AETHER SCIENCE PAPERS

Preliminary Note

The book 'Aether Science Papers' was published in 1996. For order information see <u>Aether Science Papers</u>. The 14 papers, reproduced in A4 page size from the scientific periodicals in which they were first published, constitute the main section of the book. The front section of the book is a 68 page commentary entitled 'The Creative Vacuum'. In view of the importance of making scientists aware of this work, it has now been decided to publish these opening 68 pages here in these Web pages and to include the full text of the 14 papers in files having pdf format which can be inspected by Adobe Acrobat reader.

CONTENTS

AnnouncementGravitation - A New RiddleAbout the TitleAbout the TitleThe Aetherial Role of Fermat's Last TheoremEddington's Unification of the ConstantsThe ChallengeIntroducing the Creative VacuumAether Power GenerationUnification - The Time FactorPhysical ReasonAtomic Spectra and the Moving AtomAn Excursion into Quantum ElectrodynamicsSome Critical RemarksEpilogueBibliography

The back cover of the book presents the background to the work.

Back Cover

Aether Science Papers: Part I: The Creative Vacuum

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ANNOUNCEMENT

Very soon now the world at large will need to face up to the discovery of new ways in which we can generate energy that has no pollution risk. The source of that energy is so abundant that future generations will only need to fear the hangover risks inherited from the passing of the nuclear age and our era of hydrocarbon combustion.

The source of the energy that will power our future is not a new source. It is as old as Creation, because we will tap the energy that fills space. It was the shedding of some of that energy that gave birth to the particles of matter, protons and electrons, which combined to form the stellar universe.

The secret giving us access to this sea of energy is connected with the problem that Einstein could never solve, the link between gravitation and magnetism. He could not solve it because he took the wrong direction in 'time'. He obliterated 'universal time' by saying that the rate of time varies according to our own individual viewpoints and so deprived us of our direct vision of the common 'clock' which regulates everything, including gravitation.

In fact, in space, there is electricity which we perceive, in its overall picture, as neutral and electrically balanced, but which is charged with life and motion. All that electricity is moving in a rhythmic dance, in unison, as if it were part of an enormous all-pervading clock mechanism which keeps perfect time on a universal scale. Using a term familiar to scientists the electric charge in motion in what we see as the vacuum is 'phase-locked'. This is what gives basis to quantum theory and wave mechanics and what assures order, rather than chaos, order which involves a dynamic mass balancing act resulting in gravity and a regenerative process which can package energy spread throughout all space and deliver it to us on demand.

It is this regenerative property which allows spent energy, energy wasted as heat by radiation dissipated into space, to be put into an orderly state out there, whether in near or outer space, and this sets up the mechanisms by which protons and electrons can be created. Those 'mechanisms' are those that we describe in physics in terms of quantum electrodynamics, but the essential point I wish to make in this 'announcement' is that the 'phase-lock' property of space is something we can exploit. When we contrive to set up an electric field within, and radial from, the axis of a cylindrical or spherical form, we find that the energy we supply is matched by an equal contribution from the aether filling that vacuum in space. We can use that energy! Part 1 of this work is a commentary and, when read by reference to Part 2, the collection of fourteen scientific papers appended, it introduces this story from the viewpoint of fundamental physics. Separately, by a series of 'Energy Science Reports', backed by a collection of patents, the story will be told from the practical viewpoint of the engineer and it will be the latter work which describes the technology which we now know can deliver power

Aether Science Papers (Announcement)

from that vacuum.

NEXT CHAPTER





Aether Science Papers: Part I: The Creative Vacuum Page 1

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GRAVITATION - A NEW RIDDLE

The fourteen scientific papers just mentioned are presented unamended and in the form in which they were published in the periodicals, Hadronic Journal and Physics Essays. They provide a theoretical account which will show that the 20th century did yield a definitive answer to the riddle of gravitation, together with the long-sought Unified Field Theory.

However we will enter the 21st century confronting a new riddle, that of devising a way in which to use this knowledge to build a machine able to control gravity in some way. That is a real challenge.

The author may not live long enough to see the arrival of that technology, but wishes to go on record here for pointing researchers in one possible direction. The task is to devise a composite metal structure which, under appropriate field control, develops resonant gravitational interactions between its innermost atomic electrons and the gravity field. The resonance frequency is the Compton electron frequency and the technology will need to exploit a resonance, probably with the fifth harmonic frequency of electrons in the K shell of the atoms.

As a clue take note that, if a metal were to have a propensity to be active in the supergravitational or antigravitational sense, it might have a smaller latent heat of fusion in relation to its melting point temperature than applies to normal metals. Then make a selection from known metal elements to determine which have a melting point above 1,000°C combined with a latent heat of fusion below 80 J/gm.

You will find that there are four such elements, neodymium, samarium, gold and uranium. Neodymium and samarium sit either side of promethium in the periodic table, promethium being completely 'missing' from natural Earth crust abundance data, possibly owing to its abnormal supergravitational properties.

I observe that an electron of atomic number 137 would have a first harmonic resonance with the gravity frequency, if it were to exist, but an atomic number Z of 61 (promethium) applies to the fifth harmonic and Z=79 (gold) applies to the third harmonic. The electrons in gold atoms, however, do not interact with the underlying quantum medium so as to produce a dominant harmonic perturbation, whereas those in promethium are strongly affected. The right combination of neodymium (Z=60) and samarium (Z=62), which form, incidentally, the most powerful magnets known, could, given a special field control, well develop powerful anomalous gravitational forces according to that governing control.

Anyone interested in the prospect of such a technology should pay special attention to the theory

disclosed in the fourth of the fourteen papers. Do not overlook the Epilogue added at the end of this commentary on page 60.

NEXT CHAPTER





Aether Science Papers: Part I: The Creative Vacuum Page 2

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ABOUT THE TITLE

The 'aether' is a word which says that there is no such thing as empty space. To say there is no aether is therefore to assert that space can be truly empty, meaning it contains nothing of an electrical character, it now being a well established fact that there is nothing having a physical existence that lacks electrical properties. If a scientist expresses doubt by reference to the 'neutron', I say that the neutron has magnetic properties which are seated in the motion of electric charge. Otherwise, you need to explain why it has a magnetic moment. If that scientist then mentions the 'neutrino', then I say that the 'neutrino' was only a notion, a figment of imagination invented as a devious way of declaring that the aether could absorb or shed energy and momentum without admitting that the aether exists. If that scientist says that the consensus opinion of professors of physics who deny the reality of the aether can surely not be discarded, then I ask "Why not?" and can but point to a report on page 12, 6 May 1996 issue, of The Times newspaper in U.K.

Science correspondent Nigel Hawkes wrote under a heading 'The possibility of getting something for nothing':

"A physicist at Cambridge University has produced a new and daring explanation for an old puzzle. If she is right, it could be the first convincing evidence that it is possible to get something from nothing. The question Claudia Eberlein addresses in a forthcoming issue of Physical Review Letters is that of sonoluminescence. If you expose water to a blast of ultrasound, you get a flash of light. This is deeply puzzling, because visible light has so much more energy than sound that the energy of the sound has somehow to be boosted by a trillionfold. The wavelength of the light emitted implies that the source is at a temperature of tens of thousands of degrees C. Ms Eberlein suggests that the emission of light is a quantum vacuum effect - energy given off by the vacuum. Quantum theory says that there is in reality no such thing as a vacuum and that empty space teems with 'virtual partices' including photons which flit in and out of existence. The theory is open to test. If it turns out to be right, her explanation will be a major coup, the first observable manifestation of quantum vacuum radiaton."

The energetic vacuum is, therefore, a live issue. The 'aether' is a reality and I believe that it can, like a fluid crystal, form structure and dissolve that structure, as it latches onto material substance, but if that substance vibrates excessively then even the aether is confounded and, in its confusion, it sheds

energy! I have, accordingly, chosen the title *Aether Science Papers* with deliberation, knowing that, in the end, the 'aether', per se, will have to be recognized, even though that will confound the non-believers who constitute the modern generation of physicists.

NEXT CHAPTER





Aether Science Papers: Part I: The Creative Vacuum Pages 3-9

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THE AETHEREAL ROLE OF FERMAT'S LAST THEOREM

As we approach the end of the 20th century we should pause to examine our achievements in science and technology in the past 100 years. They are indeed remarkable and there is reason to wonder whether there is much left to conquer as we enter the 21st century. After all, the discovery of new territory in a geographic sense came to an end once exploration had completed the survey of the Earth's surface, so one day soon science, at least physical science, should reach its zenith.

We will then still have to ponder on our incomplete knowledge of space that we cannot easily explore and still need to confront the few never-to-be solved mysteries that science has bequeathed to us even from centuries past. To be sure there is much for us yet to discover in the medical and biochemical field, but physics should by now have yielded the answers to all the secrets that Nature is willing to reveal.

We will never understand what lies beyond our comprehension, such as why the universe exists and what there is beyond its bounds in the context of time and space. Indeed, whatever we might foresee in the long range future of the universe, is not really relevant to mankind, because it seems probable that, on a more limited time scale, our planet is destined to encounter catastrophy sufficient to terminate human and animal life on Earth.

So let us take stock and reflect a little on what the transition to a new millenium can mean for physical science.

Yes, indeed, there are very few challenges now left to tax the mind of a true physicist. However, in saying this, I, as author, am speaking from my own knowledge as a physicist and each of us has our own different and limited perception. I am all too conscious of the fact that, if the scientific community on Earth were to be eradicated and all the books on science were to be destroyed, then, even though the human race might survive, so science as we know it would have to evolve again from nothing. It would then take several more centuries, perhaps another millenium, to bring us back to where we are today.

However, would it really matter and would science develop in the same way as our history indicates? Would we have another Newton and another Einstein? Surely, there would be another Pythagoras! The Pythagoras theorem has a unique quality. It is a survivor, a fact of science on which one can build and, though taught as mathematics, one can even wonder whether it is a statement in physics. Once a surviving remnant of mankind can reason sufficiently to rediscover and find interest in the Aether Science Papers (pp. 3-9)

theorem of Pythagoras then science, including physical science, has been reborn.

Thinking along such lines might seem to be pure fantasy, but let me make my point a little differently. Suppose that I were to say that I know how to formulate the Unified Field Theory and how to explain the true nature of gravitation and certain other still unsolved fundametal issues in physics. Suppose I were to die, as is inevitable, and my writings on these subjects were to be ignored, as seems not unlikely. Then how would that impact the world at large?

It would not even be noticed. Nor, I submit, would the loss of much of the knowledge that takes up space on our university library bookshelves. The simple truth is that mankind in general is not concerned with the understanding of the kind of physics or mathematics that fills the minds of many of our university professors.

However, technology has become important to our daily lives and there are certain basic teachings that physics in its applied form does contribute to that spectrum of activity, so I must not decry what physics at its applied level does offer to our well being. The major problem ahead of us in the 21st century is the need to discover a new and abundant non-polluting source of energy. I am convinced that this is a problem that could easily have been avoided if some aspects of the 20th century could be erased from our memories.

We have ventured into the realm of nuclear power whereas we should have been 'burning the midnight oil' in studious endeavour and probing the energy secrets of the aether. We erred because Einstein outlawed the aether, closing off access to the power source which created the universe. We erred by adopting Einstein's belief in a mathematically abstruse philosophy of so-called four-space, a four dimensional distortion of reality, a virtual world that has become a drug to which theoretical physicists have now become addicted.

Einstein took us into a mental world which had no Pythagoras. The two space dimensions of a flat surface on which one can draw a triangle with two sides and a hypotenuse were replaced, not by the three-dimensional space of the curved surface of the Earth we inhabit, but by an illusory scheme we cannot picture in our mind's eye. We are even being told today that, thanks to Einstein, we can look forward to 'time travel' as we exit through 'worm holes' in a 'time warp' to leap into the past and perhaps into the future. That surely tells us that Einstein's theory is a drug we can best do without!

Yet, in their hearts, all of those Einstein-drug-addicted theoreticians must know that they have draped the universe in a web so fine that it cannot be seen or felt or serve any useful purpose. Does it really need a child to cry out: "The Emperor wears no clothes?" Does it not suffice, after 80 years since Einstein enunciated his General Theory of Relativity, for us to ask what it does for mankind?

Why would God create four-dimensional space and give us a perception of it in three dimensions? Why, even, in applying General Relativity, do we always need to transform its results back into three dimensions to give them meaning?

So, as I say above, if we could erase all this from science as we know it, the world would be unaffected and a new generation of physicists could begin anew in developing a theory which says that the universe was created from energy shed by the aether. After all, if something is created there has to be something serving as a source for what is created.

In saying this I am reminded that Sir Edmund Whittaker, author of 'A History of the Theories of Aether and Electricity', quoted Spinoza to introduce his work as 'The intellectual love of God'. This was a way of saying that to understand the aether is to understand the Creator.

The purpose of this work is to show that the 20th century did, in fact, provide most of the answers to the primary unsolved problems of fundamental physics, including discovering that Holy Grail we call the 'Unified Field Theory'. Sadly, however, that drug-addicted community of relativists which regards such theory as their private province has refused to listen to those not sharing their addiction and so I am seeking to interest those outside that community who have retained their senses and their sanity.

It is the author's intention to show elsewhere, under the title of 'Energy Science Reports', that the 20th century has also delivered a solution to the impending energy crisis by the discovery of ways of extracting energy from the aether. This touches upon the beliefs of a more practical scientific community, but one responsive to what can be demonstrated, whereas this work is strictly concerned with reason and theory, something far more difficult to project into the minds of others than is the reality of the new energy scene. This work describes that aether and its creative role.

It may be that if this account is ignored by the scientific community then it may take several centuries before some future scientist rediscovers what is here presented. Take note that even knowing that someone once did prove something in scientific history does not make the task of rediscovery any easier.

Witness the centuries of effort in trying to solve the problem of Fermat's Last Theorem. This was Pythagoras converted to a power higher than 2, with integer sides to a notional 'triangle', the impossible dream! Fermat assured us that he could actually prove it was impossible but his secret was somehow lost.

Modern opinion, today, is that Fermat may have been deceived in thinking he had proved his theorem. Very probably that is valid opinion, because if there were a simple proof it would, undoubtedly, have been discovered by now. As will be seen below I do have reason for connecting an aspect of the aether problem with Fermat's Last Theorem, but first note that in 1995 it was announced that, after centuries of effort, a Professor of Mathematics, Andrew Wiles, at Princeton had at long last discovered a proof of Fermat's Last Theorem.

It was this reference to Princeton, the university where Einstein had spent many years as a professor, that aroused my interest. I knew how to connect Fermat's Last Theorem with the nature of electricity and thereby introduce the aether in a way that could be a challenge to Einstein's theory. With my Cambridge background and my anti-Einstein disposition, I then thought of introducing this theme in this work.

It was also the memory I had from 1981 when my wife and I passed through Princeton on our way south for a weekend in colonial Williamsburg. This was before going back north to attend a

Aether Science Papers (pp. 3-9)

conference on fundamental physical constants at the Bureau of Standards at Gaithersburg near Washington D.C.

My wife popped into the university bookstore at Princeton and persuaded them to stock my book *'Physics Unified'*, published just a few months earlier. How long, I wondered, would the book be reordered, once the relativistic community on the teaching staff woke up to what their students might see in my book. Indeed, it took a while before the inevitable happened and orders stopped, but a similar venture at the university bookstore at Stanford in California has led to a sustained inflow of orders for stock, even to this day.

I had, incidentally, already seen a brief mention of Andrew Wiles for his achievement in solving Fermat's Last Theorem in the pages of the Michaelmas Term 1995 issue of CAM, the University of Cambridge Alumni Magazine. There it was explained how, according to John Coates, Sadleirian Professor of Mathematics, "Cambridge has always produced some of the most original and gifted mathematical minds in the world." The report declared that 'notable amongst them is number theorist Andrew Wiles who sparked worldwide press interest when he cracked one of the great conundrums in all mathematics: Fermat's Last Theorem'.

It went on to quote Fermat as noting on a Greek mathematical text found after his death in 1665: "I have a truly marvellous demonstration of this proposition which the margin is too narrow to contain." Then the report further declared "Today's scholars doubt that he had. But, says Coates, over the centuries pure mathematicians have developed deep mathematical ideas trying to resolve the problem", followed by "I did not expect to see it happen in my lifetime".

It was later reported by Marcus du Sautoy in the British newspaper THE TIMES on Monday April 8th 1996 that Andrew Wiles, 'for his solution of Fermat's Last Theorem was rewarded in the Knesset (Israel's parliament) with one of mathematics' highest accolades, the Wolf prize worth \$100,000, which he shares with his colleague at Princeton, Robert Langlands.' The headline caption of that report read: 'The solving of a famous condundrum will lead to new challenges. Is this solution the end of maths?'

Well, Marcus du Sautoy, it may not be the end of mathematics but it might well become the beginning of a new age in physics as we see its scope for uprooting Einstein's theories. The event described is a reminder that Albert Einstein was offered the Presidency of the State of Israel, whilst scientists at large still seek that Holy Grail, their Unified Field Theory which eluded Einstein.

Curiously, there was something in Marcus du Sautoy's report that reveals an extrasensory perception because I had already written the text which appears ahead on pages 12 and 49. He suggested that the next challenge would concern the 'Riemann Hypothesis' concerning prime numbers. "Those numbers are in some sense the harmonics of the 'Riemann zeta function'. It is these harmonics which tell you all about prime numbers. Riemann conjectured what these harmonics look like. If true, it could imply that the music of the primes is far from being just noise."

Well, true or false, the harmonics of the primes do feature in this author's theory as outlined ahead,

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Aether Science Papers (pp. 3-9)
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but I did not know I was treading the holy ground of the mathematician when I confronted the electrodynamic resonances in my study of the subject. I still think that the discipline of mathematics is a tool designed to help us to understand Nature, rather than to fashion it by shaping it to fit what we want to believe. The challenge ahead is not one to be classified as mathematics.

Curiously, one senses history beginning to repeat itself, because it was the Riemann tensor which was applied to underpin the mathematics of Einstein's Theory of General Relativity. My attack using 'the music of the primes' will be aimed at proving the aether exists and that the concert hall in which Nature plays that music is one having three space dimensions.

To migrate from the numerology of Fermat's Last Theorem to the physics of electrical phenomena we need now to consider physical dimensions and how we incorporate electrical phenomena in this system of dimensions.

The standard physical dimensions used when expressing measured values are mass M, length L and time T plus something that has an electrical connection, the dielectric constant k. To bridge the gap between inertia and electricity it is not mass that has primary significance, but energy E, inasmuch as the inertia of any electric charge is the property by which it conserves its energy to avoid continuous (non-quantum) loss by radiation when accelerated. See my paper in International Journal of Theoretical Physics, v. 15, p. 631, 1976 or see section 7 of the last of the fourteen appended papers.

This introduces us to the problem of understanding the true nature of electricity and in particular why it comes in positive and negative forms. The answer is similar to there being odd and even numbers. They represent alternate states in a sequence. In the binary number system we see the last digit as either 1 or 0, this being the odd or even condition. In electricity we have (+) or (-) as the polarity of electric charge which I envisage as having spherical form. There is no zero charge state at the truly fundamental level because that only arises where electric particles combine into a neutral aggregation. It is, however, possible for two charges, a particle and its antiparticle, to annihilate one another and shed energy, a quantum event leaving no electrical form or normal electromagnetic wave that we can trace, which is why physicists invented the 'neutrino', but the root question we face is 'what attribute determines whether a charge is positive or negative?'

