

# Gravitation, Electrostatics, and the Electron-Positron Aether (Ether)

(Based on the 1982 paper by Frederick David Tombe, entitled Electrogravitomagnetism)

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*This article was written in 2003 based on original material from 1982, without any revision of the core ideas. Research was commenced again in 2004. As a result of seven further years of investigation, comments have now been added in red by the author, in order to draw attention to the revised views in the light of the more recent research. The first issue concerns the title itself. The electron-positron sea is not the aether as such. Positrons are aether sources and electrons are aether sinks. The electrons and positrons are paired into rotating dipoles, and as such the electron-positron medium for the propagation of light is actually a sea of tiny dipolar aether whirlpools. 10<sup>th</sup> January 2011*

**Abstract. PART 1** A unified derivation of Newton's law of gravitation, and Coulomb's law of electrostatics, demonstrates charge to be a property associated with acceleration, and inertial mass to be a measure of the amount of matter in a body. It also demonstrates inertial mass to have an effect on acceleration in relation to electrostatic forces, but not in relation to gravitational forces. *The latter point is not so. This is a misconception based on Galileo's famous experiment at the Leaning Tower of Pisa. When the mutual acceleration that two gravitating bodies induce on each other is measured relative to the common centre of mass, then the acceleration of both bodies will be inversely proportional to their inertial mass as is the case with all forces.* The derivation demonstrates from first principles that electrostatics and gravitation are mathematically parallel, despite this apparent difference between them. *The difference referred to here is not a difference after all. Furthermore, the derivation ignores the fact that we may need to switch to an inverse cube law for cases of mutual repulsion.* Einstein was aware that the acceleration of a body under gravity is independent of its inertial mass, but his interpretation of this fact, which led to his General Theory of Relativity, is called into question. *Einstein was of course wrong in every respect in relation to this issue.*

**PART 2** Maxwell's displacement current is considered. Attention is drawn to the close association between Maxwell's displacement current and Coulomb's law of electrostatics. *This close association, via the equation of continuity relates to something that has the outward mathematical form of Maxwell's displacement current, but which is clearly not the quantity which is used in the derivation of the electromagnetic wave equation. This impostor for displacement current has led to endless confusion in the literature.* It is concluded that an electromagnetic force must ultimately be an electrostatic force in origin, when examined at the microscopic level, and that this can only be possible by introducing an elastic aether comprised of electrons and positrons. *This conclusion was premature. It was correct as regards the need for an electron-positron sea, but it failed to consider that the repulsive forces might be centrifugal in origin. Centrifugal force would of course ultimately be the same in physical nature as positive electric charge, but it differs from electrostatic repulsion in that it is induced by motion.* Electromagnetism is the manifestation of stresses and strains in the aether, whereas the forces acting between the particles of the aether are electrostatic. The force acting on a charged particle moving in a magnetic field, which we will refer to as 'The Lorentz Force', is then considered. *This is a state of confusion which was caused by the failure to link the  $\mathbf{F} = q\mathbf{v} \times \mathbf{B}$  force to the centrifugal pressure that acts between rotating electron-positron dipoles.* The Lorentz Force is incorporated into Maxwell's equations, leading to a slight modification in the latter. This modification involves replacing the partial time derivatives with total time derivatives, and therefore removing any ambiguity about which frame of reference Maxwell's equations are valid in. *This is all unnecessary. The Lorentz force already was one of Maxwell's original equations, and in Maxwell's original papers it unambiguously applied in the frame of reference in which the luminiferous medium is stationary.* They are valid in the geocentric aether rest frame. Maxwell's equations do not, as is customarily believed, give any credence whatsoever to Einstein's postulate of the constancy of the speed of light. *Correct.*

