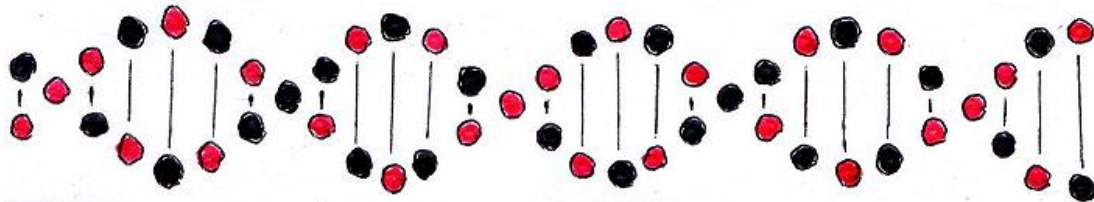


The Double Helix Theory of the Magnetic Field

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Abstract. The historical linkage between optics and electromagnetism can be traced back to a paper published in the year 1856 by Wilhelm Eduard Weber and Rudolf Kohlrausch. By discharging a Leyden Jar (a capacitor), they showed that the ratio of the electromagnetic and electrostatic units of charge is numerically equal to the directly measured speed of light. Weber interpreted this result as meaning that the speed of light is a kind of escape velocity for electricity in motion, such as would enable the associated magnetic force to overcome the electrostatic force. An alternative interpretation was advanced a few years later by James Clerk-Maxwell who connected the result to the elasticity in an all-pervading solid medium that serves as the carrier of light waves. As a consequence, he concluded that light waves are electromagnetic undulations. These two perspectives can be reconciled by linking the speed of light to the circumferential speed of the molecular vortices which Maxwell believed to be the constituent particles of the solid luminiferous medium. If we consider these molecular vortices to be tiny electric current circulations, magnetic repulsion can then be explained in terms of centrifugal force. And if these molecular vortices should take the form of an electron and a positron in mutual orbit, we can then also explain magnetic attraction in terms of the more fundamental electrostatic force being channeled through space along double helix chains that constitute magnetic lines of force.



Introduction

I. The idea that space is dielectric can be inferred from Kepler's second law of planetary motion. This law, which is essentially the law of conservation of angular momentum, can be used to show that centrifugal force is an outward radial pressure that obeys the inverse cube law in distance. Whereby the inverse square law of gravity indicates a monopole field, the inverse cube law suggests that space contains an electric dipole field as well.

The dielectric nature of space might also be inferred from the electric capacitor circuit in the dynamic state. It is unlikely that the surrounding magnetic field will discontinue in the capacitor region while the current is

flowing. When a dielectric slab is present in the space between the capacitor plates, we acknowledge the existence of a polarization current. There is no reason to assume that the situation should be any different when the dielectric slab is not present. Since a wave requires a medium of propagation, and since light exhibits wave behavior, it is reasonable to assume that a dielectric luminiferous medium pervades all of space. It then becomes necessary to explain how such a dielectric medium permits the inverse square law of gravity to act in tandem with the inverse cube law of centrifugal force.

The Aether (The Electric Fluid)

II. ET Whittaker wrote “ - - - *All space, according to the young [John] Bernoulli, is permeated by a fluid Aether, containing an immense number of excessively small whirlpools. The elasticity which the Aether appears to possess, and in virtue of which it is able to transmit vibrations, is really due to the presence of these whirlpools; for, owing to centrifugal force, each whirlpool is continually striving to dilate, and so presses against the neighbouring whirlpools - - -*”. [1]

John Bernoulli was working on the refraction of light. In 1861, James Clerk-Maxwell attempted to explain the magnetic field in terms of a sea of such excessively small whirlpools. In his paper “*On Physical Lines of Force*” [2], he used such a concept to explain magnetism on the basis that these vortices are aligned solenoidally with their rotation axes tracing out magnetic lines of force. He explained magnetic attraction between unlike poles in terms of a tension existing along the lines of force that connect directly between the two poles. In the case of magnetic repulsion, magnetic field lines spread laterally outwards in the space between two like poles. Maxwell explained the repulsion as being due to centrifugal pressure existing in the equatorial plane of the vortices, hence causing a lateral pressure between the lines of force. Maxwell’s model can be better understood if we replace his molecular vortices with rotating electron-positron dipoles, each of which consists of an electron in a mutual circular orbit with a positron. [3] Such a vortex will then double for both an electric dipole and a magnetic dipole.