Mass M has dimensions $EL^{-2}T^2$ and it is appropriate to seek to explain all phenomena in terms of E, L and T as the primary physical dimensions and, as we are probing fundamental physics rather than applied physics, to use the esu system in which the dielectric constant k of the vacuum medium is unity. Thinking in terms of energy E, length L and time T, the way forward is to regard an electric charge as a package of energy E which occupies a volume of space L³ but oscillates at a frequency 1/ T by exchanging some of that volume with a similar package of energy, albeit also with energy transfer to and fro between them. This means that there will be two types of charge, or rather states, which differ in character only according to the instant at which we observe them. One will be expanding and the other will be contracting. One, the positive charge, will be in 'phase' with whatever charge form we take as our positive reference and the other at the same moment will be in anti-phase and so be a negative charge.

Do note here that Einstein's declaration that space and time were intermeshed precluded him from

Aether Science Papers (pp. 3-9)

ever accepting the concept of instantaneous action at a distance, thereby excluding the synchrony and phase-locked oscillations which we shall use as the key to understanding electric charge polarity. Einstein lost his way with the first step he took on his path of relativity.

We, following a different path, can now, if we wish to go to really fundamental levels, explore how electric particles develop into different families, the conservation of energy and the space they occupy being key features of the transmutation process. That will lead us automatically to the point where we see how to solve the problem of linking gravitation and electrical action. The task in sight is no less than that of meeting the challenge posed by Unified Field Theory, but from there we can move even further ahead and come to terms with the very nature of electricity.

Fermat's Last Theorem can play a role in this pursuit.

When an electric charge is compressed into a sphere of radius a the charge occupies a volume of space $4(pi)a^{3}/3$ and it has, if under uniform pressure within the sphere, an energy E inversely proportional to a. Now, given the hypothesis that charge polarity depends upon the phase of an oscillation under conditions where volume of space occupied by charge is conserved, we see that a group of particles in close proximity can only change form subject to the combined volume (pi)a³ being constant. In energy terms this means that the summation of $(1/E)^{3}$ is constant, so if two fundamental particles could merge to become one single particle, which adopts one or other charge polarity then, using x,y z as their energy parameters:

$$x^{-3} + y^{-3} = z^{-3}$$

If this had an integer solution then, by multiplying throughout by $x^3y^3z^3$, we could use the numbers yz,xz and xy of that solution as an integer solution to a Fermat equation for which n=3. This is impossible and so, if we were to assume that the energy quantities really do comprise integer multiples of a basic energy quantum and the space taken up by the particles is conserved, the merger of two such electrical forms vibrating in anti-phase can never result in the creation of a single particle of unitary charge. We know this without appeal to empirical fact concerning how charges of different polarities are seen to interact. In effect, we have given meaning to the polarity of electrical charge by logical argument based on the physical dimensions E, L and T and the use of Fermat's Last Theorem.

So far as this author is aware this is the only application of Fermat's Last Theorem to a truly physical problem.

It does, however, open the question of whether, if one searches to find integer solutions to equations such as:

or:

$$\mathbf{x}^{\mathbf{n}} + \mathbf{y}^{\mathbf{n}} = \mathbf{z}^{\mathbf{n}} + \mathbf{w}^{\mathbf{n}}$$

$$\mathbf{x}^{\mathbf{n}} + \mathbf{y}^{\mathbf{n}} + \mathbf{z}^{\mathbf{n}} = \mathbf{w}^{\mathbf{n}}$$

for n equal to -3, such solutions will be found which bear upon the issue of the hypothetical fundamental quantum of energy.

To satisfy simple equations of the above form, such an energy quantum would, of course, be extremely small in relation to the mass energy of the electron and we would then need to see the neutrino as comprising large quantities of such quanta. However, since the neutrino is surely a figment of imagination, just something invented as a `bookkeeping' exercise to keep the energy and momentum balance as between matter and aether, the aether itself becomes the storehouse for energy which, in its ultimate form, may well be quantized in units of the notional energy quantum.

Unless we pursue this possibility we cannot but wonder whether an avenue of science remains unexplored, and it may well be that there is no integer solution to these equations which has any special significance.

It is to be noted that two of the appended papers use the following equation:

$$x^{-3} + y^{-3} = Nz^{-3}$$

with N=5 expressing the merger of 5 muons to form a kaon, but that did not extend to a search for the fundamental energy quantum. [Hadronic Journal, v.9, p.137, 1986] and [Hadronic Journal, v.12, p.101, 1989]. These are the second and eighth of the appended papers. Note that the equation as used in those papers has a special meaning in that the kaon was portrayed as a particle oscillating constantly between two states, spending half of the time in each state, one being that of a particle of unitary composition (x) and the other being that of a three-particle form, (x) plus two (y), so that on average it comprised simply a single (x) and a single (y) form.

With N=6 the latter equation does have integer solutions, as one sees reported by Mike Mudge in *Personal Computer World*, p. 614, April 1995. Values x=357, y=777 and z=629, satisfy the equality, but these do not relate in any way helpful in our search for the fundamental energy quantum. Solutions, if any, for N=2 are of primary interest.

The idea that conservation of three-dimensional space is the determining factor governing the properties of a fundamental electric charge, whereas the phase of the pulsating state of this space volume determines the charge polarity, may seem quite revolutionary. Physicists have, it seems, spent less time pondering the question of why electric charge comes in negative and positive forms than they have in hypothesizing about the imaginary notions of negative mass, negative energy and negative time. Concern about the nature of electric charge proper, rather than worrying about the speed of light, is important because it provides a more appropriate line of demarcation between the features of aether theory and relativity. Historically, the investigations of C. A. Bjerknes (c. 1877) on spheres pulsating in antiphase in an enveloping medium to set up mutually attractive or repulsive forces give us a lead. See references on p. 284 of Sir Edmund Whittaker's 'A History of the Theories of Aether and Electricity: The Classical Theories' (Nelson, 1951).

This, therefore, is this author's justification for arguing that Fermat's Last Theorem has real relevance to physics. It concerns the physics of three space dimensions and three physical dimensions, such as energy, length and time. The three dimensional world is the real world which the true scientist should be exploring, not the imaginary mathematical jungle which followers of Einstein have adopted.

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 10-13

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EDDINGTON'S UNIFICATION OF THE CONSTANTS

One cannot build on Einstein's foundations but one can at least take stock of Eddington's efforts and proceed from there. Eddington had the good sense to see that the clues which Nature provided to guide us forward in our search for the truth were those coded in the dimensionless numbers which link the truly fundamental constants. We will, very briefly, review that theme as it provides the platform on which much of the work here described was structured.

Sir Arthur Eddington in *New Pathways in Science* (see p. 232), published in 1935 by Cambridge University Press, declared that the seven primitive constants of physics, e, m, M, h, c, G and λ , could be reduced to three (cf. the three dimensions E, L, T) by discovering what determines the value of four purely numerical ratios:

(i) M/m .. (ii) hc/2 π e² .. (iii) e²/GMm (iv) .. (2 π c/h) /(Mm/ λ)

Eddington's own thoughts on how to derive these ratios theoretically have not stood the test of time. He relied too much on what were apparently numerical coincidences and his theory could not adapt to later data found as precision measurement techniques improved. In contrast the theory which I present in the appended papers stands up extremely well, as can be expected for a theory that has really hit upon the truths of Nature's creative mechanisms.

As summarized below, the appended papers cover the first three of Eddington's ratios, but the cosmical constant λ has a curious definition and may prove to have no real significance owing to the vagueness of the natural radius of curvature of space-time'. I would substitute the Hubble constant as the seventh primitive constant and I point out that this also can be deduced theoretically by developing the particle creation theme leading to the M/m evaluation. [Lett. Nuovo Cimento, 41, 252, 1984].

The Hubble constant arises owing to an action occurring throughout space as the aether attempts to create matter in the form of protons and electrons, but succeeds sporadically and then usually only transiently as the particles have a momentary existence. What amounts to 'missing matter' results in that this quasi-matter exists fleetingly thoughout all space and its very presence attenuates the frequency of electromagnetic waves in transit from the stars. The aether has a non-dispersive property in this connection, because it really has two dynamic systems which keep in balance in a rather special way, as discussed in the paper just referenced.

My objective in this work is not to be drawn into contention with Big Bang theory. I prefer here to

avoid the field which cosmologists find so delightful, as they harness Einstein's philosophy to describe events they can only imagine. Enough is said on that subject on page 30 ahead and in the papers at the end of this work. Instead I intend here to concentrate attention more upon the first three of Eddington's ratios.

The way in which protons can be created from activity involving muons is the subject of three papers, two of which are appended. [Nuovo Cimento, 30A, 235, 1975, Hadronic Journal, 11, 169, 1988 and Physics Essays, 1, 72, 1988]. The very close value 1836.152 of M/m, the proton/electron mass ratio, is derived theoretically but its 'fine-tuning' to even greater precision in terms of a fundamental energy quantum can become an interesting possibility in the light of our introduction.

The theoretical derivation of the dimensionless fine-structure constant giving $hc/2\pi e^2$ as 137.0359 is also of published record, as based on the same theoretical principles, which involve an adaptive 'fluid crystal' interpretation of the structured form of the aether. [Physics Letters, 41A, 423, 1972]. However, the summary derivation of this ratio also features in the papers appended.

This author's unification of gravitational and electrical action implicit in the third of Eddington's ratios is already of published record and affords the formulae:

$$\int G = (4\pi e/m)g^4(108\pi)^3$$
$$(g/\tau)^3 - 3(\tau/g) = 1$$
$$\tau = (3)^{7/12}(M/m)$$

M/m is the proton/electron mass ratio. τ is the mass of the tau lepton in relation to the electron. [Hadronic Journal, 9, 153, 1986].

The reader is invited to substitute the measured values of the electron charge to mass ratio e/m and the measured value of the proton-electron mass ratio in these equations to deduce τ and then g, the graviton-electron mass ratio, to then discover that the equations really do give the correct value of G, the constant of gravitation. Clearly, the numerical ratio e²/GMm has therefore been deduced theoretically, meeting fully the objective set by Sir Arthur Eddington.

However, there is a spin-off discovery here, because this theory has yielded a measure of the mass of the tau lepton, otherwise known as the taon. Inspection of the tables of data applicable to physical constants will show that this super-heavy electron, the taon, is the big brother in the electron family, the muon being the middle brother, otherwise known as the heavy electron.

Now, I cannot, in the limited extent of this work, discuss all my published papers, but I know that there will be those who are ready to criticize what I am saying and they may pounce on the fact that the taon-electron mass ratio calculated from the above equations, using M/m as 1836.152, is 3485.21, which is a taon mass-energy of 1780.94 MeV. As can be seen from that 1986 paper of mine, just referenced (the third in the papers appended), I was, at the time that paper was written, confronting the prospect of this taon mass-energy quantity being higher than my theory indicated. In the event, referring to Physical Review D50 (August 1994), I find that the taon is now stated to have a mass-energy of 1777.1 MeV with an uncertainty of approximately 0.5 MeV.

So I am in error somewhat on this question of the mass of the super-heavy electron. However, as can

be seen from the papers ahead I had a similar situation with the muon, in that my theory said that the muon-electron mass ratio should be 206.3329, whereas the actual muon-electron mass ratio is somewhat greater as 206.7683. The reason for this was fully explained as attributable to the real muon having two electron-sized companions. It needs three particles cooperating in a conservative manner, in space volume terms and energy terms, to assure a quasi-stability. [Lett. Nuovo Cimento, 37, 210 (1983) and 38, 342 (1983)].

In the sub-quantum energy activity in the aether the primary role is played by the virtual muon family which comprises a mixture of energy quanta of 205 and 207 electron rest-mass units . We find that the real muon, the one which shows itself in cosmic radiation and in high energy particle decay, is nucleated by the higher 207 form.

Now I have, above, mentioned the 'harmonics of the primes', having in mind the wave resonances and standing wave effects that can control the deployment of energy in particle groups. Such effects have been recognized in my researches in connection with the proton and neutral pion, as mentioned below. Also, in 1972, I had adopted the odd integer space volume quantization to derive the fine-structure constant [Physics Letters, 41A, 423 (1972)]. Later, the evidence pointed to the wave resonance as well, so that in 1983 I did explain why the 'aether' muon or 'virtual' muon, being a bare muon, had a mass slightly below that of the real muon, the one having a electron retinue. Referenced on the integer mass ratio 207, the applicable formula, to a first approximation is:

$$m_{1}/m = 207 + 2 - (9/4)(207)/(207 + \sqrt{3})$$

which is 206.7687. The second Lett. Nuovo Cimento paper referenced above gave reason for 'tuning' this to a slightly lower value, bringing it into perfect accord with the measured value of 206.7683.

What I now declare as being extra proof and vindication of my research in arguing in support of the wave resonances just mentioned, is the fact that the real taon should replicate the muon situation by having a retinue of two virtual muons, whereas the muon had a retinue of two virtual leptons of electron size. The number 207 can be replaced by 17, at least to a first approximation, because the taon is that much more massive than the muon. Accordingly 17 can replace 207 in the above equation to give:

$$m^{7}/m^{\mu} = 17 + 2 - (9/4)(17)/(17 + \sqrt{3})$$

which is 4.43 Mev below the value of m⁷ corresponding to the factor 17, if m^{μ}/m is 205. So the 1780.94 MeV estimate of the virtual taon mass indicates a `real' taon mass of 1776.51 MeV, whereas the value, as now reported, is 1777.1 +/- 0.5 MeV.

Whilst on this theme of wave resonance governing particle mass, I feel it appropriate to mention the harmonic resonance which determined the value of the neutral pion mass. As can be seen by reference to the eleventh appended paper [Physics Essays, 2, 360 (1989)], in determining the mass of the neutral pion in relation to that of the electron, a governing resonance involves the prime number 1619. [This is the ratio A:2C of Table II on p. 365 of that paper.]

When I wrote that paper I did not know that the neutral pion had a measured mass-energy of 134.9764 +/- 0.0006 MeV. Yet, in presenting the paper I gave reason for this mass-energy being either 134.976 MeV or 134.960 Mev, according to whether the component charges involved are well spaced apart or are in contact. Evidently, experiment tells us that they are well-spaced, but here is a very good example of the power of my theory.

The neutral pion is not foremost in importance amongst the many fundamental particles, but it does present an awesome example of the wave resonance effect. As scrunity of Table II in the paper will show, it would really upset the resonance proposition if the mass indicated was not in agreement with experiment, but it is pleasing to see that my theory is supported in a truly remarkable way. I just hope that the reader can come to appreciate what I am saying and so share my enjoyment at having deciphered the physics of Nature's handiwork in this particular particle situation.

As to the 'harmonics of the primes', the best example in the papers appended is the seventh appended paper [Hadronic Journal, 11, 169 (1988)]. The numbers 23, 41 and 1153 are all prime. They relate to the properties of the proton and I can but declare my delight at having deciphered the secrets of the proton as codified in the limited but highly precise numerical data which those highly skilled in precision measurement have afforded.

Sir Arthur Eddington could not have imagined what would prove to be possible once the quantities in which he was interested had been measured to a precision below the part per million level. The numbers do not explain anything, but as they extend in their limits of precision they make the task of explanation all the more formidable. It is only if one has the right interpretation of them in physical terms that one can hope to derive theoretical values which match up to those observed. However, once on track, one knows one has discovered the governing truths and it certainly gives one confidence in spreading the theoretical investigation across the myriad of particle forms that Nature produces.

How else can it be that the substance of the papers which are appended could have emerged so readily? One cannot sit down and `invent' realistic physical ways of deciphering the particle spectrum, just by willful determination. One can, however, if given one point of entry that is well-founded, build on that and hope to find that it does, of itself, build a particle spectrum that fits the one observed. This has proved to be the case. It has not involved use of Einstein's theory, which tells us something we should not fail to heed, but that was not how I entered into these studies.

In simple truth, I wanted to understand how energy was stored by magnetic induction and I did not believe that the route to that understanding could in any way ignore the reality of the presence of the aether. To me, mathematical symbols, though useful if one can picture something tangible that they represent, are meaningless if devoid of substantive reality. The aether is real and it deserves respect!

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 14-17

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THE CHALLENGE

I propose next to turn my attention to a problem in physics, one well within the scope of the knowledge I gleaned from my school studies. This is a challenging question in Newtonian mechanics. One of the lessons of history is that one should not 'put the cart before the horse'. That lesson dates from the era before we discovered electricity. Electrical technology changed things around. We can now, if we wish, transport the horse using electrically powered vehicles.

When Newton enuciated his laws of motion he had no way of predicting the way in which electrodynamic forces would affect his dynamical findings in mechanics. Seen in retrospect, it is now evident that, in prescribing his third law, Newton has put the cart before the horse. The 'cart' is the assertion that action and reaction between any two particles are always in balance. The 'horse' is the rule, Newton's rule, which declares that when two particles emerge from a collision then, if there is no loss of energy, the receding particles have a relative velocity that is equal but opposite to their relative velocity at the moment just before impact.

Electrodynamics concerns electric charges in motion and the electric energy potential attributable to charge interaction is a function of the relative position of those electric charges. It is therefore a logical physical consequence that, to the extent that motion affects energy in a charge interaction, that energy must depend upon the square of the relative velocity. When we work out the square root of that energy at impact we find, as we know from simple mathematics, that there are two solutions, just as -1 or +1 is the square root of 1. Since all ponderable matter comprises nothing other than charged particles, this is really why two particles separate after collision with their relative velocities reversed.

Newton derived his 'rule' by declaring that action and reaction are equal and that energy is conserved in the collision between two particles. He could equally have deduced that if two colliding particles separate with their relative velocities reversed, then, assuming that energy is conserved, action and reaction are equal and opposite. The fact that the masses of the particles may be different does not affect this argument and so one might think that, since the answer comes out the same, it matters not whether the cart or the horse has the forward position.

However, imagine now that you, the reader, are sitting in a classroom, paying careful attention. The teacher aims to show why the principle of conservation of momentum applies to a body which is a conglomerate of numerous component particles, all in motion. The teacher explains that because the law of action and reaction governs how each and everyone of those particles interacts individually with each and every other such particle, then one can sum all the forces and their moments about any axis to prove that net momentum, whether angular or linear, is conserved and is independent of

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Aether Science Papers (pp. 14-17)
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internal interactions within that conglomerate body. As a student you do not question this, because the teacher has ensured that the syllabus followed introduces you to the basics of mechanics before you learn anything about electromagnetism. However, what would be the scenario if the teacher made a mistake and did put the cart before the horse by teaching electrical principles before teaching mechanics?