## PART 1

One notable difference between electrostatics and gravitation is that in electrostatics, we have two types of charge, which are both mutually repulsive, whereas in gravitation, we only have one kind of charge, and it is mutually attractive. *In actual fact, gravitational charge is simply mild negative electric charge. Two negative charges become mutually repulsive when they are strong enough to invoke the reversal threshold in the radial field, by virtue of inducing sufficient linear polarization of the electron-positron dipoles such as that the lateral centrifugal pressure becomes greater than the tension along the lines of force.* This difference is sufficient to give rise to a principle in gravitation, which is not paralleled in electrostatic theory. *Wrong.* The principle, demonstrated notoriously by Galileo from the Leaning Tower of Pisa, is that under the force of gravity, bodies of different weights will fall at the same rate. *On the contrary, relative to the common centre of mass, the acceleration of two bodies under gravity will indeed be proportional to their inertial mass. Galileo's experiment only appears to be true because the objects that were dropped were all very much smaller than the Earth itself.* Einstein observed this principle from a different angle. He considered it as a 'Principle of Equivalence' of inertial mass and gravitational mass. *Einstein was totally wrong.* This 'Principle of Equivalence' became the cornerstone of his General Theory of Relativity, which allowed the theory of gravitation to appear more different than the theory of electrostatics, than it might otherwise have done. *Einstein's General theory of Relativity not only invokes the false principle of Equivalence. It also involves spiking Newton's law of gravity with his toxic special theory of relativity.* A new combined derivation of Newton's law of gravitation and Coulomb's law of electrostatics will take place below, demonstrating that the two forces are absolutely mathematically parallel, and that inertial mass and gravitational mass are quite definitely not equivalent. *The derivation is wrong because it commences on the basis that Galileo had a legitimate point as regards his*

*experiment at the Leaning Tower of Pisa. Also the derivation doesn't take into consideration that when the radial forces go repulsive that we mostly need to switch to the inverse cube law.* These facts call into question the validity of Einstein's General Theory of Relativity (1915), never mind why this theory can only be applied to gravitation, and not to electrostatics. *The derivation was actually an imperfect attempt at exposing the falsity of a false theory. In actual fact, the involvement of special relativity in general relativity is sufficient to discredit the latter.* This is notwithstanding the fact that the General Theory of Relativity hinges entirely on the validity of Einstein's Special Theory of Relativity (1905). The Special Theory of Relativity will be undermined in the second part of this paper.

1. Electric charge  $Q$ , is a property associated with a body, which partly determines its acceleration, within the context of Coulomb's law of electrostatics. Inertial mass  $m$  is another property associated with a body, which also partly determines acceleration in relation to electrostatic forces. Ernst Mach defined inertial mass in terms of the inverse ratio of the accelerations  $a$ , which two bodies induce on each other as a result of electrostatic interaction. *Not sure that Mach restricted his definition to electrostatic interaction. It applies to electromagnetic and gravitational interactions too.* (Most common interactions such as collisions, friction, air resistance etc., are electrostatic in origin). Mach's definition of inertial mass is summed up in the equation

$$\frac{m_1}{m_2} = \frac{a_2}{a_1} \quad (1)$$

On cross-multiplying equation (1), this definition exposes Newton's three laws of motion as being merely a definition of the two quantities (i) inertial mass, and (ii) force. Since a definition cannot be wrong, it follows that Newton's laws of motion cannot be wrong in any circumstances whatsoever.

Gravitational mass, which I prefer to call gravitational charge  $W$ , is to Newton's law of gravitation, what electric charge is to Coulomb's law of electrostatics. In classical mechanics we give both  $m$  and  $W$  the same units since they are directly proportional to each other in magnitude, and this disguises the fact that they are quite different quantities. *In actual fact, gravitational charge is simply weak negative electric charge.*

## A UNIFIED DERIVATION

2. Consider the acceleration of an elementary particle (a particle that is not made up of other particles) in a frame of reference which is fixed relative to the background stars. Let us postulate an acceleration law, which may lead us to existing classical theory, when summed over a system of particles. The postulate has to take into consideration the fact that neither force, nor inertial mass have as yet been defined, and as such cannot appear at this stage. Likewise, Newton's Law of gravitation, and Coulomb's law of electrostatics have not yet been discovered, hence forbidding any criticism of equation (2) in relation to any manner in which it might appear to be at variance with Newton or Coulomb. The Question is whether or not the postulate will lead us to Newton's and Coulomb's laws. Let us postulate that the acceleration law for an elementary particle is;

$$\ddot{\vec{r}} = \frac{\pm Q - W}{r^2} \hat{r} \quad (2)$$

The left hand side represents the acceleration of a particle due to it being in the vicinity of another particle of charge  $Q-W$ . The only property of the particle, whose acceleration we are considering on the left hand side of the equation (2), which will actually effect its own acceleration, is the sign of its own electric charge. This will determine the sign beside the  $Q$  on the right hand side of equation (2). *Equation (2) is based on the premises of applying the results of Galileo's Leaning Tower of Pisa experiment to elementary electrically charged particles. It therefore applies in the frame of reference in which the particle of charge  $Q-W$  is stationary, and not in the frame of reference in which the centre of mass (as yet undefined) is stationary.*

