of a neutral presence of a statistical population of leptons which share the motion of a particle. Subject to statistical constraint, a moving electron must then have its kinetic energy linked to the presence of electrons and positrons. The electrodynamic action arising from an electron discharge across a gap between an anode and an earthed cathode cannot have kinetic energy solely represented by the rest-mass energy of induced electrons as that would mean kinetic energy itself has electric charge separate from the primary charge. Enlightenment on this issue comes, however, from that derivation of the formula $E = Mc^2$ in Appendix II. In conserving energy as it is accelerated the primary charge will necessarily contract in radius because the Thomson formula for the electron requires energy to be inversely proportional to charge radius. Collectively with the presence of numerous other such moving electrons this contraction will make space available for occupancy by electron-positron pairs created by absorbing some of that energy. However, when the energy of the electron reaches the threshold value of three times the rest-mass value, the electron can revert to its original form by creation of an electron-positron pair. Such a transition does not involve a major energy fluctuation and the notion of a 'statistical' presence of such charge pairs merely implies that energy is used, as it were, in climbing a staircase, two units at a time with the energy intermediate the steps being stored by contraction of the primary electron. For energy to increase with speed with net electric charge constant, such a scenario apportioning energy as between the contracted state of the primary electron and the transient presence of induced lepton charge pairs, seems essential if the muon analogy is to hold up and muon lifetime enhancement at speed is to conform with the theory already presented. This will, however, pose a question as to whether that lifetime might exhibit a pattern of change in steps corresponding to each stage of charge pair creation or decay. On the other hand one can be confident that electrons carrying current in wire conductors and having kinetic energies far below those needed to trigger electron-positron pair

creation will perform as required by the Neumann Potential but the equal presence of their counterpart opposite charges, albeit non-moving, is essential.

In any ongoing debate of this subject one needs to keep in mind is that experimental data concerning lepton mass increase at high speed invariably concerns numerous such particles all moving together at the same speed. Under such conditions the lepton-pair created in measure related to kinetic energy can share that function amongst many primary particles, thereby reducing overall energy fluctuation to a minimum.

The essential point I do wish to stress is that, if muon lifetimes exhibit what has been assumed to be 'time dilation' and conform with the mass-increase formula, as by my theory based on the kinetic energy being vested in the existence of muon charges paired by opposite polarity, then the analogy between electrons and muons suggests that electron-positron charge pairs must feature in electron current activity. Accordingly, notwithstanding Fechner's hypothesis having been put in doubt, I see that in exploring that problem I have strengthened my case for the derivation of the Neumann Potential based on Coulomb's Law, not to mention the other consequence, the dismissal of Einstein's notion of 'time dilation' as being irrelevant to the physics governing muon lifetime.

The analysis mentioned above now follows. The Fechner hypothesis requires electrodynamically-interacting charges Q and q moving at velocities V and v, respectively, to be that of charges + Q and - Q, moving at velocities V/2 and - V/2, respectively, interacting with charges + q and - q, moving at velocities v/2 and - v/2, respectively. We now adopt the more general hypothesis that the interaction is between such opposite pairs of charges, moving respectively at $+V_1$ and $-V_2$ and at $+v_1$ and $-v_2$, where:

$$V = V_1 + V_2$$

and:

$$v = v_1 + v_2$$

The four components, based on the energy potential formula (9.6), now have a U^2 term which has the value:

$$(V_1 - v_1)^2 - (V_1 + v_2)^2 - (-V_2 - v_1)^2 + (-V_2 + v_1)^2$$

which reduces, in magnitude, to:

$$2[(V_1.v_1) + (V_1.v_2) + (V_2.v_1) + (V_2.v_1)]$$

which, in turn, contracts to:

$$2(V_1 + V_2).(v_1 + v_2) = 2(V.v)$$

This is precisely the expression obtained by analysis based on the Fechner hypothesis, leading to the force term (9.8):

$$2Qq(V.v)/R^2c^2$$

which, as a negative quantity, becomes a positive energy potential when integrated with respect to R from R to infinity. This energy potential is:

$$2Qq(V.v)/Rc^2$$

which, as before, is double the Neumann Potential, again bringing into focus the need to accept that the field medium of the aether reacts diamagnetically to halve magnetic action, thereby giving physical foundation for the gyromagnetic anomaly factor of 2.