You would have learnt that when an electrical charge is in motion in a magnetic field it experiences a force owing to that motion, a force directed at right angles to the motion. You would have learnt also that when an electric charge is in motion it sets up a circular magnetic field in a plane at right angles to its motion and centred on the axis of that motion. So, if two charges travel together at the same velocity, side-by-side, they will, by symmetry, set up a balanced action and reaction. However, what if these two charges are moving together but one is somewhat ahead of the other? Then those forces acting on the charges cannot be directed along the line drawn between them. They will be directed in opposite directions and have the same magnitude, but as they are not acting in a common line drawn between the charges they must cooperate to produce an out-of-balance couple.

So, armed with what you have been taught about the forces between electric charges in motion, you now come to learn about Newton's laws. The teacher says that action and reaction are equal and opposite between each particle of a pair in the conglomerate body and is about to go on from there to justify the principle of conservation of momentum for the body as a whole. You put your hand up and ask the obvious question. "What if the particles forming that body are electric particles? Will not that affect the assumption we are making about action and reaction being equal and opposite?"

Now, here, your teacher has a problem. If he or she is well read then what will come to mind is the rather complicated law of electrodynamics that was formulated by Ampere expressly to ensure that action and reaction are equal as between two electric charges in motion. However, the teacher knows that that force law is never used in practice. The Lorentz force law, which is supported by Einstein's theory, is the one we use, but what the teacher will most probably not know is that Lorentz's law has been disproved experimentally [122].

The question really at issue is whether that body could, owing to its internal electrodynamic interactions ever begin to rotate of its own accord or perhaps propel itself in a linear direction, without there being any applied external force. Your teacher will then, no doubt, insist that you must learn Newton's laws, which forbid that possibility. You, on the other hand, will still be asking yourself how Newton could command authority on the issue, even though he could not have taken account of the electrodynamic issue. Meanwhile, your teacher might later ponder the question of why Ampere bothered to formulate his law of electrodynamics if Newtonian law gave a sufficient explanation. I say, he or she might have such thoughts, but I know that, almost certainly, the thought will be that 'experience' shows that we can get by without worrying about such problems. Yet, I also know that we can, if we so choose, live through another century without understanding gravitation and its unifying link with electromagnetism.

Teachers are supposed to know the answers to such questions but this is a subject they never mastered. In later life, after leaving school, one sees, if one bothers to look, that this same problem has remained an active issue without ever being resolved. It remains unresolved, but teachers, even those who lecture on physics at university, do not go out of their way to draw this scientific inconsistency to the attention of their students. Indeed, one sometimes sees evidence of an even

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Aether Science Papers (pp. 14-17)
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worse scenario, where the problem is recognized but the teacher assumes that it has all be solved by Einstein's theory, notwithstanding the fact that Einstein struggled to his dying day to forge that unifying link that could bring electrodynamics and gravitation together.

Newton was concerned about the force of gravity and, to this day, scientists of the highest calibre still strive to find that connection between gravitation and electrodynamics. They occasionally hear of claims by individual 'crackpot' researchers who assert that they can build electrical or magnetic machines which deliver more power output that input. This is contrary to Newton's laws, because action and reaction are always said to be equal and opposite. Yet the Lorentz force law which was 'confirmed' by Einstein's theory is a law which, as applied between two electrical particles in motion, does not itself conform with that law of action and reaction. It is here that we see the farce that underlies all attempts to merge Einstein's gravitational theory and electromagnetism into a common unified field system. Indeed, there is something wrong deep down in the foundations of the problem. The true law of electrodynamics, one which does conform with gravitational theory, is the subject of reference [1], but see also the sixth of the appended papers.

Scientists declare that when the forces predicted by the Lorentz force law are integrated for a complete system then the overall result is a balanced action and reaction. However, they are not then dealing with basic principles as applied to discrete interactions between elements of matter but are asserting overriding constraints of their own choosing and this amounts to insisting that Newtonian philosophy has the last word.

One could say "So be it" if the hoped-for unification of the gravitational field and the electrodynamic field was already an established fact, but it is not. Also one cannot escape being left with that dominating problem of wondering about the attractive forces involved in the formation of the stars and how energy ever converged into matter to create it in the first place and set things in motion.

If there were a force out-of-balance, a possible breach of the principle of conservation of linear momentum that could occur under certain very special and exceptional circumstances, then one could see a way forward and make some sense out of the current nonsense which is limiting our field of enquiry. Once the aether yields energy so it must assert force on matter. Newton would say that that is an `externally applied' force, but yet it could be a force developed within matter, inasmuch as aether fills all space, even the space between the electrons in atoms.

So here is another rather subtle point that gets glossed over in the teaching of physics. In this situation, the teachers close ranks and refuse to refer to the aether. It does not exist, because Einstein's theory does not require it! It does not exist because it was thought to regulate the finite speed of light but experiment shows that the speed of light in vacuo is referenced on something sharing the Earth's translational motion through space, though not the Earth's rotation. So, assuming that the aether moves through the Earth, there can be no aether!

Well, that is hardly logical. Indeed, it is as illogical as an argument which says that we think there are green men on Earth, but we can find no green men, so there are no men on our green Earth!

There is, indeed, an aether, if only defined as that which feeds energy to sustain the creation of matter, and one can be sure that much of what now remains unexplained in physics has its explanation rooted in that mysterious aether which physicists have turned away from. To say

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Aether Science Papers (pp. 14-17)
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otherwise and declare that the aether does not exist is like knowing that all the answers are in a textbook but refusing to open the book because to read such a book goes against one's principles.

The aether is an energetic medium which reacts to actions set up by the flow of electric current in wires. It is like a bank that accepts money on deposit. It accepts and disperses the energy we label as that stored by magnetic induction. It disperses that energy just as a bank uses money on deposit by dispersing it to borrowers, but it has reserves of energy just as the bank has reserves of money, and the aether allows us to withdraw on demand the energy we have put on deposit. Take away the aether and you take away the whole basis of magnetic induction in electrical technology. It is like taking away the banking system and letting money float around freely in the community. Scientists have adopted a way of interpreting electrical phenomena by supposing that electric particles in matter, migrant photons and the mysterious neutrinos are all that one needs to consider. In that philosophy, however, there is no creative source yielding new charges and nowhere to give energy a resting place when the particles are eventually annihilated.

Now, it may seem to the reader that, in challenging the foundations of Newtonian mechanics by bringing in my concerns about electrodynamic interactions, I am mischievously trying to shake the very foundations of physics. I am not, but I am intent on moving forward and solving the unification problem and to do this I must insist on the adoption of the correct formulation of the law of electrodynamics.

To advance to that I will presently, in the pages ahead, make a quantum leap, a leap that takes me back to the physics of my last school year, some 51 years ago, when I heard about the Bohr model of the atom. The reader will see from such reminder of one's schooling and pre-university education that I am deliberately stressing how easy it is to see where science has gone off track. We need to be very sure of the basics of our subject and look very closely at the groundwork on which we later build.

There is now ample evidence which confirms my own long standing conviction that if the mass ratio as between two interacting electric charges in motion is not unity, as it has been for all the chosen experiments giving us the basic empirical foundations of the subject, then the law of action and reaction can be breached [49].

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 18-25

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INTRODUCING THE CREATIVE VACUUM

As the reader will now understand, this monograph provides a documentary record pertaining to Unified Field Theory. It summarizes research by the author spanning 40 years from the mid 1950s when the theory was first conceived.

It has been ignored by the scientific community because it is seen as a contradiction of the Einstein four-space doctrine. Einstein died in 1955, having failed in his lifelong quest to discover how to unify gravitation and electromagnetism. Yet, Einstein's followers have not, in the 41 years thereafter, been able to succeed where Einstein failed and so the scientific community sits and waits, hoping that the Unified Field Theory will one day be discovered.

It is the common belief of theoretical physicists that there has to be a way of understanding the force of gravitation in terms of electromagnetic action. The challenge is to discover the unifying link by which the electromagnetic field theory and gravitational field theory merge to have a causal physical connection that we can understand. This author, now 68 years of age, is acutely conscious of the fact that those scientists who do see it as their exclusive right to search for the Unified Field Theory will never abandon beliefs rooted in Einstein's theory.

This monograph, therefore, is this author's final effort to present his theory as a formal collection of the key published papers, all of which have passed the test of referee scrutiny, but yet they are unlikely to be found in the standard periodical stock of a typical university library. The papers all fail the test of conformity with the Einstein model of four-space, but all offer a meritorious solution to problems which are far outside the scope of Einstein's theory. The author's papers that are of record in the mainstream periodicals are also listed for reference, but this collection of fourteen prior published papers suffices as a concise summary record which will allow physicists, who are so minded, to understand and appreciate what is here presented, most assuredly the ultimate theory of the unified field.

It was in 1980 that the author did succeed in breaking through the referee barrier of the Institute of Physics in U.K. by styling a paper on the subject putting all the emphasis on its rigorous mathematical foundation. The Einstein gravitational field equation of his General Theory of Relativity was derived without using any of Einstein's arguments and solely from the consideration of how energy deploys in the field separating two interacting bodies.

Analogous papers on the spatial deployment of energy in the electromagnetic interaction and the Coulomb electrostatic interaction were also published elsewhere in the mainstream literature and at about the same time. An adequate discussion of and reference to these three contributions appears in

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Aether Science Papers (pp. 18-25)
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the last of the fourteen papers appended in Part 2.

That paper, entitled 'Retardation in the Coulomb Potential', though published in 1995, is really only a summary review paper of earlier work, but it offers the reader a cogent introduction and it is recommended that it should be read first. The author is gratified by the fact that the first reprint copy of the paper read by an academic colleague, whose contribution to electromagnetism earned him an Sc.D. degree from Cambridge, was acknowledged with a note saying that it was "brilliant".

This has encouraged the author to make this final bid to interest the scientific community in what is a very comprehensive unification of field theory. It is a theory which should not be ignored because, though, to be sure, critics will inevitably feel uncomfortable about accepting much that is proposed, that discomfort will stem primarily from the irritation of having to revise what they have come to believe. The merit of the theory offered lies in the powerful cohesion of its foundations and the ultimate test that it affords precise quantitative values for the fundamental dimensionless constants of physics.

Science cannot stay forever in a stalemate condition, where Einstein's General Theory of Relativity stands apart from quantum theory and wave mechanics, never to be united but always living in hope. Unified field theory should not be seen as the quest to link these two disciplines, but rather as the quest to discover the causal physical connection between magnetism as rooted in quantum activity and gravitation as also rooted in the same activity!

The title 'The Creative Vacuum' for this introductory text has been chosen because it aptly describes the function of the vacuum medium. It is an orderly composition of electrical charge, neutral overall, but active as a sea of energy. It constantly strives to create matter in the form of protons and electrons, but is subject to equilibrium and the latter is only upset when matter already created decays to lose its mass and so its energy. That energy is then subjected to regenerative effects, owing to the jitter motion which prevails throughout that vacuum medium.

The theory is founded on the understanding of magnetic induction and how the vacuum medium stores and returns the energy associated with the magnetic field. This is rooted in quantum mechanics, the mechanics of the vacuum itself. The aether has a jitter, a so-called Zitterbewegung. The need for its dynamic jitter to be balanced leads to the gravitational feature. The theory offers a full qualitative account backed by quantitative evidence, because, as already indicated, it gives precise values for the relevant dimensionless constants which incorporate the constant of gravitation, Planck's constant and the proton-electron mass ratio.

If you, the reader, wonder why a theory having such scope and importance is not already well known and copiously referenced in the standard scientific literature, then in that you begin to share this author's own thoughts. There is something wrong with a system that encourages scientific endeavour and encapsulates it in numerous scientific papers which are then well and truly buried, not always on the shelves of university library archives. I will here indulge in a little digression on this subject, but I shall eventually come back to the main theme.

The problem just mentioned is, of course, the escalation of the university system with the need for academic staff, also escalating in numbers, to add the weight of their own contributions to the growing piles of information, with the result that, as with the proverbial 'black hole', the system has

collapsed and now offers very little enlightenment. There is so much incentive academically urging academics to contribute papers to conferences and to periodicals that there is little of real merit being added. For example, if Einstein's theory really did explain gravitation, why are so many thousands of papers still being written, all trying to develop the theory of gravitation? Much the same applies to magnetism, where the concept of 'spin' has some special meaning, but one wonders precisely what it can be. It seems to me that the fundamentals of a subject are not understood but yet scientists persist in probing the periphery of their subject whilst repelling intruders who offer something of fundamental significance.

Not long ago, I had wanted to look up one of my own papers in the bound periodical collection of my local university. I found that the librarians had cleared the shelves of journals published before 1970. Upon enquiry I was informed that I was not the only person to ask what had happened to the earlier works of reference. The librarian was surprised, especially as he had just had the same enquiry about the chemical journals from another staff member. He explained that in science and technology anything dated before 1970 was deemed to be outmoded and of little interest. To him, it seemed that the pace of development was such that only the work of the past twenty or so years was worth remembering. I would need to go to another repository where the old archives had been buried if I wished to trace what I had contributed to science before 1970.

Now, it might not be appreciated by everyone, but when, as a scientist, you contribute to knowledge by securing publication of a peer-reviewed paper, and you are told that your work has been 'buried' along with other papers of the same vintage, it is as if you have become a ghost and are searching for your own grave in a cemetry.

There is so much being published in science that we have reached a state of chaos, which puts us in a situation where we need to fight to be heard, and there are those amongst us who see no point in engaging in that struggle.

I will now, for a moment, stand back from that ongoing contest to mention that 1996, the year in which I am now writing, is the fourth centenary of the birth of the person who introduced the aether into science, by postulating that it had mechanical properties. Since we are concerned with the 'creative vacuum' or the `aether' it is appropriate to remember Rene Descartes. Descartes assumed that the aether comprises particles that are continually in motion, but as there is no empty space, he inferred that those particles are continually moving into places vacated by other aether particles which are themselves in motion. Overall, the motion was that of vortices as the particles were all part of a great machine, but one which we can now examine at a microscopic quantum level and see as a kind of universal clock mechanism.

Sadly, however, towards the end of the 19th century, the mechanistic aether seems to have lost favour, because the aether came to be viewed, not as a clock which kept everything in the universe together in a rhythmic dance, but rather only as a 'sea' rippled by light waves. The luminiferous aether concept became the dominant consideration. The aether was not deemed to be the bonding agency which wedded all matter in the universe together in an energy machine. Electromagnetic waves and their finite speed were seen as the signature that proved the aether existed and, once that signature became blurred, there were those who broke away from the aether faith.

It was in the early part of the 20th century that a French astronomer, Alexandre Veronnet [123], made

a bid to arouse interest in an 'etheron' particle picture of the aether, bringing the Bohr magneton into that 'clock mechanism', but wave mechanics had a different style of presentation and the aether began to sink into its own sea of oblivion.

Einstein was the champion who led the aether dissenters. As philosopher Bertrand Russell explained:

"Empty space, to Descartes, is as absurd as happiness without a sentient being who is happy. Leibnitz, on somewhat different grounds, also believed in the plenum, but he maintained that space is merely a system of relations. On this subject there was a famous controversy between him and Newton. The controversy remained undecided until the time of Einstein, whose theory gave the victory to Leibnitz." (Quoted from:) *History of Western Philosophy*, 1961 Edition, Published by Allen & Unwin, page 87.

Well, I now submit here that the controversy is far from over. Space is not merely a system of 'relations'. It is a real mechanism, albeit one that is, as is all matter, rooted in the electrical form of the constituent aether particles.

The way forward from the Einstein diversion requires that we heed what another British philosopher had to say about Einstein's theory.

"The effects of rotation are among the most widespread phenomena of the apparent world, exemplified in the most gigantic nebulae and in the minutest molecules. The most obvious fact about rotational effects is their apparent disconnection from outlying phenomena. Rotation is the stronghold of those who believe that in some sense there is an absolute space to provide a framework of dynamical axes. Newton cited it in support of this doctrine. The Einstein theory in explaining gravitation has made rotation an entire mystery."

(Quoted from:)p.356 of *The Principle of Relativity* in the book *Alfred North Whitehead: An Anthology*, published by Cambridge University Press, 1953.

So I assert that we must look to 'rotation' to see how we can revive belief in the aether, and I note that vortices and rotation are complementary aspects of the universal mechanism that is tuned to the spirit of Descartes.

Can the aether spin?

If those 'vortices' or those aether particles describing minute circular orbital motion, as part of that universal clock we call the aether, can store energy, as by expanding their orbits so as to move faster, then we have territory to explore.

If, further, those aether particles can, by analogy with matter, group together to form structure, but by keeping their mutual spacing, then we have the makings of a dimensionless physical constant connected with both energy quanta and that aether. That gives us a larger aether form that we can explore in terms of spin, a form which might set up pulsating ripples as surrounding aether is disturbed by that structural rotation. This suggests a route to the photon, linked to the theoretical

derivation of the fine-structure constant, the latter comprising Planck's constant, the fundamental unitary electric charge and the speed of light.

On a larger scale, maybe large spherically formed expanses of aether can be set in rotation, as with body Earth or the Sun, all leading to interesting properties revealing the role of the aether.

On an intermediate scale, there are other possible spin forms of aether. Remember that we can move through the aether, as if it does not exist, and so aether in spin can move through a solid wall to transport its action from one side of that wall to the other. Yes, there is evidence of that to be seen in the thunderball phenomenon, which becomes a candidate for research enquiry into the aether. There are the mysteries connected with atmospheric electrical phenomena and invariably there is something spinning, as in the funnel of a tornado. Indeed, observers have seen the tornado travel one way when the prevailing wind direction was in the opposite direction! Rotation, therefore, offers the logical entry point for a fascinating study of the aether.

My main aim here is to interest the reader in my theory as a whole, but that can only be by individual study of my many published papers and other writings on the subject. The appended papers and bibliographic listing are, therefore, the main contribution I make in presenting this work, but I need to encourage you, the reader, to make that effort. So I will digress a little more.

In 1977 I was invited to explain my aether theory to the students and staff of the Physics Department at Cardiff University in Wales. One simple diagram I presented at that Cardiff meeting and which appeared in the lecture paper [113] of that occasion is reproduced by the following dimensional expressions:

charge density σ : $M^{1/2}L^{-3/2}T^{-1}k^{1/2}$ angular velocity ω : T^{-1} mass density ρ : ML^{-3} $(\sigma^{2}/\omega^{2}\rho)$: k

My argument was that the aether contains electric charge, as needed to sustain displacement according to Maxwell's theory. Charge has the dimensions of mass M, length L, and time T, taken together with the electrical dimension of the dielectric constant k. The question at issue was that of understanding how, if the aether could develop spherical pockets that could rotate inside enveloping aether, its angular rotation or spin would relate to electric charge. If I assumed that a uniform charge density would be induced in proportion to the angular velocity of vacuum spin I found that the aether would need to exhibit a uniform mass density to keep the dimensions in balance. In fact, I developed the relationship between vacuum spin, the radial electric field and the angular momentum of aether spin, together with their energy connection.

I was aiming at the objective of showing that the energy added owing to that rotation would be both the electric field energy stored by charge displacement and an equal amount of kinetic energy.