3. If it is desired to apply this law to situations concerning the acceleration of systems of particles, we must first of all clarify the meaning of such. Mass has not yet been defined, and so we cannot talk about the 'centre of mass'. We therefore consider the motion of a point defined with respect to the system, which will be called the 'centre of charge', and defined as follows

$$\underline{R} = \frac{\sum_{i=1}^n (|Q_i| - W_i) \underline{r}_i}{\sum_{i=1}^n (|Q_i| - W_i)} \quad (3)$$

and hence

$$\underline{\ddot{R}} = \frac{\sum_{i=1}^n (|Q_i| - W_i) \underline{\ddot{r}}_i}{\sum_{i=1}^n (|Q_i| - W_i)} \quad (4)$$

where

$$\underline{\ddot{r}}_i = \underline{\ddot{r}}_i (INT) + \underline{\ddot{r}}_i (EX) \quad (5)$$

i.e. the acceleration of each elementary particle in the system can be split up into the internal acceleration due to all other elementary particles in the system  $\underline{\ddot{r}}_i (INT)$ , and the external acceleration  $\underline{\ddot{r}}_i (EX)$  due to an external source. Considering the internal component of equation (4), we have for the numerator,

$$\sum_{i=1}^n (|Q_i| - W_i) \underline{\ddot{r}}_i (INT) = \sum_{i=1}^n \left[ (|Q_i| - W_i) \left( \sum_{\substack{j=1 \\ j \neq i}}^n \frac{\pm Q_j - W_j}{r_{ij}^2} \hat{r} \right) \right] \quad (6)$$

The right hand side of equation (6) will sum to pairs of quantities of equal magnitude and because all particles either attract or repel each other, members of each pair will have opposite sign. Hence

$$\sum_{i=1}^n (|Q_i| - W_i) \underline{\ddot{r}}_i (INT) = 0 \quad (7)$$

If  $\underline{\ddot{r}}_i (EX)$  is not caused by a collision with another system and is generated by a system far enough away, it would be reasonable to assume that  $\underline{\ddot{r}}_i (EX)$  is the same for every elementary particle in the system whose acceleration we are considering. Hence

$$\underline{\ddot{R}} = \frac{\sum_{i=1}^n (|Q_i| - W_i) (\pm Q_{EX} - W_{EX})}{\sum_{i=1}^n (|Q_i| - W_i) r^2} \hat{r} \quad (8)$$

therefore

$$\underline{\ddot{R}} = \frac{\sum_{i=1}^n (|Q_i| - W_i) (\pm Q_{EX})}{\sum_{i=1}^n (|Q_i| - W_i) r^2} \hat{r} - \frac{W_{EX}}{r^2} \hat{r} \quad (9)$$

Now care must be taken when considering the summation term of equation (9) because the sign in front of  $Q_{EX}$  will depend upon the sign of  $Q_i$ . The equation should look like this

$$\ddot{\underline{R}} = \frac{\pm (NETT (|Q| - W)) Q_{EX}}{\sum_{i=1}^n (|Q_i| - W_i) r^2} \hat{r} - \frac{W_{EX}}{r^2} \hat{r} \quad (10)$$

where  $|Q|$  is the modulus of the cancelled down net electric charge, and  $W$  is a cancelled down quantity of gravitational charge which depends on the difference between the number of negative electrically charged particles, and the number of positive electrically charged particles in the system. It is most likely that since the gravitational charge of a particle is negligible compared with its electric charge, that this quantity would also be negligible in the equation (10) which could then be written,

$$\ddot{\underline{R}} = \frac{Q_{NETT} Q_{EX}}{\sum_{i=1}^n (|Q_i| - W_i) r^2} \hat{r} - \frac{W_{EX}}{r^2} \hat{r} \quad (11)$$

hence multiplying across by  $m$

$$m \ddot{\underline{R}} = \frac{Q_1 Q_2}{r^2} \hat{r} + m \underline{g} \quad (12)$$

where

$$\underline{g} = -\frac{W_{EX}}{r^2} \hat{r} \quad (13)$$

and

$$m = \sum_{i=1}^n (|Q_i| - W_i) \quad (14)$$

Equation (11) therefore incorporates Coulomb's law of electrostatics, Galileo's Leaning Tower of Pisa 'weight independent' acceleration law, Newton's law of gravitation, and Newton's first and second laws of motion with