The easiest way in which to explain this vacuum spin' induction is to imagine that all space exhibits a quantum activity as if everywhere there is electric charge keeping in universal phase in minute orbital loop motion at the same frequency. Here we need to picture large spheres of aether as capable of spin at an angular frequency b and see every charge in that aether as a quantum unit having a microcosmic orbital spin motion at a very high frequency compared with b. This high frequency is the Compton

Aether Science Papers (pp. 18-25)

electron frequency ($\Omega/2\pi$) and it corresponds to the photon energy needed to create an electron. Quantum mechanics involves linear harmonic oscillations and that tells us that the controlling medium has a linear restoring force rate when displaced. An electric charge e in the aether, as needed in Maxwell's displacement theory, complies with a force rate of $4\pi Ne^2$, where there are N charges e in unit volume of space, all neutralized overall by a universally-constant density of background charge of opposite polarity. Here I use the c.g.s system of units, in which an electric field of strength E stores energy density $E^2/8\pi$ in vacuum of unit dielectric constant, owing to Ee being equal to $4\pi Ne^2x$, where x is displacement distance. Energy density is N times ($4\pi Ne^2x$)(x/2), which is $E^2/8\pi$.

This restoring force rate determines the jitter frequency of the vacuum state by the equation:

$$8\pi N^2 e^2 = \rho(\Omega)^2$$

where ρ is the effective mass density of the e charges, which is proportional to N. In the equation 8π has replaced 4π because, to assure dynamic balance, the orbital radius of the motion is half of the displacement, which spans the orbit diameter.

Now consider the superimposed effect in a sphere of aether which spins at the angular frequency ω . If the spin is in the same sense (parallel axes of spin) as the quantized orbital motion, then to keep the phase-lock as between enveloping aether and aether in spin, the above equation becomes:

$$8\pi(N-\delta N)e^2 = (\rho/N)(\Omega-\omega)^2$$

where ρ/N is constant.

From these two equations we can deduce the relationship: $\delta N/N = 2\omega/\Omega$ approximately

This means that δN charges e per unit volume of that aether sphere are displaced from it owing to spin ω . Conversely, if we can feed electrostatic energy into that sphere to displace that amount of charge, the phase-lock asserted by the external aether will promote the spin at &oemga;. Or, if we can get the aether sphere to spin by other means, the phase-lock asserted by the external aether will promote charge induction. Once the external aether has to assert itself to hold that phase-lock as between different regions of aether, it does work and that is our 'free energy' input!

Suppose we can contain some positive ions into a small sphere. The aether will see this as producing a radial electric field from the centre of that sphere and it will develop a charge displacement to neutralize that core charge and effectively transfer the charge effect to the surface of the sphere. Now, this means that N has been changed in that sphere and so the natural frequency of quantum jitter will change. The aether charges lying outside that sphere will, however, not allow this loss of synchronism and very powerful electrostatic forces are asserted to ensure that the synchronism holds. The vast amount of energy sustaining the quantum jitter at the Compton electron frequency in the aether of enveloping space will be pooled with the rotating aether sphere to keep that state of synchronism. The relative frequency is what is held constant. Thus, if N increases in the sphere to cause the local value of Ω to increase, then the offset of ω , will assure that synchronous condition. In other words, rotation at ω follows as a consequence of the phase-lock constraint. This imports energy from the aether.

Owing to the linear harmonic motion properties of the quantum world, there is equipartition of energy in the sense that for every unit of electric field energy stored there is an equal unit of kinetic

energy stored. Therefore, by adding one joule of energy in one pulsation of the 'vacuum spin' state we receive 'gratis' one further unit of energy drawing on the universal energy priming of the aether activity at that jitter angular frequency Ω .

It has therefore become an interesting task, technologically, to reiterate this action at a rapid pulse rate, given that we can, in fact, set up that priming radial electric field or the spin in an effective way. This is what now takes this aether subject from the realm of oblivion and, without stopping in the arena of philosophical debate, progressing directly into the field of technology, where the aether can be seen to serve us as an energy source.

As long ago as 1960 I published my first account of this 'vacuum spin' induction theory [107] and evaluated the spin charge density in relation to spin angular frequency ω . The formula gave the charge density as 4.781 esu/cc per rad/s of spin (page 32 of that reference). In terms of coulombs, one micro-coulomb per cc would correspond to aether spin at 6,000 rpm. I note that ten micro-coulombs per cc. squeezed into a sphere of 10 cm. diameter corresponds to an energy density of the order of 10^9 J/m³.

In my 1977 lecture paper [113] I explained how the Sun was created by gravitational attraction between protons setting up a positive core charge which produced a radial electric field. That charge

had the density of IG times the 1.4 gm per cc mass density of the Sun. Put G as 6.67×10^{-8} in c.g.s units and one obtains 3.6×10^{-4} esu/cc, which develops a vacuum spin of 7.5×10^{-5} rad/s or one revolution every 23 hours. If the whole angular momentum of the solar system as it is today were to be put back into the Sun, then, as that paper [113] shows, the Sun would spin at 8.3×10^{-5} rad/s or one revolution every 21 hours. My 1980 book *Physics Unified* [112] put on record a more formal account.

This is close enough to explain how the solar system got its angular momentum from the phaselocked aether and support the proposition that energy can be shed by this 'vacuum spin' activity of the aether and transferred to matter. Our experiments can tap the aether energy in the same way, simply by setting up a radial electric field inside a conductive medium that can sustain the build up of the charge displacement.

In 1983 I presented the theory of 'vacuum spin' at a conference held by the U.K. Institute of Physics at Oxford University. See pages 179-184 of reference [29]. I explained how the known facts about the energy density of thunderballs pointed to an aether in which there could be energy storage by spin.

I referred to Altschuler et al. of the High Altitude Lab. in Boulder, Colorado (1970) and their suggestion in Nature [114] that thunderballs might be nuclear powered because they all had an energy density in the range 2 to $5x10^9$ J/m³. This is the same energy density as mentioned above!

My 1983 paper went further because I knew that if the Earth shared its spin with the aether then that would involve two systems each neutralizing one another in electric charge terms but in a way which would still produce a magnetic field. The Earth's magnetic field is seated in the charge displaced in, and rotating with, the Earth, but the vacuum charge involved in that aether spin cannot develop a magnetic field because it is the reference against which magnetic action is measured.

From knowledge of the strength of the Earth's magnetism I could calculate the Earth's vacuum spin

Aether Science Papers (pp. 18-25)

charge and it was found to have a value which would constrain vacuum spin, whether in thunderballs, tornadoes or in certain homopolar motor experiments, to have an energy density estimated as being 2.37×10^9 J/m³. See page 183 of reference [29].

To understand how it is that we can survive on Earth inside a sea of electricity packed by energy that can intrude upon us, just consider two microbes, one in the space between two parallel plates of a highly charged capacitor and the other sitting inside a sphere in which there is radial displacement of vacuum charge. The first microbe will die from electrification once the voltage between those capacitor plates is high enough. Its constituent positive and negative charges will be pulled in opposite directions and torn from its body. Whether the second microbe survives will depend upon which comes first, the vacuum spin with its radial displacement or the microbe. The electrification involves tearing electric charge from the constituent atoms in any matter within that sphere as charge of one polarity goes to the surface, the ionosphere in the case of body Earth, whereas the positive ions left behind simply move to positions intermediate the centre and the boundary surface of the sphere to cancel the electric field and allow the entering microbe to survive unharmed. We humans actually live in a powerful electrified environment which allows the Earth, by rotating, to set up a magnetic field that arises from an electric charge we cannot sense. Vacuum spin precession is why the magnetic N pole orbits the Earth's N pole.

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 26-32

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AETHER POWER GENERATION

If we can get energy from vacuous space, energy in excess of that we can store by setting up electric or magnetic fields, then that proves there is something in space that stands apart from matter. That 'something' is the aether.

Anyone who has seen the television showing of the power of the tornado and the whirling funnel that provides a channel for a succession of lightning discharges must suspect that something abnormal is feeding energy into that funnel. Rotational wind speeds of 420km/hr are recorded in the cylindrical funnels which are said to be up to 180m in diameter. Of course, we do know that whirlwinds form by natural movement of air in the atmospheric activity, but something special happens when lightning occurs as it seems to add speed to the rotary motion and confine it into a narrow funnel, whereas increased rotational speed with diminished radius of motion should promote flow radially outwards by centrifugal action.

Now, I pose a simple question. What can it be that determines the radius of that tornado funnel? Indeed, what can it be that determines the radius of the thunderball? Ignoring the problem of where the energy comes from and how there is a containment and a quasi-stable state, what is it that determines the radius of the cylindrical form we see in the tornado or the spherical form we see in the thunderball? I gave the answer in that 1983 lecture of mine at the Oxford conference mentioned above [29]. The limit is set by a 'virtual' electric field strength needing to be no greater than that prevailing at the Earth's surface owing to the Earth's rotation. By 'virtual' I mean the effective fields induced by aether spin. In the thunderball there are two aether spins, a spin of an aether sphere within the spin of a much larger aether sphere. These fields are cancelled by charge displacement in matter and we cannot sense them as fields unless the speed of rotation changes. Then we get ionization. Just as ionization was involved in setting up the spin state, so ionization occurs as the spin state decays. However, there is an energy gain in this cycle of events, as already indicated.

When I gave my 1983 lecture I did not know that the tornado wind speed at the perimeter of the funnel was of the order of 420km/hr. I could have predicted a figure of the order of 500km/hr, for the simple reason that the wind speed at the funnel perimeter would be about half that of aether spin just inside the funnel, whereas the radial electric field at the surface of a cylinder of uniform electric charge density is 1.5 times that at the surface of a sphere of the same radius having the same uniform charge density. Given that the induced 'virtual' charge density is proportional to angular speed, the 'virtual' electric field intensity is the same for the aether cylinder and the aether sphere only if the actual speed at the cylinder surface is two-thirds that at the surface of the sphere. For the spherical Earth that speed is about three times 500km/hr and so is it really surprising that the tornado wind can

Aether Science Papers (pp. 26-32)

reach a value of 420 km/hr?

All speculation, you might say! However, as I indicated in the 'Announcement' at the beginning of this work, we can build on that speculation to extract energy from the aether for our future source of power.

I know of several ways in which this 'free energy' scenario can be demonstrated. Indeed, it is the subject of my primary research interest at this time. However, I will take up the theme that follows from my 1983 paper [29]. It refers in its penultimate paragraph to Nobel Laureate Kapitza's efforts to produce thunderballs for application in triggering fusion reactions [120]. Then, in the last sentence, I declared in my paper that:

"It remains to devise and conduct experiments aimed at inducing this (vacuum) spin condition by using radial electric fields, so as to verify and perhaps apply the phenomenon to useful ends."

That was my outlook in 1983. I can now quote the research achievement of Dr. Kiril Chukanov. He reports [115]:

"I first produced experimental proof that artificially created ball lightning could produce energy for practical needs in 1987 in Bulgaria."

After describing his experimental set-up, which involved an ionized gas discharge in a quartz tube, he wrote:

"I experienced great difficulty in evaluating the amount of power produced by the quantum plasma macro-object, but my rough estimation was three to four times more power output than that being supplied by the (input of the high frequency signal-generating) lamp."

By 1990 he had taken his research project into Sunnivale, California and his onward reporting on his production of excess energy showed that he had measured heat generated in a water jacket enclosing the evacuated glow discharge chamber used in his tests. In his 1994 book *Final Quantum Revelation* he reports a 900 watt rate of excess energy generation using electrodes of some 3 cm separation. A vacuum developing aether spin in a filamentary discharge region having a volume of, say, 0.3 cc, drawing on 'excess' energy of density 109 J/m³, would take about 3 seconds to regenerate each action cycle to give the 900 watt excess output.

Chukanov mentions a 3 second duration of the burst discharge before the discharge, in writhing like a snake, spread to the sides and touched the walls of the containing tube and caused overheating.

Professor Chernetskii and his team of researchers in Russia have also produced excess energy at power levels in a self-sustaining plasma discharge device, claiming 4 to 5 times electrical power

output compared with power input. This was reported in 1989 in a Novosti Press Agency Press Release [123].

Dr. Wingate Lambertson at a conference in 1994 in Denver, Colorado reported similar levels of power gain from a circuit including a discharge tube and a device formed as a specially-fabricated thyristor [121].

Recently reported Canadian research in 1995 by Dr. Paulo Correa and Alexandra Correa [116, 117, 118] has established a sustained excess power generation of 500 J per pulse in a cold-cathode discharge confined to an abnormal glow region, with a prospective 40 megawatt-hour electrode lifetime. The Correa technology delivers electrical d.c. output steadily at several hundred volts and a power gain that is also of the order of 5:1 over d.c. input at similar voltage level. The Correa technology will undoubtedly lead us forward on the quest to exploit energy sourced in the aether, especially as it is already well-patented in the USA. In the Correa apparatus successive pulses developed the 500 J in an abnormal glow discharge which is trapped between electrodes, close to the cathode, and probably confined to a volume of a fraction of 1 cc, which also corresponds to 109 J/m³ of energy density.

Several other reports of excess energy production are now of record in the scientific and patent literature and one needs, therefore, to be prepared for the aether to reappear into our scientific philosophy, as being the only source that can supply that excess energy.

Indeed it is appropriate to refer here to the excellent book *The Secret of the Creative Vacuum* by John Davidson [119]. This book had the sub-title 'Man and the Energy Dance' and, as readers might guess, it was this that inspired my choice of *The Creative Vacuum* as the title heading for Part 1 of this work. I refer readers to the chapter in Davidson's book which discusses 'Free Energy and the Real Space Age' and the correspondence between Thomas Townsend Brown and Rolf Schaffranke concerning apparatus involving a dome-shaped aluminium canopy which was part of an electrode structure (see pp. 194-195 in Davidson's book). Upon setting up a radial electric field inside that canopy it was found that the apparatus could lift itself into the air together with an attached load. Furthermore the apparatus was later shown to perform this lifting operation when tested within a high vacuum.

Evidently, the reason for this breach of accepted scientific doctrine was not understood by the experimenters involved in those tests, but I see this as a manifestation of the vacuum spin action mentioned above. It taps energy from space to build a kind of aether whirlwind inside the canopy and the electric pressure set up inside that canopy by the energy in spin pushes obliquely against the underside of the canopy to drive it upwards. It becomes a material object powered against the gravity field by a thrust developed against the aether in spin and most of the energy in that spin is drawn from the free energy environment of enveloping space.

How can it be that the scientific community of the world can stand aloof and pay no attention to such experimental anomalies which are only rarely discovered but which have such enormous implications for the future of mankind? How can it be that books such as that written by John Davidson have no direct impact on that scientific community by causing a redirection of research funding to probe the reported anomalies in a serious way?

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Aether Science Papers (pp. 26-32)
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When the consequences of these developments and onward research on this new energy theme become generally known and accepted, the aether will eventually reclaim its rightful place in physical science and then acquire a stature which will dwarf its early role in history. Meanwhile, we need to be a little patient and watch events as the interest grows and conferences on the subject, as well as new journals devoted to these matters, escalate in numbers.

In the light of these findings, I am bound to submit that science has lost its methodology. Technology has needed science to point the way forward towards new sources of energy that are non-polluting, but science has faltered. Sensible methodology would have been tolerant of retention of the aether as the foundation on which to build the material world. Even though it is academically interesting to see how far we can go without using a word meaning the 'aether', it was not at all wise for science to reject the concept totally and without reservation. Now, in the present circumstances, too many of the scientists who build their hopes on physical theory are committed to the denial that there is a universal timing mechanism governing everything. They deny the possibility that energy can be delivered to us by an aether, which, if recognized at all, is deemed wholly passive in its role. As a result, instead of leading our thought processes and guiding us forward into a new technological era, building on knowledge of the aether, the scientific philosophers of today have crippled the mental agility of younger generations and made progress so much more difficult.

For my part, in writing this text, my main objective is to draw attention to the papers I have written in connection with aether theory. I say there is an aether and I use it throughout my research to explain much in physics that has otherwise remained unexplained. I have been obstructed in my efforts by the prejudice of orthodox belief and have had many more papers rejected than have been accepted, especially in my earlier years of endeavour, from 1955 to 1975.

The future ahead now rests, not with reason and philosophy, but with the forces of new technology, because pursuit of reason and logic is claimed as the exclusive province of those who insist on inventing descriptive language alien to Nature's own method of revelation. In physical science we are now destined to witness a slow reformation as technology leads the field and those amongst us who are wise enough to seek recovery of lost ground will hopefully do so by paying more respect to those who have pioneered a belief and not a disbelief in the aether. We need to pay homage to the memory of Ren, Descartes and, again quoting the words of philosopher Alfred North Whitehead, words he used by reference to Albert Einstein:

"The worst homage we can pay to genius is to accept uncritically formulations of truths which we owe to it."

In my book *Modern Aether Science* [110] published in 1972, I have developed my theory on the basis of Descartes' work, but as further advanced by that early-20th-century French astronomer, Alexandre Veronnet [123]. He quantized the aether particle motion in units of the Bohr magneton and partly anticipated what I was later to discover from my research as an analogy between aether and the ferromagnetic state. I go much further, however, even including the domain aspect of ferromagnetism. I came to picture each individual star nucleating within its own space domain as gravity appeared, akin to ferromagnetism appearing when a crystal inside iron cools through the Curie temperature. I came to picture each such star moving, in a sense driven by forces somewhat similar to those just suggested in connection with the anti-gravity aluminium canopy experiments, so

Aether Science Papers (pp. 26-32)

as to transit into other space domains at intervals of 100,000 years or so. Imagine Earth, carried along by the solar system, at the known cosmic speed of the order of some 400 km/s, moving through a domain boundary region. For about one minute the Earth would sit astride the boundary. If there is a polarity reversal of electric charge as between the two adjacent space domains, where antiprotons replace protons and positrons replace electrons, is it any wonder then that the Earth's magnetic field reverses in such events? Is it any wonder that gravity forces might become antigravity forces as between matter astride those two domains, for that brief period, to cause earthquakes on an unimaginable scale, sufficient to destroy whole species of life? May it not be, if we wish to worry about our future destruction, that we have a choice for our thoughts as between (a) our own self destruction by nuclear weapons and the like or (b) the random event of a comet or asteroid crashing into Earth or (c) the inevitable and possibly predictable event when our Earth next crosses a space domain boundary?

Might it not be that the day will come when some potential survivors will need to climb into space vehicles propelled by future antigravity technology? They will board as we approach that space domain boundary so as to go through it ahead of the Earth but make the transit in a fraction of a millisecond, eventually returning to Earth only after the dust has settled. Believe it or not, our physics, when revised to take account of what is disclosed in the *Aether Science Papers* of this work, allows us to estimate the timing of the next space domain boundary transit, once we can be sure about the timing of the last one. Indeed, I have detailed the evidence for this quite extensively in chapter 16 of my 1972 book *Modern Aether Science* and in chapter 8 of my 1980 book *Physics Unified* and can hardly say more. All I can say is that the predictive power of my theory, as evidenced by the papers appended, seems now to be so far beyond dispute that the implied space domain structure cannot be cast aside as mere hypothesis. The planar boundaries are absolutely essential to assure the restoring force rate as universally applicable to displaced aether charge [34]. Those boundaries must exist and the pattern of geomagnetic reversal and catastrophic events over a range of cosmic time, when taken together with the speed measurements connected with anisotropy of cosmic background radiation, provide the data allowing us to chart our passage through the space domain boundaries.

I will here remind the reader of my early comments concerning the 'Big Bang'. There are two papers in the appended bibliography which warrant special attention by the 'Big Bang' enthusiast. There was, of course, no 'Big Bang'. To escape from that dilemma one needs first to understand how the aether attenuates electromagnetic waves without suffering dispersion. The secret here is the same as that which explains gravity. It is 'dynamic balance'. The aether has a dual displacement feature, whereas Maxwell allowed unbalanced lateral displacements which meant that waves travelled without exhibiting lateral inertia. The formal analysis of this is in reference [26]. To complete the story one needs to explain the Hubble constant without appealing to the expanding universe hypothesis and I did that in my paper reference [42]. See also the special note on page 10 which refers to that paper. Unquestionably, we inhabit a universe that is 'steady-state' apart from its bubbling equilibrium. It is as if we were minute observers sitting inside a solid piece of iron, experiencing the thermal agitation whilst being firmly rooted inside that iron, but subject to drifting as we share the Earth's motion, just as if we were part of magnetic domain migrating through a crystal. Eventually, though we may suffer the `heat death' or something similar if gravity is switched off, and lose the attractive power of magnetism as that iron goes through its Curie temperature, the iron (as well as the aether) will still be obedient to a physical system that does not need the notion of an `expanding universe' or 'dilating time'.
As I revise this section of text, I happen to have just read an article at page 20 of the April 1996 issue of 'Physics World'. It tells us that researchers are seeing more and more evidence of 'proton radioactivity'. Atomic nuclei are shedding protons! The first such discovery is said to date from 1970, but, as the article explains, "Theorists predicted proton radioactivity long before it was observed by experiment for the first time in 1970."

Atomic nuclei are known to decay by shedding α particles, β particles and neutrons and atomic nuclei are said to comprise protons and neutrons, but not beta particles, otherwise known as electrons and positrons.

What do you, the reader, believe? Before you reached your conclusion did you ask the 'obvious' question? How do physicists really know that there are neutrons inside an atomic nucleus and not just protons and electrons? Have they ever `seen' a neutron inside the nucleus or are they simply guessing that, because neutrons `appear' as a decay 'product', those neutrons were not 'produced' but had always existed inside the parent nucleus? If so, how is it that protons are durable, whereas neutrons decay with a mean lifetime of about one quarter of an hour?

Maybe you have accepted what you were told and can see no reason for doubt. So, now you are being told that 'proton radioactivity' has been discovered, even for atoms with an atomic number greater than Z=82, a so-called 'magic number'. Might that not suggest that the atomic nucleus can shed protons and negative beta particles in a highly energetic paired relationship and we have studied this as an unstable neutral entity and given it the name 'neutron'?

In 1929 there was a book published by Cambridge University Press under the title 'The Universe Around Us'. Its author was Sir James Jeans. On page 144 one can read the words 'the most abundant isotope of mercury, of atomic number 80 and atomic weight 200.016, is built up of 200 protons, 120 nuclear electrons and 80 orbital electrons'.

I can see no reason to doubt this, it being well-accepted in 1929. How could it be that the phenomenon of the neutron as something observed outside an atomic nucleus could change opinion as to what was inside that nucleus? One curious reason I have been given dates back to the middle of the 19th century. It appears that the Reverend Samuel Earnshaw formulated a theory about the aether. He proved mathematically that charges of opposite polarity could not form collectively into a stable combination with each held in position solely by mutual electric field action. I was told that this destroyed any claim that there could be particles composed of protons and electrons closely bound together. Yet Earnshaw's theorem, though unknown to most physicists, was fully explained in the fifth edition of the book *The Mathematical Theory of Electricity and Magnetism*, also published by Cambridge University Press and also written by Sir James Jeans. Now, I wonder, why would Sir James Jeans be declaring in 1929 that there are protons and electrons in a stable atomic nucleus, if a theorem with which he was very familiar denied the possibility?

The simple truth is that so many physicists today are ignorant on matters of such fundamental importance. Even Earnshaw's theorem, ostensibly rigorous mathematically, is flawed. It declares that:

"A charged body placed in an electric field of force cannot rest in stable equilibrium under the influence of the electric force alone."

In fact, it can, because if a multitude of electric particles, all identical and all of the same polarity, are spinkled into a uniform sea of electric charge of uniform charge density and opposite polarity, then the mutual repulsion of those particles will cause them to take up lattice sites in an array, each such particle being located at a stable position. What Earnshaw and Jeans did not bargain for was that continuum of charge as an enivironmental background. They assumed as their premise that there was nothing in the space between the particles! Yet, in the aether, there is no empty space. It is a plenum! Jeans did say in his notes on Earnshaw's theorem that "if a molecule is to be regarded as a cluster of electrons and positive charges, then the law of force must be somewhat different from that of the inverse square." He was wrong on this, given that we have an aether that fills all space.

I have raised this subject here for two reasons. You will understand one reason when you examine the first of the fourteen papers, where I discuss the constitution of the deuteron and also that of the neutron. Secondly, however, in following my interest in energy generation, I have become attentive to the claims made for what has come to be known as 'cold fusion'. The scientific community went beserk upon hearing in 1989 the claims made by Professor Martin Fleischmann and Professor Stanley Pons that there was evidence of excess heat generation from experiments in which a palladium cathode was immersed in heavy water. The absence of neutron production was seen as clear evidence that no nuclear transmutation could possibly have occurred.

Where is that scientific spirit which yearns to learn something new? How is it that physicists always see the world in black and white and are ready to 'black' what shines through as appearing 'white', without being tolerant of alternative opinion? They banished the electron from the atomic nucleus and substituted the neutron. That was their doing and not an act of Nature.

In science there is always the need to be critical as, so often, revision of one's ideas and formulations is necessary, but, progressively, so long as we keep the main uncertainties in science as our target, we will solve all problems. The need for the phase-lock on a universal scale has been my main target, because it brings together magnetism, gravitation and the quantum connection as encapsulated in the fine-structure constant and from that flows the photon and the problem of duality with electromagnetic wave theory. I leave it to my papers, as listed in the bibliography, to tell their own story and to prove that many of the secrets of the aether are now exposed.

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 33-35

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UNIFICATION - THE TIME FACTOR

Physicists versed in the theory of relativity use the expression 'proper time' to refer to what they see as the time rate in their own moving frames of reference. In relativity, time is something that moves ever onwards at different rates according to the perceptions of different observers having different states of uniform motion.

By implication there is what we may term 'improper time' which one could say is that prevailing on a universal scale if we were to hold on to our intuitive sense of time as once accepted and relied upon by most scientists including Sir Isaac Newton.

Now, there is no scope for unifying anything in physical theory unless one has common ground on which to build and the question of 'time' is intimately involved in the actions of gravitation and electromagnetism because these are both dynamic in nature.

The equality of inertial and gravitational mass is not something to be described as a 'principle'. If we do that we need to ask "Whose principle?" You reply: "Einstein, it is his 'Principle of Equivalence'!" Well, really, are we supposed to believe that we experience gravitation because we are being accelerated in an expanding universe? If so, then that acceleration has to be at a different rate for different observers wherever they are in the universe, just as our 'proper time' has to be peculiar to each of us as individuals.

Is it not better to examine the cause of that equivalence and see gravitation as evidencing the dynamic connection between two mass systems in a state of balance, one being the normal matter form and one being a `ghost-like' something that belongs to the aether but is the gravity-producing agency?

The proposition advanced here by the author is that the mass property of an element of matter as such is seated in its electric charge and that such charge is obliged by an 'aetherial' influence to conform to a jitter motion which puts it out-of-balance dynamically. That 'aetherial' ghost world, which we cannot see and which we only barely detect in its quantum interplay with matter, contrives to provide what we here term 'gravitons' which collectively have a local mass equal to that of matter present and which move in dynamic juxtaposition with the jitter so as to provide a balance.

The electromagnetic reference frame is that in which the charge is seen to be at rest as far as the jitter motion is concerned, but yet there is always motion in the inertial frame. This essentially is the causal basis of the phenomenon underlying Heisenberg's Principle of Uncertainty. So, you see, we can dispose of both Einstein's Principle of Equivalence and Heisenberg's Principle of Uncertainty by the simple analogy of a school child on a see-saw. The child goes up and down and one can never be sure

exactly how far that child is above the ground, but we know that the body mass must be balanced by something on the other side of that see-saw. We may not believe in ghosts, but that something is not another child! It is an apparition in the aether, a reaction to the presence of that child's action.

The gravitons are created as needed. They are what may be termed 'virtual leptons' and, as already implied on page 11, one can show that tau particles play a role here. But they exist in measure related to the inertial mass and they share a synchronized motion in the electromagnetic reference frame solely associated with the jitter that we know features in quantum mechanics.

Such effects therefore bring together quantum physics, gravitation and electrodynamics in a very direct way, but the action demands the dynamic balance of a quantum jitter motion, a feature which somehow, quite incredibly, eludes Einstein's theory. The seat of that jitter and the dynamic reaction has to involve energy and action in something that exists in an environmental association with matter but is physically distinct and so we need that aetherial medium. Here again we are reminded that Einstein deliberately chose to reject the need for an aether and thereby failed to grasp its dynamic reality. In that he paid the heavy price of having to wander in a philosophical wilderness searching for his unified field theory. He was searching for a connection between the electrical and gravitational mass properties of matter after actually discarding the missing link, the aether itself.

Einstein came close at one point during the early years of wave mechanics to seeing the connection with the Heisenberg jitter activity but he lacked the foresight to interpret his mathematics as representing a real aether and so missed seeing the need for dynamic balance.

The acceptance of a coordinated state of jitter motion, which could not occur unless there is an instantaneous action-at-a-distance in the Coulomb sense, is essential to the understanding of the causal factors governing gravitation. It is this that gives the charges their rest mode in the electromagnetic frame, notwithstanding the jitter motion in the inertial frame. This leaves the electrodynamic action of the gravitons as the only related action subject to retardation effects, owing to propagation delays, but even here, exceptionally in the gravitational context, since the gravitons are in synchronized motion owing to their dynamic interaction with the charged matter, even the gravitational force is not subjected to retardation so far as it applies between charged matter at rest in the electromagnetic reference frame.

In essence, therefore, this summary account is the basis of the unified field theory offered here by the author. It requires the existence of the energy-active aetherial medium which is our 'Creative Vacuum'. It further requires that this medium, so far as it is coextensive with the range of gravitational action, is, in effect, a universal clock keeping everything in harmonious synchrony so as to share the same jitter frequency. This universal clock keeps what, in Einstein terminology, might be said to be 'improper time'.

In order then to explain why experiment suggests that atoms moving through the electromagnetic frame adapt to what is termed their 'proper time' we need to apply the above teachings to a free atom in motion through the electromagnetic reference frame.

Note that the connection between electrodynamic interaction and gravitational interaction requires that the electrodynamic force acting between gravitons is directed along the line joining them. The gravity force between matter is, in fact, not a force set up directly between the charges in that matter

Aether Science Papers (pp. 33-35)

but rather a force on their 'field', meaning the closely-associated gravitons.

There is no use of the Lorentz force formulation in this analysis because the Lorentz force law is not sufficiently fundamental. As is shown in the papers referenced in this work, we can derive that law as a version of a generic formulation for restricted use in electric circuit theory, but a more fundamental generic force law is needed to explain gravitation. See particularly reference [1].

Fortunately, there is a way of proving this, but first take note that we are to adopt the position that, for gravitons in motion in the electromagnetic reference frame but holding their relative positions unchanged, their electrodynamic interaction force is of the inverse-square of distance form and acts directly between the gravitons.

An analogous condition electrodynamically is found in the case of a hydrogen atom in translational motion at speed u through the electromagnetic reference frame. It follows, therefore, that experimental tests on the spectral displacement of radiation from such an atom as a function of speed should confirm the hypothesis about this aspect of the electrodynamic force law.

Note here that Einstein's theory dodges the issue by always looking at the problem as if u is zero, and by translating the form of the problem on the assumption that there has been some kind of physical transformation, even one involving time passing at a different rate. This is where the `proper' time versus `improper' time aspect is introduced.

Unfortunately, for those who adhere to Einstein's principles, those transformations between frames of reference, when applied to the aether itself, actually smear vacuum charge as such, meaning the charge that sustains Maxwell's displacement currents and participates in the quantum jitter motion. They make those currents appear as a series of continuous current filaments. This treats the vacuum medium as having the closed circuit properties which suit the Lorentz version of the electrodynamic force law. The problem treated by the Einstein technique then becomes a distortion of the truth.

It is essential, therefore, to stay with the problem of the atom in motion at a translational velocity u and accept the complications of having to factor the actual electrodynamic action into the analysis, whilst working in the universal 'improper' time frame.

The basic physics of the Bohr hydrogen atom suffice for this exercise but there is something new here that will surprise physicists. It will be presented below in the precise form of a paper submitted to Physics Letters. The letter of rejection is reproduced immediately following the paper, to show the reader the cursory editorial treatment administered. Then it is for the reader to judge whether the paper, which has bearing on the whole of the unified field theory discussed in this work, warrants such rejection.

NEXT CHAPTER





Aether Science Papers: Part I: The Creative Vacuum Pages 36-40

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PHYSICAL REASON

As we have just seen, it is not a satisfactory argument to say that something can be explained in terms of a `principle' that emerged from Einstein's thoughts.

Quoting from Professor A. M. Taylor's *Imagination and the Growth of Science* (John Murray, 1966), this being the published version of the Tallman Lectures 1964-5 which he delivered at Bowdoin College, Brunswick, Maine, U.S.A.:

"Einstein, as a schoolboy of sixteen, was struck by the electrodynamic paradox, and for ten years he puzzled over it."

The paradox concerned the breach of Newton's third law: that action and reaction must always be equal and opposite. The action of a moving magnet on a stationary electric charge appeared to be different from the action of a moving electric charge on a stationary magnet. This is contrary to Newton's third law. Hence the paradox.

So, as Professor Taylor stated:

"Einstein postulated that the phenomena of electromagnetism, as well as those of mechanics, possess no properties corresponding to the idea of absolute rest; from which it followed that the action of a moving magnet on a stationary electric charge is equal and opposite to the action of a moving electric charge on a stationary magnet. There is in fact no meaning in the words stationary and moving; one ought to say rather that action between a magnet and an electric charge depends only on their relative motion."

So we are told that, based on the experimental findings of the 19th century, certain conclusions were reached about how electric charges and magnets interact. These conclusions were 'paradoxical' and young Einstein worried about it for ten years from the age of sixteen and finally concluded that when we say a magnet is moving it is not really moving and when we say it is at rest it is not really at rest. He told us that we must look at the problem in just such a way as to avoid the paradox by, as it were, putting on special spectacles. These allowed us to see the situation from either perspective, that of the electric charge and that of the magnet and we could rely on the prescription of those spectacles to

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Aether Science Papers (pp. 36-40)
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contrive to make sense of the paradoxical situation.

Now, to me, this is not physics, but illusion. No 19th century physicist would ever say something is at rest or in motion without admitting a frame of reference. The question really at issue, so far as electricity and magnetism are concerned, is simply that of whether one needs to adopt, as that frame of reference, the aether through which body Earth moves in its motion with and around the sun.

Whether or not there is a real aether filling all space is not something to be determined by Einstein pondering on the matter for ten years. The empirical properties of interacting electric charges and magnets are the facts from which to decipher the properties of the aether, because the aether is the 'unknown' parameter in the physical equations which apply. One can be sure that, if there is a paradox, it is not because Nature has a problem, but rather because some human intervention has led us astray in interpreting the evidence.

Surely the so-called electrodynamic paradox is not to be regarded as the consequence of something akin to Fermat's Last Theorem, where we found a problem to think about but could find no immediate solution. Indeed, on the basis of the Einstein philosophy, Fermat's Last Theorem can be proved by virtue of a postulate that says the problem has no meaning and therefore can have no solution.

To say there is no aether on the basis of the problems encountered by the Michelson-Morley experiment is a statement that the person reaching that conclusion has decided that the aether is like a single sheet of graph paper providing a fixed frame of reference on which one can plot the motion of all light waves whatever their source. The paradox posed by that experiment can then be dismissed by declaring, not that there is no aether, but that the analogy with the graph paper is incorrect. The only open question is that of determining the true nature of the aether and this author is not at all disposed to accepting that Einstein's thoughts have rendered that problem meaningless.

We will therefore now target Einstein's interpretation of 'time dilation' for attack, to see how it can stand up to scrutiny on the basis of experimental facts.

Suppose I am at rest on body Earth and I am looking at an atom moving in uniform translational motion, relative to me and past my field of view at a speed u. The atom is subjected to excitation and radiates photons of a certain frequency which I measure and take as the timing of an atomic clock.

Apart from any doppler effects, Einstein's theory tells me that that clock runs slower, so far as I can judge, owing to that motion at speed u. In other words, if I could jump into the atom and share its motion, so that I would then see the atom as at rest from my new perspective, it would beat to a faster time rhythm, even though there is no variation of clock rate as viewed from that Earth-based observation position.

Well, this is a very curious clock because it seems able to send its time signals to Earth and somehow lose a few on the way! That is a paradox in itself, but those who advocate this philosophy approach the problem differently, by saying that the clock loses 'time', the faster it travels. They will even tell you that it has all been proved by transporting atomic clocks in jet aircraft and comparing their time with clocks on the ground.

Those statements do not stand up to scrutiny, however, because we are concerned with non-

accelerated motion and any clock transported by an aircraft is subjected to acceleration.

So the experiment to take note of is the one in which atoms radiating photons are transported in a laboratory experiment at very high speed across one's field of view, the atoms being part of a discharge through an evacuated tube.

Einstein's theory does not explain how an atomic clock works. It is Bohr's theory of the hydrogen atom that provides the basic insight into how the atomic clock has a time rate. The photons emitted have a frequency determined by the energy released as its electrons change state.

Now, when we first learn about Bohr's theory, we are concerned with atoms which we see as being at rest. This means that the only significant forces acting between the atomic nucleus and the electrons are the electrostatic forces and the only significant energy involved is the related electric potential energy plus the kinetic energy of the electrons.

The theory assures us that the electron suddenly drops from its excited state to one of lower potential and spontaneously there is emission of a photon having a very well defined frequency proportional to that energy.

The timing of the clock must therefore be a function of how fast the energy can be wrapped up, as it were, in a quantum package and receive its 'stamp' of value, its frequency characteristic, before being dispatched at the speed of light. Neither Einstein nor Bohr were concerned with this exercise in logistics. It is like an artillery officer giving the order 'fire' and taking it for granted that his men have loaded the gun. That officer needs to know that the logistics are in place to assure that the shells of the right calibre are in position. Regarding the atom as such a gun, the photon energy to be shed is dispersed through space in the field enveloping the atom, but somehow the act comes together as if everything is instantaneous and the energy is duly dispatched by virtue of rules which we accept as being simply the facts of quantum theory.

In a real world, someone needs to express an opinion on that logistics exercise and the opinion I offer is a simple one, namely that the interaction energy adjustments in what is termed the 'Coulomb gauge' do occur with an action that is virtually instantaneous. If Einstein's followers say otherwise, then let them explain the logistics, as otherwise all they are firing from that 'gun' are a few words and mathematical symbols, but not energy.