inertial mass  $m$  defined as  $\sum_{i=1}^n (|Q_i| - W_i)$ . The definition of inertial mass given at equation (14) clearly

indicates that inertial mass is a measure of the amount of matter (number of elementary particles) in a system of particles. *This is not quite right. Particles are sources and sinks in the aether. The pressure or tension of the aether in the interstitial regions between particles can therefore affect the mass without the number of elementary particles being altered. This fact is also important in relation to the net charge on a wire in an electric circuit. That net charge can alter without changing the number of particles in the system. Hence, charge is something that is introduced into an electric circuit from the exterior power source. Net charge in an electric circuit is an injection of pressurized aether, and it doesn't require any change in the balance between negatively charged particles and positively charged particles.*

Gravitational charge, which is only known to exist with one sign (and hence no levitation), must therefore be directly proportional to inertial mass. We can therefore assign the same units to both quantities, and this ensures that Newton's third law is general for electrostatics and gravitation. The inverse square law of acceleration is the basis of classical physics *wrong*, and since it assumes the presence of a background of apparently fixed celestial objects, it seems logical to suggest Coulomb's law of electrostatics and Newton's law of gravitation, are both intertwined with the background stars. This is known as the Mach hypothesis. *This is less than accurate. Galileo's Leaning Tower of Pisa experiment only applies in the frame of reference in which Earth is stationary. The rule does not apply when we are considering the gravitational accelerations that two bodies in general*

*induce upon each other relative to the common centre of mass. Also, the inverse cube law takes over when repulsion is involved, because we are then dealing with the centrifugal pressure that is being generated by the dipole field of the luminiferous medium, and it is the dipolar luminiferous medium of electrons and positrons that serves as the medium relative to which motion induces centrifugal force in planetary orbits*

## PART 2

Electromagnetic theory was rapidly approaching completion towards the end of the nineteenth century, although it lacked the discovery of the electron and the positron. Without these two elementary particles it would have been impossible for the great electromagnetic pioneers such as James Clerk-Maxwell, or Hermann von Helmholtz to have been able to ascertain the true nature of the aether.

Lorentz occupies an ironic position in electromagnetic history. He predicted the electron, and also the equation for the force on a charged particle moving in a magnetic field. *In actual fact, the Lorentz force already appeared at equation (77) in Maxwell's 1861 paper "On Physical Lines of Force" [1]. It's also doubtful that he was the first to predict the electron as such.* These were the penultimate two ingredients necessary to put the picture together. Unfortunately Lorentz held the belief, that there was an aether wind blowing through the Earth, due to the Earth's orbital motion around the sun. As such he was in a dilemma over the results of the Michelson and Morley experiment of 1887, which detected no motion of the Earth through the aether. Lorentz tried to get around the problem by devising equations that would account for contraction of material objects due to the aether wind, in such a way as to totally cancel out any observation of the Earth's motion through the aether. These highly over optimistic equations were eventually to form the basis of Einstein's special theory of relativity, which is heavily flawed due to its inherent self-contradictions. The Clock Paradox, which points out the fact that two clocks can't both run slower than each other, is well documented in Professor Herbert Dingle's 'Science at the Crossroads'. Unfortunately Einstein's theories took hold amongst the scientific establishment, and this prevented electromagnetic theory from coming to a satisfactory conclusion.

## MAXWELL'S EQUATIONS

4. In the following considerations, knowledge of Maxwell's equations and Vector Field Theory will be assumed. Nobody disagrees that the equation,

$$\text{curl } \mathbf{B} = \mu\epsilon\partial\mathbf{E}/\partial t \quad (\text{Maxwell's Displacement Current}) \quad (15)$$

(where  $\mathbf{B}$  is the magnetic induction vector,  $\mathbf{E}$  is electric field, and  $t$  is time) holds true between the plates of a condenser. The disagreement arises over the derivation, and hence the interpretation. *But we shouldn't be focusing on capacitors, because electromagnetic radiation occurs everywhere, and not just between the plates of a capacitor.*

(5) Let us look at the conventional derivation *of equation (15)*, which I consider to be heavily flawed. It begins with Ampère's circuital law,

$$\text{curl } \mathbf{B} = \mu\mathbf{J} \quad (\text{Ampère's Circuital Law}) \quad (16)$$

where  $\mathbf{J}$  is the current density. The divergence of a curl is always zero therefore the divergence of  $\mathbf{J}$  must also be zero. However the equation of continuity of charge,

$$\text{div } \mathbf{J} + \partial\rho/\partial t = 0 \quad (\text{Equation of Continuity of Charge}) \quad (17)$$

(where  $\rho$  is charge density) tells us that the divergence of  $\mathbf{J}$  is only zero in static situations. In time varying situations, it may not necessarily be zero. Orthodox teaching tells us that we now have a dilemma.

We do not however have a dilemma, because Ampère's equation (16) was derived from a closed loop integral equation in which the divergence of  $\mathbf{J}$  would necessarily be zero. Ampère's Equation (16) is not permitted to exist unless  $\text{div } \mathbf{J}$  is equal to zero.

Orthodox physicists, who nevertheless erroneously believe that we do have a dilemma, tell us that we need to add an extra  $\mu\epsilon\partial\mathbf{E}/\partial t$  term to the right hand side of Ampère's equation (16) in order to cater for time varying  $\mathbf{B}$  fields.

Their argument contains two flaws. First of all, we are not permitted to add an extra term to the right hand side of Ampère's equation (16). Ampère's equation (16), as it stands, is what was derived from first principles, using

sound mathematical reasoning. We cannot change the derivation. Secondly, the curl operator only involves partial spatial derivatives. A time dependent  $\mathbf{B}$  field would not alter the result. Ignoring these two flaws for a moment, I will point out what their reasoning is for adding this extra  $\mu\epsilon\partial\mathbf{E}/\partial t$  term to the right hand side of Ampère's equation (16). It lies rooted in Coulomb's law of electrostatics, which in its differential form is,

$$\text{div } \mathbf{E} = \rho/\epsilon \quad (\text{Coulomb's Law of Electrostatics}) \quad (18)$$

If we take the divergence of  $(\mathbf{J} + \epsilon\partial\mathbf{E}/\partial t)$  and compare with equations (17) and (18), we will produce a zero result. Orthodox physicists hence believe that they have solved their dilemma, which in my opinion doesn't exist anyway.

(6) James Clerk-Maxwell assumed the existence of a dielectric aether. He wrote an excellent paper on the subject in 1861 [1]. *In the 1861 paper, Maxwell talks about a sea of molecular vortices. It wasn't until his later paper published in 1865 and entitled "A Dynamical theory of the Electromagnetic Field" that Maxwell started to really put the emphasis on the dielectric nature of the luminiferous medium.*

Maxwell's belief in the existence of a dielectric aether became of great importance when he came to examine electrical current flowing in a condenser circuit. *It's actually a bit of a myth that Maxwell was concerning himself with capacitor circuits when he conceived of the idea of displacement current. This myth seems to circulate widely in the literature. On reading the preamble to Part III of his 1861 paper, where displacement current is first conceived, it is clear that Maxwell is simply looking at pure elasticity without any mention of electric capacitor circuits.* He believed that the current in a condenser circuit must form a closed loop, despite the gap between the condenser plates. In order to complete this closed loop, he introduced a polarization current in the dielectric aether between the condenser plates. *The 1861 paper does not indicate that Maxwell considered these issues at all. This notion must have originated in a secondary source.*

Maxwell's choice of the term  $\epsilon\partial\mathbf{E}/\partial t$  for this polarization current lies, on the one hand in the proportionality between the electric field vector  $\mathbf{E}$ , and the electric displacement vector  $\mathbf{D}$ , and on the other hand, he believed that adding this term to the circuit current term ensures that the divergence of the combination  $(\mathbf{J} + \epsilon\partial\mathbf{E}/\partial t)$ , will always equal zero. *No. Maxwell does not seem to have considered this in his 1861 paper.* At most points in the condenser circuit, the circuit current term and the polarization current term will not overlap and their divergences will be zero anyway. *wrong* The region of major interest lies at the surface of the condenser plates, as this is where the electric charge is said to be building up. It is on these surfaces that Maxwell examined the divergence of the current. *There is no evidence that Maxwell specifically considered displacement current on the surface of capacitor plates.* He treated the total current on these surfaces to be equal to the sum of the circuit current and the dielectric polarization current. *In his 1865 paper he produced an equation which added conduction current to displacement current. But capacitors are not mentioned in the context.* Doing this may or may not be contrary to Ampère's equation (16). It depends whether one is viewing the polarization current as an additional term, or whether one is treating it as ultimately coming under the umbrella of the  $\mathbf{J}$  term. Only the latter approach is legitimate. *But would we ever need to add a polarization current to a conduction current? This bit clearly hasn't been properly thought through. It's confusion on top of confusion resulting ultimately from the failure to realize that electric current is pure aether flow and that the motion of particles is only incidental. The confusion also results from the fact that we shouldn't be looking at capacitors in order to try and ascertain the displacement mechanism in electromagnetic radiation, which is in fact a fine-grained rotational phenomenon.*