Accepting the proposition of 'instantaneousness', the question then of interest is that of understanding what happens if the atom is moving at that speed u when it sheds the photon. In theory this should introduce electrodynamic forces as between the charged atomic nucleus and the electrons and it should introduce electrodynamic field energy considerations, which are not subject to the instantaneous action but are affected by retardation at the speed of light. Even before we embark on the task of accounting for the effects of motion of the atom, we know, therefore, that we can be sure that the photon package will not be able to capture that electrodynamic energy fast enough to define sharp spectral lines. The clock frequency, however, must be affected by that motion but we confront a mystery in how to factor the electrodynamic effects into the analysis of the problem.

Einstein's theory gives an easy answer by saying that the atom itself is not moving anyway, so it emits the photons with the same timing that applies for the atom when presumed to be at rest. There

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Aether Science Papers (pp. 36-40)
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are no electrodynamic problems to consider. The physical processes involved are pushed aside as if they do not exist. Instead, one takes the clock frequency and simply declares that `time' itself is transformed as the photons are viewed by an outsider watching the atom move across his field of view.

Now, I am not willing to accept that argument. It seems to me that, bearing in mind the photon is emitted spontaneously when the atom is 'at rest', it must be emitted spontaneously when the atom is 'moving' at speed u. This means that the electrodynamic energy component cannot contribute to the photon energy, but note, however, that the electromagnetic forces which determine the separation distance between the electrons and the nucleus do affect the electrostatic and related kinetic energies which do, in turn, govern the energy released and so the photon frequency.

I expect, therefore, to be able to deduce the effect of motion on the atomic clock rate and the key question is how this compares with the result indicated by Einstein's theory and how both stand up to test against what is observed by experiment.

Note that we are here facing the simple issue of whether atomic clock motion supports so-called `time dilation' or whether we are dealing with the loss of clock rate owing to physical reasons connected with the electrodynamics of the moving atom.

At this stage I ask the reader to have the good sense to understand that, before one can say an atomic clock when in motion runs slow, solely because Einstein said time itself `dilates', one should at least examine how the physics of the Bohr atom are affected by motion. I admit that I find it outrageous and beyond belief to see physics taught as if everything stems from Einstein's way of looking at the world when our textbooks do not even explore the normal physics of the problem.

This is all the more concerning when one sees that the alternative very logical physics treatment gives an atomic clock rate as a function of speed of the atom that is in full accord with experiment.

More to the point, the physics involved provides answers helpful in resolving the problems of the Unified Field Theory, which defeated Einstein!

The formal paper already mentioned will now be presented, followed by the text of the referee rejection.

The expression β will be used to represent $(1-u^2/c^2)^{1/2}$. The reader's knowledge of the binomial theorem will be needed to compare the expansion of this expression as:

 $1 - (1/2)(u/c)^2 - (1/8)(u/c)^4 - \dots$

with the difference of two energy expressions, one concerning electric energy potential and one concerning kinetic energy, being $2\beta^2$ and β^5 , respectively.

These are therefore:

 $2 - 3(u/c)^2 + (3/4)(u/c)^4 \dots$

and:

 $1 - (5/2)(u/c)^2 + (15/8)(u/c)^4 \dots$

which differ by:

 $1 - (1/2)(u/c)^2 - (9/8)(u/c)^4 \dots$

It follows that, for small values of u/c, the expression β is the same as that for $(2\beta^3 - \beta^5)$, except for a term of the order $(u/c)^4$.

I am going to base my case on the fact that the time dilation formula as used by Einstein has not been tested to this level of accuracy by atomic clock experiments.

For the benefit of readers who understand the theory of relativity, I point out also that the fact that fast moving cosmic mesons exhibit a longer life in proportion to $1/\beta$ has nothing to do with 'time dilation' and all to do with the enhancement of energy with speed. The added kinetic energy materializes as a statistical presence of mesonic particle pairs of opposite polarity and this adds mesons which can act in an 'understudy' capacity if the primary meson is hit by a decay influence. The decaying meson merely replaces one that is part of the pair-creation and annihilation system. This causes the mean lifetime of the meson, as measured, to be increased approximately in proportion to $1/\beta$. For a detailed account of this process see particularly reference [32], but also reference [33] for onward experimental confirmation.

We are here concerned, not with muons which have a decay lifetime, but with electrons which exhibit no such lifetime, except as part of their ability to tunnel through potential barriers, as they decay only to be promptly reincarnated in the same form in the near vicinity of their demise [38].

In criticizing Einstein's theory of relativity, I have no intention to allow its advocates to squirm out of the argument by trying to sidetrack from the main issue by appealing to other evidence about some other aspect of the theory. The immediate task at hand is the problem of the atomic clock and its relevance to the electrodynamic interaction between two discrete charges sharing a common component of motion at speed u. Einstein said that the clock would run slow as seen by an observer witnessing that motion. I say that it will operate at a lower frequency because of those electrodynamic forces and that its frequency will not be the same as that derived using Einstein's time dilation formula.

I further say that I am making this a point of issue because the correct understanding of the true nature of the law of electrodynamics is going to bring us to the point of success in unifying the gravitational and electromagnetic force. We shall see that the electrodynamic force between two charges moving together at the same velocity is a force acting directly along the line drawn between the two charges and not one of the form prescribed by Lorentz or Einstein.

Next we come to the rejected paper in question, as submitted to Physics Letters. Note that the references in the paper are identified by a number sequence applicable only to the paper and do not relate to the main bibliography of this work.

NEXT CHAPTER

Aether Science Papers (pp. 36-40)





Aether Science Papers: Part I: The Creative Vacuum Pages 41-47

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ATOMIC SPECTRA AND THE MOVING ATOM

Energy deployed in electrodynamic interactions is physically separate from the electric field and cannot be recovered fast enough to affect photon emission. An atom moving at speed u then has a spectral redshift proportional to $2\beta^2-\beta^3$, where β is $(1-u^2/c^2)^{1/2}$, identical to relativistic time dilation, apart from minor differences of order $(u/c)^4$, but the latter put the relativistic interpretation in doubt.

The Australian Defence Science and Technology Organisation based on a study by their Electronics and Surveillance Research Laboratory has recently issued a report [1*] which urges an aether-based treatment of space and time measurement.

That report does not, however, contribute any new insight into the physical processes which regulate the time keeping of the atomic clock in motion through space. It assumes that clocks are slowed by the factor β of $(1-u^2/c^2)^{1/2}$ and that the momentum of a particle of mass m takes the form mu/ β , where u is the velocity of the clock in the aether frame. The argument then develops from these assumptions using non-relativistic doctrine.

However, in the debate between relativity and aether, the fundamental question concerning the timekeeping of an atomic clock is not the issue of whether time itself is speed-dependent, since 'time' has no feature which can be said to have a speed, but the effect of motion on the clock 'mechanism'. In the case of the atomic clock the issue is whether the electrodynamic interaction between the nucleus and the electrons in an atom is dependent upon the translational motion of the atom at that speed u relative to the aether or the observer at rest.

There is the equally important question concerning how energy deployed in the field surrounding the atom can be collected in a package fast enough to be shed as a photon, which is the signature of the action we see as defining frequency and which we interpret as time. Note that a photon emitted by an atom changing between specific energy states can hardly be something that waits for the atom to recover its field energy and then stores the energy about to be released until it has all been collected and packaged for emission. That would need another secondary theory to determine the delay time, the storage mechanism and the nature of the ultimate trigger permitting its release. This confronts us with an impossible task, bearing in mind that the deployment of the atom's field energy in its ground state is spread over an indefinite range and supposedly affected by field retardation in the everchanging positions of the atomic electrons.

The answer to the first question is that we do not know from our laboratory experiments on charge

Aether Science Papers (pp. 41-47)

interactions how two discrete electric charges in motion relative to the laboratory frame interact in force terms, because all our experiments smear at least one of those motions into a circuital current form. As to the second question, the easiest answer, and the only logical answer for a physicist impressed by the sharpness of frequency of spectral lines, is to say that the motion-related distributed field energy just cannot be redeployed fast enough to affect the emitted photon. The energy component attributable to the electrodynamic interaction is not part of the photon emission. It must be energy that is lost by adding entropy to the field environment, the so-called 'zero-point field', but energy which no doubt can somehow be regenerated, repackaged and shed back to matter-form as part of a process of thermal equilibrium prevailing in atomic matter at a steady mean temperature.

There are many researchers who are now looking to the aether as a way forward in explaining certain energy anomalies that are creeping into their experiments and this makes the issue raised by Edgar [1*] topical. The reason is that it seems that energy can become divorced from a specific atomic connection and stored in the aether pending gradual recovery from a quantum-electrodynamic field coupling between atomic electrons and the aether, and in this one sees a link with the problem of the atomic clock.

The object here is to show that the above answer to the second question, when taken in conjunction with the facts of experiment concerning the atomic clock, can lead us towards an answer to the first question. It shows us how to avoid the problem of that 'smearing' action by verifying that the component electrodynamic force action between two charges as attributable to their translational motion at a common velocity u is, contrary to the Lorentz force law, at all times the same and is directed along a line drawn between the two charges.

In atomic theory one of the primary inconsistencies is the notion of a quantized unit of angular momentum, having regard to the fact that mass can vary as a function of β . We find that electric charge is quantized and this would suggest quantization of magnetic moment rather than angular momentum. To bring reconciliation the logical step is to realise that the mass added by motion is seated in the materialization of a kind of 'ghost' particle system. This is that of the fleeting and transient statistical presence of pairs of oppositely charged leptons which can be said to have mass-energy accounting for the kinetic energy of the source charge.

Separate from the kinetic energy of the individual charges, the electrodynamic action between charges in motion then becomes a collective action seated in a local reference frame defined by that 'ghost' world. It involves field energy which one could say is 'mutual kinetic energy' but which, unlike the kinetic energy of a discrete charge, cannot itself contribute to mass, because it has no overall motion relative to the governing frame and so cannot augment the lepton population.

The Bohr theory of the atom affords the easiest presentation by which to bring these factors into perspective in determining how the translational motion of an atom might affect its spectral emission.

The Bohr theory assumes a conserved angular momentum for the atomic electrons when there is no spectral emission or event affecting the energy state of the electron. In Newtonian mechanics a conserved angular momentum is the consequence of a centrally-directed force and energy conservation. It makes sense therefore to regard the atom as conforming with both the Bohr and Newtonian conditions between such events and to assume that the regulating quantization of charge velocity moment occurs as a kind of reset action at times of energy transition. Implicit in this is the

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Aether Science Papers (pp. 41-47)
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underlying requirement of that centrally-directed force, by which any electrodynamic action between the atomic nucleus and an electron must act along the line joining those particles, as does the force of gravity.

If these assumptions are correct, then we should be able to derive a satisfactory explanation for the observed electrodynamic redshift of the spectrum of the moving atom without making assumptions about time dilation.

The magnetic field energy associated with the electrodynamic force cannot be recovered from the surrounding field fast enough to contribute to the frequency characteristic of an emitted photon. However, the related electrodynamic force action does prevail in the periods between such emission. The radius of the orbital component of electron motion in the atom is affected by that and so depends on the translational motion of the atom, with a consequent modification of the Coulomb interaction energy as between nucleus and electron.

As is well known from the Bohr theory of the atom, the energy shed in emitting a photon is determined as the change of the Coulomb interaction energy as offset by half this amount owing to the corresponding change of the kinetic energy of the electron. If, however, the electrodynamic interaction causes the Coulomb attraction to be offset by a factor $(u/c)^2$, then the force which determines the orbital radius of electron motion changes in proportion to β^2 . The result of this is to adjust the energy state governing the photon to relate to the Coulomb interaction energy as offset by a factor $\beta^2/2$. However, note that the Rydberg constant, as derived by Bohr theory, is proportional to $(Ze^2)(Ze^2m_e)$, where Z is atomic number, e electron charge and m_e electron mass. The first Ze² term in brackets corresponds to the energy of the charge interaction but the second such term is really the result of calculating the electron's distance from the atomic nucleus. This latter distance is changed in proportion to β^2 owing to the electrodynamic forces and further in proportion to β owing to the centrifugal effect of the increase in mass me with speed u.

The net result of these β^2 -dependent modifications is to change the Rydberg term in proportion to [2- β^2](β^3), which is $2\beta^2$ - β^5 . This corresponds to a reduction of emission spectrum frequencies with increasing speed u of the atom.

Now, when this is compared with the relativistic time dilation factor β we find that the differences only appear in the fourth and higher order terms in (u/c). These are too small, given the flow speeds of atoms used in experimental tests for the findings to be capable of interpretation as proof of the time dilation hypothesis. Such evidence of slight discrepancy, as has been reported for the relativistic formulation, gives support for this author's proposition that aether-based electrodynamic principles offer the true explanation.

Indeed, there is an underlying and compelling argument in favour of the interpretation based on the non-relativistic case, because if the u-dependence of the atom's time keeping were based on the Lorentzian formulation of eletrodynamic force, which is consistent with relativistic formulation, the β^2 term introduced above would become time-dependent during the period taken for the electrons to move around their orbits and its effective mean value would be much reduced. Yet, it is the assumption that the electrodynamic force between electron and atomic nucleus is a direct interaction force along the line joining them, as required for compliance with a gravitational action, and is

constant for action between charges sharing a common motion component u, that results in a redshift in accordance with experimental observation.

As the author has shown elsewhere, for example in reference [2*], the known empirical data governing electrodynamic action results in the relevant force law, because two interacting charges cannot develop a turning couple by their mutual interaction and because their interaction with everpresent charge activity in the background field environment can permit energy exchanges with that environment. Such energy exchanges are, in the general case, associated with out-of-balance linear force actions. The law derived by admitting such imbalance of action and reaction nevertheless assures full balance of action and reaction for the specific case where the two interacting charges have no relative motion.

This is evident from reference $[2^*]$, where it is shown that, since the Neumann potential contains the total energy we associate with the electrodynamic interaction, any force component not represented by this potential must either do no work or do work in such a way that the relative velocity of the two charges is not affected. The Neumann potential component of the resulting force law has a symmetry owing to its (v.v')r form by which the force acts along the charge separation vector r.

It would seem, therefore, that when such electrodynamic force action is applied to the atom there is a strong case for regarding the spectral redshift from atoms in rapid translational motion transverse to the observer's line of sight as being not an indication of relativistic time dilation but rather evidence contributing to the empirical data which determines the true law of electrodynamics. The form of law so determined is compatible with the action of gravitation and so this is a step forward in the quest to resolve the long-standing problem of unifying electrodynamics and gravitation. The so-called theory of 'field unification' may not, in the end, be a theory concerning 'fields' as such, but rather a theory in which energy and force are seen as separable from the 'field' at times when there is spontaneous release of energy quanta.

The development of the theory of retardation governing actions between electric charge in relative motion and particularly the separation of the Coulomb action from the electrodynamic action has been addressed by this author in a recently published review paper [3*]. The detailed analysis and presentation in that paper are wholly consistent with the new theme presented above.

Finally, it is noted that the assumption is often made that the enhanced lifetime of the mu-meson with speed is evidence of time dilation. This is not a valid assumption. As seen by an observer at rest in the lepton-pair creation frame which characterizes the applicable reference frame in electrodynamics, the mu-meson has a mass enhanced by speed and attributable to transient pair creation of mu-mesons. The chance of total decay of this mu-meson complex is reduced by the increase in the mu-meson population, the measure of chance and the overall mass incremented by speed being in inverse proportion. If mass increases in proportion to $1/\beta$, so the lifetime of a lepton subject to natural decay is proportional also to $1/\beta$, because the chance of decay has reduced in proportion to β .

Since we have above seen the Lorentz force law come under challenge even though it is unaffected by transformation between inertial frames and this is generally seen as its supporting feature as based on relativity, a note is added below as an Appendix to justify this challenge.

Appendix

If the Lorentz force formula holds in one inertial frame it will, as Edgar [1*] shows, hold in all such frames, given the assumption that momentum is conserved as between lossless colliding particles. Implicit in this, however, is the assumption concerning momentum that we are dealing in mass only and this overlooks the fact that the Lorentz force is concerned with electric charge.

Conservation of angular momentum about a centre of motion is solely a consequence of motion of mass under the action of a centrally-directed force, given that energy is conserved. When two electric charges come together in a collision they are subject to mutual force action before they collide and the electrodynamic component of this action is determined by energy which is a function of the square of their relative charge velocities, v'-v. This energy together with kinetic energy and electrostatic Coulomb interaction energy is conserved and one can adduce from this that, since the energy is the same before and after collision, but there has been a redeployment, the two mathematical solutions of $(v'-v)^2$ apply to the two respective states. In other words, the relative velocity of the two charges after impact is -1 times the relative velocity before impact.

In Newtonian mechanics, which do not concern electric charge, this circumstance of lossless collisions was derived as Newton's Rule from the assumption of conservation of linear momentum. However, the physics is that of particles which are in their underlying structure nebulous entities of electric charge. By approaching the problem from the electrodynamic aspect one then sees how Newton's Rule takes priority over the momentum conservation principle and in fact we can see that momentum is conserved solely because we have an electrodynamic action between two colliding particles and no net energy transfer to or from that two-particle system in the process.

In the real world, however, there are numerous systems of charge in motion and there is inevitably an ongoing exchange of energy between those systems. The physics of the notional two-body problem do not govern the electrodynamic interactions of a system of electrical charge in motion. However, from the physics applicable to electrodynamic actions between two charges if generalized to permit energy exchanges with surrounding charges, one can derive the solutions to problems in mechanics relating to force action between two bodies, each comprising a neutral cluster of many charges.

The heart of the problem which besets the Lorentz force law is that it does not, in the general case, satisfy Newton's Third Law but it is accepted because it satisfies the transformation rules which suit relativistic doctrine. The electrodynamic law derived in reference [2*] gives results identical to those based on Lorentz law when applied to closed circuit interactions. Contrary to the Lorentz situation, it also gives the correct form of the law of gravity, even with the planetary perihelion refinements [4*], when applied to charge systems sharing a universal jitter motion, the causal physical basis of Heisenberg's Principle of Uncertainty. The 'universal' factor is one for which a component of motion shared by all charge is a common velocity u, as used in the above analysis. The electrodynamic force of mutual attraction acting directly between the charges in the atom, has a gravitational counterpart for mutual actions between atoms, but in the latter case the charges involved are those of an overall-electrically-neutral virtual charge population that keeps the dynamic balance with that common jitter motion of matter.

We need, therefore, to question the current acceptance of the time dilation hypothesis by reexamining the electrodynamic interactions within the atom.

References

[1*] R.S. Edgar, 'Field Analysis and Potential Theory: Part 3', DSTO Report RR-0017, Australian Government Defence Science and Technology Organisation, December 1994.
[2*] H. Aspden, 'A New Perspective on the Law of Electrodynamics', Physics Letters, 111A, pp. 22-24 (1985).

[3*] H. Aspden, 'Retardation in the Coulomb Potential', Physics Essays, 8, pp. 9-28 (1995).

[4*] H. Aspden, 'Physics Unified', (1980), Chapter 2, Sabberton, P.O. Box 35, Southampton, England.

In connection with the above paper the following referee statement was provided with the letter of rejection received from Physics Letters:

"Manuscript Ho738: Atomic Spectra and the Moving Atom, by H. Aspden

The paper is very nicely written but I do not think it is physics, more science fiction. The author is clearly very open minded about the foundations of his subject, being willing, apparently, to jettison relativity, quantum mechanics, even conventional classical electrodynamics. However, since these theories are accepted by almost everyone else, he must provide very strong arguments, which should be explicitly mathematical and include convincing detailed sample calculations, before a physics journal such as Physics Letters A should publish the ideas. I insist on the need for mathematical formulation of the ideas because it is all too easy to be carried away in a verbal phantasy which has only the lexicon of physics but none of its tight logical structure."

The accompanying letter on behalf of Physics Letters A was dated 26 September 1995 and signed by Professor P. R. Holland of the School of Interdisciplinary Sciences at the University of the West of England in Bristol. It read:

"Please find enclosed the response from the referee(s) on your paper. We regret that on the basis of the referee's report your paper is not suitable for publication in Physics Letters A. We must therefore unfortunately decline it. Thank you for submitting your work to our journal."

I note that I did enclose with the submitted paper copies of the two references to my prior published papers in Physics Letters and in Physics Essays that I identified in the submitted paper. Both had that 'explicitly mathematical content' and, indeed, I deem the analytical account presented in the submitted paper as being quite explicit in a mathematical sense, especially as the logic of the few equations used in the Bohr Theory of the Hydrogen atom is so elementary and so well known.

So, there you have it! Physicists are so well satisfied with their theory of relativity and its 'tight

logical structure' that they would rather stay looking for their Holy Grail, their hoped-for Unified Field Theory, without listening to someone who points his finger directly at the weakness in what they adopt as their logical picture of the moving atom. They have failed to see that the electrodynamic force as between two discrete charges in motion reveals itself very clearly in the radiation spectrum emitted by a moving hydrogen atom as having a form wholly consistent with that of the force of gravity in that it acts directly along the line drawn between the two charges. Yet, when this is drawn to their attention, by inferring that the spectral redshift is the signature of an electrodynamic effect, rather than being a 'time dilation' phenomenon, they choose to regard the argument and the evidence as 'science fiction'.

Can you wonder, therefore, why this author has now resorted to experimental investigation aimed at extracting energy from the aether that the learned professors of physics say is an illusion?

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 48-53

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AN EXCURSION INTO QUANTUM ELECTRODYNAMICS

The starting point in the whole of my research has been the subject of electrodynamics and its energy anomalies, by which I mean the experimental anomalies and not the paradoxical notions that beset the theory of the subject.

I have found repeatedly, from my attempts to write about such matters, that referees of physics journals delight in pointing to the success of quantum electrodynamics in explaining the anomalous magnetic moment of the electron. They claim such precision in their calculations that is so overwhelming that surely only a fool would dare to think that, by contemplating an aether, there may be a better and easier way of going about that task.

So, having discovered the easy alternative, I delved into that wonderful world of QED to see how its magic derived a theoretical value for the g/2 factor of the electron which measurement shows as being 1.001159652193(10). This is the value adopted in consultation with the CODATA Task Group in 1986 and as made available to scientists in U.K. by a pocket chart published by The Royal Society jointly with other learned bodies. The numerical value just quoted is stated to be the magnetic moment of the electron in terms of the Bohr magneton.

I saw that a book entitled *Introduction to Gauge Field Theory* had been authored by Bailin and Love and published in 1986 under the auspices of the Institute of Physics in U.K. and that the promotion literature specifically declared that it provided 'a detailed treatment of quantum electrodynamics'. I bought that book with the express purpose of seeing exactly how those who really understand QED actually obtain the wonderfully precise number that one understands fits so well with the value measured.

In a browsing mood, I first opened the book on page 214 and was pleased to see that chapter 14 began with the words: "The spectacular success of quantum electrodynamics (QED) in calculating the Lamb shift and the anomalous magnetic moment of the electron and the muon ...". Yes, that statement meant that what I was looking for would be found in the earlier chapters of the book. After all, here was a book on that very subject.

I found the relevant section heading on page 140: 'The electron anomalous magnetic moment'. The opening words were: "In this section, we specialise to the case of QED (Abelion gauge theory) and derive the electron anomalous magnetic moment. For convenience we shall work in the Feynman gauge..."

Aether Science Papers (pp. 48-53)

I was expecting then to see the analysis develop to the derivation of something very close to that 1.001159652193(10) number recited above, but, to my horror, the derivation ended on page 142 with the words:

"Thus the anomalous magnetic moment of the electron is: $(\alpha)/2\pi)(e/2m)$."

Alpha, α , is a fundamental constant in atomic physics, the fine-structure constant. I knew that this was only the first-order determination, $\alpha/2\pi$) being the reciprocal of $2\pi(137.036)$, which is 0.0011614. Evidently the 'spectacular success' was not something I could verify by guidance from that book. I was expected to accept that QED was a 'spectacular success' but it was something I had to take on trust without knowing what assumptions were made in the onward iterations of the calculation.

The book was, of course, full of equations, each one following the other and so conveying the impression of being 'a tight logical structure' but when the crunch came and a numerical result should have emerged I had to be satisfied with the above first-order approximation formula.

From my academic background in engineering I had always judged the result of a 'tight logical structure' on the end result, by comparing the numerical value derived with that observed as an actual experimental result.

I am now going to make the outrageous statement that QED is so powerful a technique that it is like taking a power-driven sledgehammer to crack a nut or, may I say, like using the method of Professor Andrew Wiles to prove Fermat's Last Theorem. There just has to be an easier way to explain how Nature determines that anomalous magnetic moment!

A back-of-an-envelope type of calculation can do better than that QED result presented in the book by Bailin and Love. All that is meant by the anomaly of the electron magnetic moment is that the antics of an electron in motion cannot bring to bear the electric energy in the far field zone fast enough to affect its inertia when in orbit having a very restricted radius. There is a cut-off range connected with the electron's Compton wavelength and only the electric field energy within that range contributes to the electron's inertia in its state of minor orbital motion.

This may be an engineer's way of looking at the problem, but it is a realistic approach, just as that artillery officer I mentioned earlier would expect to be able to turn his field gun without swinging something around in far off space.

If what I have said above about the moving atom and its problems in collecting energy spread over its electromagnetic field is 'phantasy', then so the world of QED is phantasy of an extreme kind, because that goes even further by involving us in the problems of photon-electron interactions and something called 'normalization' to avoid infinities but which amounts to the 'cut-off' range just mentioned.

So, I sit, in my aging years, watching the world of physics evolve its 'tight logical structure' and

wonder if that world will ever look up my paper, reference [61] in the bibliography, ('Fundamental Constants derived from Two-Dimensional Harmonic Oscillations in an Electrically-Structured Vacuum', Speculations in Science and Technology, v. 9, 315-323 (1986).

That paper shows, in a few pages, how the electron's g/2-factor, can be explained with at least the same precision that is claimed for QED.

The formula is:

$$g/2 = 1 + \alpha/[2\pi(1+3^{1/2}/N) - \alpha]$$

Here, N is determined as the nearest prime number to the value $3\pi/2\alpha$. Since α^{-1} is just a little above 137, N is 647. Table I below is reproduced from that referenced paper to show how g/2 depends upon the value of α^{-1} .

α-1	(g/2) factor
137.03597	1.001159652365
137.03598	1.001159652280
137.03599	1.001159652195

Table I: Relationship between the fine structure constant and the g/2-factor

Now, that paper [61] was received by the publishing journal in November 1985 and at that time I, the author, was completely unaware of the prospect that the CODATA values to be adopted later in 1986 would establish 1.001159652193(10) as the g/2-factor of the electron. Nor did I imagine that the α^{-1} value adopted would be 137.0359895(61).

What must then be absolutely clear to anyone reading this is the fact that if QED is a 'spectacularly successful' theory because it provides something very close to this relationship between the fine-structure constant and the anomalous magnetic moment of the electron, then it cannot be any closer than the value derived above using my very simple formula with N as 647. What I offer, however, is a 'back-of-the-envelope' type of analysis for deducing that formula, whereas the eighth-order calculation based on numerous, indeed thousands of, Feynman diagrams as well as arbitrary hadronic involvements, as needed to get a close QED value, is a task that could well keep the reader fully occupied for several years. That assumes the reader has very advanced skills in the relevant mathematics, skills far in excess of the school-level training which suffices to understand my method.

As is well known, the electron exhibits a characteristic wave frequency, which is the Compton electron frequency v_c . This is the frequency of the photon corresponding to the mass-energy of an electron at rest. Now, although Einstein may have said that the idea that something can be at 'rest' is meaningless, I do not accept that. You see, it is a question of deciding whether each electron in the universe is a law unto itself so far as external governing influences are concerned, or whether it is regulated by external influence. I can assure you that that Compton electron frequency is a universal

Aether Science Papers (pp. 48-53)

regulating rhythm that beats the time and all electrons have to dance to that time. They are not free to wander, each having its own proper time, much as Einstein might have wished that to be the case! If you have read in books about 'time' that there is no such thing as 'universal time' then you have exposed yourself to a 'brainwashing' exercise conducted by devil authors who preach the Einstein doctrine but contribute nothing to the science which sustains technological progress.

My method involves an energy cut-off range determined by a wave resonance in the near-field zone of the electron as shown in Fig. 1. The length of the radial lines in the outer cavity is half the Compton wavelength of the electron, because the field oscillations are phase-locked by the charge polarity condition. The length of the radial lines in the inner core of the electron charge is approximately the electron charge radius a and represents a standing wave condition of much higher frequency.



Fig. 1: Pattern of electron field cavity wave resonance

Now, the electron itself is a form of energy compressed into a field and we can calculate how that energy is distributed. J. J. Thomson did that calculation in the 19th century to find that, in electrostatic units, the energy $e^{2}/2a$ was seated outside the charge radius a. However, he discovered from the study of how electron mass increased with speed, even tending to become infinite as the speed of light was approached, that the effective rest mass of the electron was $2e^{2}/3ac^{2}$.

This meant that, if the electron were hollow within the radius a, then we could write the energy E as being $3Mc^2/4$. However, even before Einstein came into the picture in 1905, the Cambridge

cosmologist, the James Jeans already mentioned had, in his early years before being knighted, explained that mass and energy are equivalent and had argued that matter could be annihilated to produce radiant energy. He saw this as being the energy source feeding the sun and all other stars.

It is a simple exercise to work out that if the pressure of the electron field at the radius a is the same within the body of the electron, meaning that the charge e has an appropriate distribution conforming with this condition, then the speed of propagation of wave disturbances in the electron charge itself has the value c and that the electric energy inside that radius is $e^2/6a$. So, you see, the net result is an electron of energy $2e^2/3a$ giving a relationship between energy and mass that we can write as $E=Mc^2$.

Much of this was accepted physics before Einstein appeared on the scene and was known as 'electron theory', so it is very hard to understand how modern physicists can write that history off as if it never happened!

For our immediate purpose, we have now the basis for studying the coordinated wave interaction as between that external influence at the Compton electron frequency and the wavelengths associated with that radius parameter a of the electron.

Looking now at Fig. 1, ask yourself how the world outside the electron might interface with the world inside the core charge of the electron. If you think of pressure from the viewpoint of a gas then the interface is just a pressure interface and there is not much to say. However, a gas comprises numerous particles all moving in different directions. There are three degrees of freedom. However, inside that electron it may be that there are not numerous component particles behaving as a gas and moving with those three degrees of freedom. There could be an oscillation that has only one degree of freedom, amounting in its overall effect to a radial oscillation within the radius a. I emphasize here that I have no special insight into what goes on inside an electron. I can only make tentative assumptions and reason on that basis to see how what develops compares with what we see and measure in our experiments. So, I trust you are following the gist of my argument, because I am coming to the point that between the sphere of radius a and the sphere interfacing with those Compton frequency oscillations there is an adjustment at constant pressure in going from one degree of freedom to three degrees of freedom.

What this amounts to is that the surface area of that intermediate interface will be three times the

surface area of the inner interface. In short, the outer interface radius will be $\sqrt{3}a$, subject, however, to a little 'tuning'.

Now, if this seems a little speculative, there is an alternative approach giving the equivalent result. Look again at Fig. 1 and imagine both the radial oscillations within the core charge of the electron and in the cavity excited at the Compton electron frequency as setting up standing wave antinodes needing to balance those of travelling waves progressing by reflection around a circuit within the middle cavity. You will see that the three-wave interface at the charge surface requires a 120° angular separation. The geometry of this system also requires the outer radius to be 13a.

A vital consideration is that point made earlier as to what it is that tells an electron that it is a negative

Aether Science Papers (pp. 48-53)

charge or a positive charge. I do not want to dwell too long on this point so I will simply explain that it is all a question of how those the two frequency modes of oscillation beat together. Undoubtedly, as those who may study the history of aether theory may discover, the answer lies in developing the concepts of C. A. Bjerknes of the period 1877 to 1910 as already mentioned. Positive and negative are states involving oscillations in antiphase, all positive charges sharing a common phase and all negative charges sharing a common phase, but I leave that research to others. Suffice it here to say that the phase of oscillation is important. The Compton electron wavelength has to blend with the wavelength 2a, as the reader can work out from the diagram in Fig. 1.

The ratio of these wavelengths has to be an odd integer that cannot be factorized as that would allow the phase of the electron oscillations to have optional values in relation to the regulating universal rhythm of the Compton frequency oscillations. All positive electron charges have the same phase and all negative electron charges have the same phase but positive and negative charges are different because they are in antiphase.

This is the secret of the meaning of electrical charge polarity. It is just a question of phase, but there is phase-lock ensuring that there are no maverick charges in the electron family. There are only electrons or their positive versions, the positrons.

It is on this basis that there is a constraint on the adoption of the distance parameter a as a wavelength. The wavelength λ_c assumed by the resonant oscillation within the electron has to ensure that:

 $\lambda_c/2 = Na$

where N is a prime number.

Now, from what has been said above, it can be seen that, since a without this constraint is given by $2e^2/3hf_c$, hf_c being the rest-mass energy of the electron and the Compton wavelength λ_c being c/f_c , we can write:

$$a = [2\pi e^2/hc]\lambda_c/3\pi$$

approximately.

From these two equations we find that N becomes the nearest prime integer to $3\pi(137)/2$, bearing in mind that α , which is $2\pi e^2/hc$, is approximately 1/137. This gives N, uniquely, as 647. The formula on page 49 is then easily explained because the field energy of the electron disposed outside the cut-off radius R is simply $e^2/2R$ and R is simply $(\lambda_c/2)(1+\sqrt{3}/647)$. Using the formula:

$$(g/2)(mc^2 - e^2/2R) = mc^2$$

where m is the normal rest mass of the electron, and also the fact that λ_c is h/mc, it then needs a little algebra to find the residual electron energy thereby effective in confined orbital states of motion. This allows us to determine its ratio to the normal energy applicable for translational motion but one then arrives at the result presented in Table I above.

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 54-59

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SOME CRITICAL REMARKS

Just in case, at this stage, you are asking yourself why, if what I am offering by my theory is so wonderful, the physics community has not responded in an enthusiastic way, I ought to offer you an explanation. It is because I did not sit in one of those academic compartments occupied by theoretical physicists who enjoy the benefit of state funding allocated to coordinated research within such compartmented peer groups.

There is a strong reaction aimed at repelling all who try to intrude into the private territory claimed by such groups. The weapons used are silent but effective. One's original ideas are simply rejected under the cloak of referee anonymity or, if they do somehow penetrate into printed form in journals which are not deemed to be 'mainstream' they are just ignored. Indeed, papers in many non-mainstream journals are excluded from inclusion in the abstracted science literature and so avoid citation record: they are lost forever! There is one other weapon that is brandished in those rare instances where the intruder does penetrate the barriers, as by getting a point across in a Letter to the Editor which refers to the writings of those who have found favour. It is the weapon of public scorn and ridicule. Do you wish me to quote an example to support that assertion? Well, yes, I will even give you an example pertaining to that anomalous magnetic moment of the electron, my non-QED derivation of the g/2 factor.

I had drawn attention to this in a Letter to the Editor as published in American Journal of Physics, v. 54, p. 1064 (1986) and, some few months later, I found the following Letter to the Editor had appeared in July 1987 in volume 55 at pp. 584-585.

"PI IN THE SKY

H. Aspden's [1] amusing "unbelievable" formula for g/2 reminds me of Ramanujan's remarkable number:

 $(2143/22)^{1/4} = 3.14159265258..$

(to be compared with $\pi = 3.14159265358..$)

The agreement with π is to 300 parts in a trillion, a factor 10 less spectacular than Aspden's agreement with QED, but, like his, still well within the error of even the most careful measurements of the circumference and diameter of the very finest physical circles. Should one hope that a future theory will confirm that π is indeed equal to $(2143/22)^{1/4}$ thereby freeing us from the need to compute higher and higher order terms in any of the many tedious series mathematicians have had to resort to in these unenlightened times? Ramanujan's approximation to π offers a rather more transparent example of an unbelievable formula against which to assess the validity of one's amazement at Aspden's. Speaking for myself, I'm a little surprised. But not at all astonished.

[1] .. H. Aspden, Am. J. Phys. v. 54, p. 1064 (1987). Aspden says there is a theoretical model behind his formula, but he invites the reader to consider the result in and of itself, 'without further elaboration' and it is in that spirit that I offer this reaction."

> N. David Mermin Department of Physics Cornell University Ithaca, NY 14853-2501

Now, it may be that David Mermin was simply seeking to amuse the many physicists in USA who would read this contribution. I had said, in effect: "Look, you are all told that QED gives wonderful quantitative results which can explain the anomalous properties of the electron with such remarkable precision that it convinces you to accept QED principle, but here is a very simple formula that serves the same purpose just as well and which is very simple and has an equally simple supportable physical basis."

In the event, David Mermin had implied that I was merely 'playing with numbers', but he had seemingly not taken account of the fact that I had presented a formula which gave the same result as QED whatever the ultimate value of the fine-structure constant α . I gave a specific case, showing that the formula was the same as the QED result, even if α^{-1} were 200 rather than a little above 137. I hinted that I might have discovered by my wave-resonance derivation something bearing upon the identity or wave-particle duality that had come from the introduction of quantum theory into electromagnetic energy transfer processes.

I still do not see how this has any connection with the subject of Ramanujan's formula for π , nor, I presume, had Ramanujan derived his formula from a genuine study of the geometric characteristics of a circle.

However, I cannot just point my finger at David Mermin and say that his 'ridicule' has destroyed interest in my own scientific proposition, because, since that formula of mine was published not one single enquiry has been addressed to me asking how I deduced the formula. David Mermin himself could have written to ask if, in fact, he really had doubts and was at all interested.

So you must draw your own conclusions. Do those, including perhaps your goodselves, who read about physics generally, really care enough to ask questions to find answers to doubts about what is being told, or are they (and you) merely living a passive role expecting others to select, inform and amuse?