(7) As charge builds up on the plates of a condenser, the term on the right hand side of equation (17) will be non-zero and hence so will  $\text{div } \mathbf{J}$ . Either Ampère's equation (16) doesn't apply in this situation, or there is no build up of charge on the surface of the condenser plates. It has to be one or the other. Let's assume for the time being that Ampère's equation (16) does apply. It must therefore follow that there is no net build up of charge on the surface of the condenser plates. The polarization current in the dielectric between the plates must cancel out the charge that flows into the plates from the circuit current. *Wrong. Total confusion. Ignore.*

(8) Maxwell wanted his displacement current term to represent as near as possible a real current. He clearly envisaged it as the current associated with polarizing dipoles in the aether, without actually having much of an idea as to their physical nature. If the displacement current  $\epsilon\partial\mathbf{E}/\partial t$  is a real current, it has to satisfy the equation of continuity (17). This is only possible if, (i)  $\mathbf{E}$  satisfies Coulomb's law of electrostatics *wrong*, and (ii) if  $\epsilon\partial\mathbf{E}/\partial t$  has a minus sign in front of it. The introduction of a minus sign in front of the  $\partial\mathbf{E}/\partial t$  term is undesirable for other reasons, and this leaves us with a problem. The answer to the problem lies with Lenz's law. Between the plates of a charging condenser in an electrical circuit,  $\mathbf{E}$  will be equal to  $\mathbf{E}_0 - \mathbf{E}_i$ , where  $\mathbf{E}_0$  is the steady electric field driving the circuit current, and  $\mathbf{E}_i$  is the induced electric field that opposes the polarization process

in the condenser dielectric. It therefore follows that  $-\partial\mathbf{E}/\partial t$  will equal  $+\partial\mathbf{E}_i/\partial t$ , and therefore we can now see that the  $\mathbf{E}$  in the Maxwell's Displacement Current equation (15) refers to the induced  $\mathbf{E}$  in the dielectric that opposes the displacement current. This is Lenz's Law extended to polarization in a dielectric. The induced  $\mathbf{E}$  in Maxwell's Displacement Current equation (15) is now starting to show increasing similarities to the induced  $\mathbf{E}$  in the theory of electromagnetic induction. *This is all total confusion arising from the fact that it has been overlooked by Maxwell, that the displacement current term as is used in the derivation of the electromagnetic wave equation cannot be related to linear polarization. See section (9) below.*

(9) If the induced  $\mathbf{E}$  in Faraday's law of electromagnetic induction,

$$\text{curl } \mathbf{E} = -d\mathbf{B}/dt \quad (\text{Faraday's Law of Electromagnetic Induction}) \quad (19)$$

is equated to the induced  $\mathbf{E}$  in Maxwell's equation (15), we can then combine these two equations to produce a wave equation with a propagation speed equal to the speed of light. Unless this is a total coincidence, all the above considerations would prove that the  $\mathbf{E}$  in Faraday's equation (19) is interchangeable with the  $\mathbf{E}$  in Coulomb's law, because the  $\mathbf{E}$  in Maxwell's equation (15) is interchangeable with the  $\mathbf{E}$  in Coulomb's law. *The whole point is that it is not interchangeable. We need to find an alternative way for justifying the displacement current term that is used in the derivation of the electromagnetic wave equation.*

Even though they are both represented by completely different mathematical formulae, there is clearly a link between the 'action-at-a-distance' electrostatic  $\mathbf{E}$  on the one hand, and the electromagnetic  $\mathbf{E}$  on the other hand. The relationship is that of the microscopic to the macroscopic. *Yes, there is a link, but the link has not been properly established in this article.* We must introduce an electrically neutral plasma aether of electrons and positrons to properly explain the link. *And we require pure aether hydrodynamics in the interstitial regions between the electrons and positrons in order to establish the true nature of the link.* I imagine this aether to be an extremely dense solid structure, highly elastic and yet to which normal atomic matter is largely porous. The aether would pass through ordinary atomic matter, just as water would pass through a basket. Microscopically, the only forces at work in the aether are the electrostatic forces acting between the electrons and positrons. *But these can be modified by angular acceleration of the dipoles leading to centrifugal pressure.* But macroscopically we have an elastic medium, which is subject to stresses and strains. Where we have a stressed aether, we have a magnetic field. *It's not a case of rotational stress in a solid. The magnetic effects arise from the solenoidal alignment of the dipoles and the angular acceleration of these dipoles.* Magnetic waves propagate at the speed of light, which is effectively the Mach number for the aether at normal temperature and pressure. Magnetic and optical phenomena must be considered as elastic effects in the aether. An electric current in a circuit will stress the surrounding aether giving rise to a magnetic field. *It will stress it in the sense that it will re-align the dipoles and angularly accelerate them as if they were fly-wheels.* The induced  $\mathbf{E}$  in both Maxwell's Displacement Current equation (15), and in Faraday's law of electromagnetic induction equation (19), is caused by aether stress. Aether stress simultaneously results in both induced  $\mathbf{E}$  fields, and induced  $\mathbf{B}$  fields, since both  $\mathbf{E}$  and  $\mathbf{B}$  are mathematically intertwined. *This conclusion was only partially correct. The  $\mathbf{E}$  in Faraday's law is equal to  $-\partial\mathbf{A}/\partial t$ , where  $\mathbf{A}$  is the magnetic vector potential, and it is not exactly the same as the  $\mathbf{E}$  in Coulomb's law, because it acts in the transverse direction within electron-positron dipoles, as opposed to in the radial direction. This conclusion completely overlooked the hydrodynamical behaviour of the aether in the interstitial regions between the electrons and the positrons. It was a premature conclusion based on not recognizing the need to introduce an angular displacement current that relates to the magnetization process.*

(10) When electrons flow to the surface of a condenser plate from the circuit wire, positrons from the aether beyond the plate flow towards it from the opposite direction, hence negating the build up of charge inside the plate. The aether positrons flowing towards the condenser plate do so as part of the polarization process occurring in the aether beyond the plate. Hence the circuit current term and the displacement current term are both acting concurrently at the surface of the plate, and they are both flowing in the same direction. In fact I would go further and state that the current at the surface of the plates is a single current that could be viewed either as the circuit current or the displacement current. Its divergence will be zero no matter whether it is viewed as a single entity or as the sum of a circuit current and a polarization current. No net charge builds up on the surface of condenser plates. Charge density  $\rho$ , and rate of change of charge density  $-\partial\rho/\partial t$ , will always be zero. If however there is no dielectric between the condenser plates, charge will either build up on the plates or it will flow straight across the vacuum. In either case, we would have a total breakdown of the theory of electromagnetism in the vicinity of the condenser plates. *This is all confusion which overlooks the fact that electric current is pure aether flow (vitreous fluid), and that particles only flow with the aether or eat their way towards the source as a secondary effect.*

(11) The Earth's gravity will carry a pocket of the aether with the Earth in its orbit around the sun, in the same manner as it carries the atmosphere. This will explain the result of the famous 1887 Michelson-Morley

experiment, which led Einstein to postulate the constancy of the speed of light. *Some say that Einstein didn't know about this experiment. I don't know what to believe. Einstein claims that he was relying on some equations which he referred to as the Maxwell-Hertz equations. Whatever these equations were, he certainly can't have been relying on Maxwell's own equations or anything to do with Maxwell's original works.*

The rotation of the Earth about its axis will cause torsional stress in the aether around the Earth. This will result in the Earth's magnetic field. *No. The Earth's magnetic field rotates with the Earth's rotation and so the source must be a permanent magnet inside the Earth.* Vortices will form in the aether near to the poles. The precession and nutation of the Earth will cause these magnetic poles to wander and to be located away from the rotational poles. Rotational slippage of the aether at the surface of the Earth could account for the results of the famous Michelson-Gale experiment of 1925, when interference fringes were detected as a result of the Earth's rotation.