Evidently, the world of physics does not conduct itself in the way those who feed it with public funding have a right to expect. It is a world which, so far as I can see, bestows its favours amongst its

own members with no tolerance of any would-be intruder whose only motivation is to interest that community in something discovered outside its closed ranks.

If you, the reader, think I am merely exploiting one isolated example in referring to David Mermin, then do refer to pages 160 to 164 of B. W. Petley's 1985 book *'The Fundamental Physical Constants and the Frontier of Measurement'*, as published in U.K. by Adam Hilger, the publishing house of the Institute of Physics.

He explains how "it is not too difficult to synthesize an eight digit decimal number by combinations of the integers 2, 3 and 5 with π " and he quotes a Physics Today article in 1971 by Roskies and Prosen and one in 1971 by Robertson in Physical Review Letters on the same point. The gist of this quotation concerned the efforts of record aimed at deriving theoretical values for that constant α^{-1} and also β , here used as the proton-electron mass ratio.

In the paragraph of Petley's book just preceding those comments, Petley made the following statement:

"No doubt the theoretical attempts to calculate the value of α and β will continue - possibly with a Nobel prize winning success. Aspden and Eagles (1972) obtained: $\alpha^{-1} = 108\pi(8/1843)^{1/6}$ "

This was a very curious observation, seemingly ambiguous in its context, given that the following paragraph harped back to the 'numbers game' of those who waste time trying to discredit genuine theoretical effort.

In Table 5.3 on page 161 of his book Petley had listed 6 theoretical expressions for α^{-1} , dating from 1914 to 1972, including one by Eddington in 1930 giving 137 exactly. The sixth entry in the list was 137.035915, which was this author's value. A seventh entry dated 1973 was the then measured value, stated as 137.03604(11). A separate listing gave three entries for β , the proton-mass ratio, dating from 1951 to 1969, but, sadly, it seems that Petley had not seen this author's derivation [3] of the proton-electron mass ratio which was published in a mainstream physics periodical in 1975, as otherwise he would no doubt have included that also in his tabulation. That theoretical derivation of β was in full accord with the measured value, even though the latter was known to part per million precision and it was based on the same theoretical principles as applied to α^{-1} . I may add here that, as you read through the fourteen papers which follow these remarks, you will be shown how these precise theoretical values for α^{-1} and β are derived.

Here, I mention further that Brian Petley was writing on the subject on which he was an expert, being a scientist with the National Physical Laboratory in England. I further note that my coauthor on the 1972 paper about the derivation of α^{-1} and also on the 1975 derivation of β was employed by the Australian CSIRO at their National Measurement Laboratory and, indeed, these two papers [2, 3] had been submitted for publication with the supporting approval of the Director of that Australian government laboratory.

So, I trust I will not be judged as being a little unreasonable in suggesting that all is not well in our scientific world. Certainly, there is no room for the free-thinking person who has ideas that differ from those prevailing within an institutional research project.

I hope that what has been outlined so far will serve as a good introduction to the more formal collection of published papers which follow. This introductory commentary has been given the title *'The Creative Vacuum'*, because that is what it concerns, the medium in which you, the reader, exist and came to exist as a consequence of Creation. I did not, in the spirit of David Mermin, name this work 'Pi in the Sky', because this is a serious endeavour, not intended to amuse or to mislead, but merely aimed at disclosing some simple solutions to a few of Nature's scientific riddles.

These papers, as now reproduced in Part 2, are identically those as presented several years ago. They could be improved by reworking and inevitably there will be the few points that need further clarification and possibly some correction. With that in mind I will await events and see if publication of this work entices comments from readers. Hopefully, in a second edition version, if there is one, I can provide supplementary notes on such points. One such note, directed to an important paper I have referenced but not included in the fourteen appended is needed here in connection with reference [42]. This is the paper, already mentioned, in which I derive the Hubble constant. In that paper I quoted incorrectly the value of the Thomson scattering cross-section of the electron and used that incorrect value to deduce the Hubble constant H. I find upon correction that H⁻¹ would be 3,600 million years if I rely on the standard formula for the Thomson scattering cross-section. Referring to Fig. 1 of this text (page 51) and using the electron radius a of the Thomson electron as defining the obstructing cross-section, the value 21,600 million years would apply. However, if the intermediate field cavity radius shown in that figure is effective the obstructing area is enhanced threefold, making the Hubble time period 7,200 million years.

Cosmology today is confused as to the age of the universe based on the notion of an expanding universe. As the conflicting evidence points more and more to a non-expanding steady-state universe the theoretical approach I offer for the cosmological redshift should begin to command the attention of theoreticians, especially those who are inclined to be constructive in their criticism. I find, however, that critics usually prefer to be destructive, no doubt because that is a safer course when confronted with something potentially controversial.

It was in 1969 that I published my book '*Physics without Einstein*'. One reader wrote to say it was 'too mathematical', even though its formulations were quite simple. Influenced by that, I produced a book '*Modern Aether Science*' in 1972, without including any mathematics. A reviewer, someone who had just authored his own book claiming that the universe expands and contracts in cycles, seized upon that non-mathematical aspect and declared that I, the author, was evidently lacking in mathematical skill! No doubt, the title of the book did not help. It seemed to classify it as something archaic and it was not shelved amongst physics books in some bookshops I visited. It did not sell, but yet its message is even more apt now than it was those 24 years ago. Its book jacket indicated that a further mathematical treatment would follow under the title '*Aether Science Papers*', but I received no enquiries for that follow-on work and so exercised prudence and patiently struggled to get the occasional paper published in the science periodicals. This, I mention, only because I am now redeeming my 'promise' in naming this book '*Aether Science Papers*'. As will be seen, the papers

Aether Science Papers (pp. 54-59)

which follow are mathematical.

I ought here to mention again the book '*Physics Unified*' which I authored and published in 1980 to get my research to that date on record in a consolidated form. That book gives the formal 'teaching' background which introduces my theory. The fourteen selected papers which follow form a core but are supplemented by many earlier papers of record in the science literature, such as the 1972 paper about α^{-1} and the 1975 paper about β . It may, incidentally, come to be noticed from scanning though the titles of those papers, as listed separately on pp. 63-67, that I have shown how to calculate the lifetime of various particles but that the muon lifetime is not mentioned in the titles. The reason is that the muon mean lifetime was derived and published in *Physics Unified* using my theory and so I did not solicit its separate publication as a paper.

I cannot, therefore, resist the temptation to tell you that the 'remarkable success' of QED does not seem to extend to calculating the muon lifetime. The Bailin and Love book, which I mentioned on page 48, included a chapter on 'Feynman Rules for Electroweak Theory'. In that chapter, under a subheading of 'Test of Electroweak Theory', it gave the not-impressive prediction of the mean lifetime of the muon as 2.90+/-2.61 microseconds. It compared this 'test value', as albeit subject to that overwhelming uncertainty, with the measured value of 2.197138+/-0.000065 microseconds. The theoretical value I derive on p. 146 of '*Physics Unified*', using the same aether theory that gave α^{-1} and β , is 2.1973 microseconds, so I do not see the Feynman methods as being so wonderful.

If you, the reader, have been at all impressed by my very simple precise derivation of the anomalous magnetic moment of the electron without use of Feynman diagrams, then you will not be disappointed by what follows. If you remain unimpressed then the rest of this work will not prove of interest and I will not have succeeded in winning you over, but I have done my best and if you can do better in solving the physical riddles of Nature then may you have more success in your own efforts to get your findings accepted!

If you feel that the 'aether' is not something one should take seriously and prefer to read about 'electroweak theory' then, to ease your thoughts as you begin to read the first of the selected fourteen papers, I quote from the opening three paragraphs of my 1983 paper entitled 'Planar Boundaries of the Space-Time Lattice' [34].

'Modern physical theory is tending to regard the vacuum medium as having structure somewhat analogous to that of crystalline materials. Thus we see WEISSKOPF [1] discussing quantum electroweak dynamics and asserting that the Higgs field implies that the vacuum has a certain fixed direction in isospace, namely that of the spinor associated with the Higgs field. WEISSKOPF states that the situation is like that of a ferromagnet, in which the direction in real space is determined as long as the energy transfers are smaller than the Curie energy.

This, of course, implies an ordered structure of the vacuum medium, a feature discussed at some length by REBBI [2] in an article entitled 'The lattice theory of quark confinement'. REBBI refers to a 1974 proposal by WILSON that QCD (Quantum Chromodynamics) should be formulated on a cubic lattice, an array that divides space

and time into discrete points, but is essentially an approximation to real space-time. The advantage is that this allows calculations to be made that would otherwise be impossible.

This author, in collaboration with Dr. D. M. Eagles [3], has advocated the analysis of a vacuum structure and shown how a value of the fine-structure constant correct to about one part in a million can be determined by a cubic lattice model of the vacuum. Further research on this model has now shown the essential need for a particular boundary condition imposed upon a physical portrayal of the vacuum state expressed in terms of electrical charge. It is in view of the current interest in lattice theory as applied to the vacuum field system that it seems appropriate to draw attention to what has been, to the author at least, a rather elusive consideration.

[1] V. C. WEISSKOPF: Physics Today, v. 34-11, p.69 (1981)
[2] C. REBBI: Scientific American, v.248, p.36 (1983)
[3] H. ASPDEN and D. M. EAGLES: Physics Letters A, v. 41, p.423 (1972)."

This paper went on to explain why the storage of electric field energy in the vacuum (the aether) demands the presence of planar lattice boundaries, which implies a domain structure in space somewhat analogous to that found in ferromagnetic materials. The paper was written in 1983, a few weeks after I retired from my executive position with a multinational corporation to engage in a private research venture as a Visiting Senior Research Fellow at my local university. Some 29 years earlier I had parted from my Ph.D. research on magnetism at Trinity College, Cambridge to take up a career in industry, but it was that academic research background concerning ferromagnetism and its domain structure that led me to conceive the need for an aether that was similarly structured.

The chronological development of the papers, as reproduced and as listed in the following pages, reflects that circumstance by which I spent those 29 years away from the academic world, whilst still developing a scientific theory of such wide scope. It may also explain why this effort has proved such a struggle, but, then again, it might further explain why there has been such fruitful progress, because there were no peer-constraints affecting project funding and suppressing originality.

The time has, however, come when, some 13 years on from retirement from the business world, this consolidated presentation of my theory is warranted.

NEXT CHAPTER





Aether Science Papers: Part I: The Creative Vacuum Pages 60-62

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EPILOGUE

Having shown the power of my theory and presented (as by the tenth appended paper) what has to be a convincing account of the true nature of gravitation, I remind readers of that riddle and the challenge I introduced at the outset of this work.

It will, I am sure, become possible to build the machine that can harness the force of gravity. One might hope to see a levitating machine operating with an energy input that is minute in relation to the power demands of 20th century aerospace technology. That objective is a little beyond my own horizon, even though I remind readers of my early reference on page 28 to John Davidson's book *The Secret of the Creative Vacuum*.

It is not beyond my range of view to see in prospect the possibility of so enhancing the gravitational pull on the working core of a machine that the drop in consequential energy potential releases very substantial amounts of heat energy.

This could become a way of doing the work of the Maxwell Demon, namely the effortless pumping of energy from a cold to a hot environment. That would provide us with a pollution-free new source of power.

With that in mind I offer now another clue. It was noted that uranium was amongst the four metals that were candidates for use in exploring the supergravitational activity, but neodymium and samarium were more likely to be destined to be at the heart of that future technology. However, it will give confidence to the project if we can also understand why uranium is also so very special in this gravitational context.

The reason is similar to the dual influence applicable close to the atomic number Z=61 (promethium). There was a 5th harmonic resonance by the K-shell electrons coupled to the gravitational frequency (the Compton electron frequency). Also, as explained in the fourth of the appended papers, for corresponding orbital motion there was a strong perturbation because the orbiting electron sweeps

close to the aether lattice charges at radius $d^{1/2}$ from the atomic nucleus centred at an aether lattice site, where d is the lattice spacing.

One needs now to imagine a gravitational resonance involving the electrons in the L or higher order atomic electron shells. Note that the harmonic pulsation frequency of the electrons, as set up in the electromagnetic reference frame, is the Compton electron frequency multiplied by the factor:

$(Z\alpha)^2\epsilon\gamma/n^3$

Here α is the fine structure constant (approximately 1/137), n is the Bohr quantum number of the electron, ε is 1 or 2 according to whether one electron is active or two in antiphase motion are active and γ is the order of the harmonic setting up the resonant condition. The latter condition is then given by resonant tuning giving a phase-lock condition in an atom for which Z has a value close to that given by:

$$Z^2 = (n^3 \epsilon > \gamma)(137)^2$$

From this, with n=2, the least value of γ corresponding to a value of Z in the range of stable atoms is then seen to be 9, with ϵ equal to 2, so determining Z as 91.

Now this is a quite remarkable circumstance, because it not only determines which harmonic is governing but it also replicates the situation we see for neodymium (Z=60), promethium (Z=61) and samarium (Z=62) by a new sequence. Thorium (Z=90), protactinium (Z=91) and uranium (Z=92) constitute a special group as well, with a very rare middle element. Unlike promethium, protactinium has a finite abundance, but it is virtually non-existent, being ten parts in a billion of the abundance values of its `next of kin' thorium and uranium!

Surely this is evidence of a supergravitational influence acting upon the two atomic elements that are at the centre of each of these dual resonant situations.

I can also add the point that had I set 85 J/gm as the threshold level for the latent heat of fusion of metals with melting points in excess of 1,000°C, there is only one metal that would then have been added to Nd, Sm, Au and U in that introductory note on page 1. That metal is the one we see next to protactinium, thorium with a latent heat of fusion of 82.8 J/gm!

The latent heat of fusion of promethium Pm (Z=61) and protactinium Pa (Z=91) were not listed in my data source as having been measured. Promethium (3.7 year half-life) is a fission product of uranium. As to protactinium, even if the wisdom of nuclear experts favours attributing its scarcity to some quirk of radioactive decay, they must surely view the natural absence of promethium as a real mystery and give serious consideration to the supergravitational proposition offered here.

Hopefully these thoughts will cause scientists to realise that the gravitational theory I have developed gives a new direction for research aimed at harnessing the link indicated between gravity and these particular atomic elements. In the meantime, and even before that research prospect of technological benefit emerges on the near horizon, I do hope that common sense will prevail and scientists will have the wisdom to turn their attentions away from Einstein's theoretical treatment of gravitation.

Leaving the gravitional challenge to the future, I now conclude this dissertation. I believe that enough has been presented in this work to put my discoveries on record for scrutiny by future generations.

The present generation of theoretical physicists has shown an unwillingness to pay attention to my findings and so they are best left to squander their time on their own devious attempts to interpret a universe of their own imagination. I was, by that anonymous referee quoted on pp. 46-47, accused of presenting phantasy and science fiction as physics and offering no tight logical mathematical structure.

You, the reader, if you have read what I have presented in this work, must now judge whether or not my `phantasy' world has something to offer.

Meanwhile, I now look away from the 'physicist' who wears his fine and invisible garments woven from a 'relativistic web' over his 'superstring' vest. I appeal instead to that portion of the scientific community that sees technology as having the more prominent role in scientific endeavour and I ask that attention be paid to the role the aether can play in supplying the pollution-free power we need in the 21st century.

As readers will understand from the dates of the papers referenced and presented, virtually all of what has been described was completed more than six years ago. I could have produced this collection of papers then, but I have deemed it more important to divert my attentions to experimental projects. I shall now concentrate on writing about 'Energy Science' from a practical viewpoint and describing the results of my endeavours of the past six years on that task of extracting energy from the aether.

Being academically trained and well versed in conventional disciplines of physical science it has not been easy for me to overturn in my mind the dogma that block research interest in the latter field. Nor has it been easy to solve the riddle of gravitation but we have now the solution, thanks to overturning belief in erroneous dogma. Gravitation aside, the breakthrough factor in this work has been the new fundamental principles of electrodynamics which we can already see have practical application in the latest research on the generation of a new form of electrical power.

It came as a welcome surprise to see that Dr. Paulo Correa acknowledged the relevance of my work [1,34,112] in the U.S. patents [117,118] which describe the research findings on that new power generation project and I record here my appreciation for that recognition.

Undoubtedly the way forward is to show that we can tap energy from the aether even though this does mean overturning some of the accepted doctrines in physics. 'Aether Science Papers' may help to ease the bewilderment of the scientific community as the new technology emerges.

H. Aspden, PhD, BSc, FIEE, FIMechE, MInstP, C.Eng, C.Phys, Wh.Sc.

May 1996

NEXT CHAPTER

HOME PAGE



Aether Science Papers: Part I: The Creative Vacuum Pages 63-68

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NEXT CHAPTER



Aether Science Papers (pp. 63-68)



Aether Science Papers: Commentary on Back Cover

AETHER SCIENCE PAPERS

BY HAROLD ASPDEN

The author has, for some 40 years now, sought to interest the world of science in his discoveries concerning the nature of the force of gravitation. His contribution has not been heeded because the research findings have not developed from the conventional theoretical stream. Yet, from his Ph.D. research at Cambridge on anomalous energy activity in ferromagnetism, Dr. Aspden could see so clearly where the mathematical philosophers had erred drastically in replacing the aether by mathematical symbols before they had fully understood how it stores energy. The aether plays a creative role, besides constituting a universal energy bank, giving us the means to deposit and withdraw energy. Left to its own devices it even absorbs the energy we shed as waste and which we write off under the heading 'entropy' but it does something our textbooks say is impossible. It thrives on that energy and regenerates it in a material form by creating the particles we know as protons and electrons. However, scientists have become blind and cannot 'see' such an aether in their vision of things. They look only at how created matter evolves and see no creative source. So they devise computer programs to test their imagination of a universe in a notional Big Bang scenario, with scant regard to the simple problem of how the energy of electromagnetic induction is actually stored in 'empty' space in our laboratories here and now on earth. In so doing they create obstacles in science where none exist, imposing their will on Nature's province and missing key issues which should be obvious to any mechanic. They use equations to represent electrodynamics, say energy has mass, introduce a quantum jitter which makes the position and momentum of that mass uncertain, and then forget to look for whatever it is that accounts for dynamic mass balance and so keeps their jittering wave mechanical universe from tearing itself into pieces. They try to understand gravity as a property of matter and cannot see that it is a property of the aether by which it responds to the presence of matter to keep it in dynamic balance. They complicate gravitation by declaring it to be a distortion of 'space-time' by matter but still cannot reach their objective of field unification. In adopting Einstein's theory mathematicians have confounded our understanding of physics, without realising that there is a better way forward by which to solve the mystery of unification of gravitation and electrodynamics. Although this unification is of clear record in the scientific literature, one needs a guide map to find a way to the relevant clearing in the jungle of periodicals which line university library shelves. This book provides that guidance and goes further in presenting the full text of fourteen of the basic papers. The reader will see from these papers how easy it is to derive the constant of gravity in terms of the electron charge-mass ratio and determine by simple theory the precise value of the protonelectron mass ratio. Given this unifying connection between gravitation and matter creation, one can see a way forward by which to tap some further energy from the same source as that which fed the creation of the universe. We are now on the brink of a technological revolution that will deliver us energy in abundance with no risk of pollution, but we need to understand its source, that real medium, the aether, that so many think of as a mere vacuum.

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