(12) If we take the curl of the Lorentz force,

$$\mathbf{E} = \mathbf{v} \times \mathbf{B} \quad \text{(Lorentz Force)} \quad (20)$$

*Equation (20) is only part of the Lorentz force. The Lorentz force itself is equation (77) in Maxwell's 1861 paper.* (where  $\mathbf{v}$  is the velocity of a charged particle moving in a magnetic field, and  $\mathbf{E}$  is the force per unit charge acting upon it, as a result of its motion) we get,

$$\text{curl } \mathbf{E} = -(\mathbf{v} \cdot \text{grad}) \mathbf{B} \quad \text{(Differential Lorentz Force)} \quad (21)$$

(see reference [2]). The right hand side of the equation (21) is the convective part of the right hand side of Faraday's equation (19). (A total time derivative is made up of a convective component and a partial time derivative component). It is the Lorentz force which is the justification for using total time derivatives in Maxwell's equations. Until now, it has been customary to use partial time derivatives in Maxwell's equations, and to keep equation (20) outside Maxwell's group, as a separate equation. The postulate of the constancy of the speed of light is the cornerstone of Einstein's theories of relativity. Partial time derivative Maxwell's equations have been used to bolster this postulate, on the basis that they hold in any frame of reference and still yield a wave equation in which the wave speed is equal to the speed of light.

With total time derivatives, this argument falls through. The situation becomes no different to that of the speed of sound in air. The velocity term  $\mathbf{v}$  in the Lorentz Force equation (20) is measured relative to the aether. We no longer have any ambiguity. Maxwell's equations apply in the geocentric aether rest frame, and probably any aether rest frame. *Basically correct, but all this would have been unnecessary had it been realized that the so-called Lorentz Force was already one of Maxwell's original equations with the  $\mathbf{v}$  term being measured relative to the luminiferous medium.*

## CONCLUSIONS

- (a) Inertial Mass and Gravitational Mass are not equivalent. Einstein's General Theory of Relativity should never have come about.
- (b) An elastic electron-positron aether is absolutely necessary, not only as a medium for the propagation of light, *yes* but also to explain how Coulomb's law of electrostatics can legitimately be manipulated mathematically with Faraday's law of electromagnetic induction, bearing in mind that the  $\mathbf{E}$  vectors in each case derive from different mathematical functions. *No. This issue was not properly solved in 1982.*
- (c) The force on a charged particle moving in a magnetic field, which we call the Lorentz Force, can be absorbed into Maxwell's Equations, bringing them into a total time derivative format, and eliminating any arguments about which frames of reference they apply in. *The so-called Lorentz force was already one of Maxwell's original equations. This fact is not widely known.*
- (d) The parallel nature of electrostatics and gravitation suggests that there would almost certainly be a gravitational component to magnetism, parallel to the much more dominant electrostatic component. However, the enormous difference in strength between electrostatics and gravitation would almost certainly render the gravitomagnetic component negligible. *This argument becomes irrelevant when we realize that gravitational charge is simply weak negative electric charge.*
- (e) The elastic aether in the vicinity of atoms and molecules would certainly have a perturbing effect on the electrons orbiting the atomic nuclei. Electrons being a constituent component of the aether itself would get mixed up with the orbital electrons. This disturbance in the aether around atomic nuclei would almost certainly manifest itself as standing waves in the aether. These standing waves would only be permitted to have certain wavelengths, depending on the charge of the atomic nuclei in question. This would explain the quantisation of electron orbits, and the fact that electromagnetic waves only get emitted and absorbed by atoms and molecules in discrete quanta. *Maybe* The electron-positron aether would also explain the close association between electromagnetic waves and beams of electrons. *Cathode rays are simply aether flow through the electron-*



*positron medium. This may result in positrons being pushed one way while electrons eat their way towards the source.*

#### REFERENCES

[1] Clerk-Maxwell, J., *“On Physical Lines of Force”*, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)

[http://vacuum-physics.com/Maxwell/maxwell\\_oplf.pdf](http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf)

[2] Tombe, F.D., *“Maxwell’s Equations and Galilean Relativity”*, Toth-Maatian Review, (January 1984)

*This article is somewhat pointless once it is realized that the Lorentz Force was actually one of Maxwell’s original equations, with the  $\mathbf{v} \times \mathbf{B}$  term in  $\mathbf{v} \times \mathbf{B}$  being measured relative to the luminiferous aether. See the more recent articles “The Double Helix Theory of the Magnetic Field” (2006) at <http://www.wbabin.net/Science-Journals/Research%20Papers-Mechanics%20%20Electrodynamics/Download/252> and “Maxwell’s Original Equations” (2012) at <http://www.wbabin.net/Science-Journals/Essays-Mechanics%20%20Electrodynamics/Download/3889>*