Aether (electric fluid or free electricity) is the stuff of all matter. Electrons will be considered to be sinks in the aether. Aether is pulled into these electron sinks, hence causing a tension in the surrounding aether which will cause a ‘*pull force*’ to act on other particles. A positron is an aether source from which a pressurized fountain of aether emerges. The aether is dynamical, compressible, stretchable, and it gives fluids their characteristics. There will be a vector \mathbf{A} equal to $\rho\mathbf{v}$, where ρ is the density of the aether, and \mathbf{v} is the velocity of an element of the aether relative to the rest of the aether. Modern textbooks refer to \mathbf{A} as the ‘magnetic vector potential’, but it more accurately constitutes a

momentum per unit volume. The vector \mathbf{A} can represent both gravity and electric current. Free electric current is however commonly denoted by the symbol \mathbf{J} , whereas \mathbf{A} tends to be reserved for the circulating current in a molecular vortex. Maxwell identified the quantity \mathbf{A} with Faraday's *electrotonic state*. If we keep the aether density constant in time, we can expand the force expression $\mathbf{F} = d\mathbf{A}/dt$ to obtain,

$$\mathbf{F} = \partial\mathbf{A}/\partial t - \mathbf{v} \times \mathbf{B} + \nabla(\mathbf{A} \cdot \mathbf{v}) \quad (1)$$

where $\mathbf{B} = \nabla \times \mathbf{A}$. See **Appendix A**.

Eq. (1) is recognizable as the '*Lorentz force*', but the terms in the Lorentz force appeared in Eqs. (5) and (77) of Maxwell's 1861 paper, which was written when Lorentz was only eight years old. It would be more accurately called the '*Maxwell Force*'. Taking the curl of Eq. (1) we obtain,

$$\nabla \times \mathbf{F} = \partial\mathbf{B}/\partial t + (\mathbf{v} \cdot \nabla)\mathbf{B} = d\mathbf{B}/dt \quad (2)$$

which is a total time derivative expansion of Eq. (54) in Maxwell's 1861 paper. See **Appendix B**. Oliver Heaviside always referred to Maxwell's Eq. (54) as Faraday's law, even though it is not strictly speaking Faraday's law as such. Maxwell's Eq. (54) is similar to Faraday's law, but it doesn't account for convectively induced electromotive force.

The first term on the right-hand side of Eq. (1) represents the force due to tension or pressure in the aether. Around a sink or a source, this tension or pressure can be split into a radial (irrotational) component and a transverse (angular) component. The irrotational radial component can be represented in the form $\nabla\Psi$, where Ψ is a scalar potential function. The second and third terms on the right hand side of Eq. (1) can each be either the Coriolis force or the centrifugal force. In a sea of molecular vortices, these convective forces can manifest themselves in a number of fashions. The transverse Coriolis force arises in cyclones and in non-circular planetary orbits in conjunction with the conservation of angular momentum. We also witness a Coriolis force in a rigid rotating body when it is forced to precess. This induced Coriolis force can prevent a gyroscope from toppling under gravity. Centrifugal force acting on the individual elements of a rigid body that is rotating on an asymmetrical axis causes the rotation to realign. This can completely reverse the direction of rotation, as is witnessed in the case of a rattleback. Centrifugal pressure in the electron-positron sea keeps the planets from falling down, while differential centrifugal pressure between air molecules, above and below a wing, keeps aeroplanes in flight. The convective forces are also responsible for both the magnetic force that is induced on a current carrying wire in a magnetic field,

and the induced electromotive force in a wire that is moving at right angles through a magnetic field.

The Double Helix Alignment

III. Lenz's law can be understood on the basis that any stretching of the aether will have a tendency to tighten the electron sinks and to widen the positron sources. This will result in the generation of aether pressure that will oppose the tension that has created it. Tension in the aether may be caused by 1) stretching the dipoles linearly, hence causing them to precess, and 2) stretching the dipoles torsionally so as to increase their vorticity. These actions both lead to the centrifugal and Coriolis pressures that underlie magnetization and gyroscopy. When a dipole is caused to precess out of its solenoidal alignment, it will be forced back into line again by induced aether pressure, and during this process, the circumferential motion of the electrons and the positrons will be deflected at right angles into the axial direction. This fundamental axial Coriolis force underlies Ampère's Circuital Law. In the solenoidal equilibrium state, the electron-positron dipoles, all rotating in the same direction, will be aligned in a double helix fashion, with their rotation axes tracing out magnetic lines of force. An electrostatic tension will exist along these lines of force due to the fact that the electrons and the positrons will be alternately stacked. See Fig. 1,

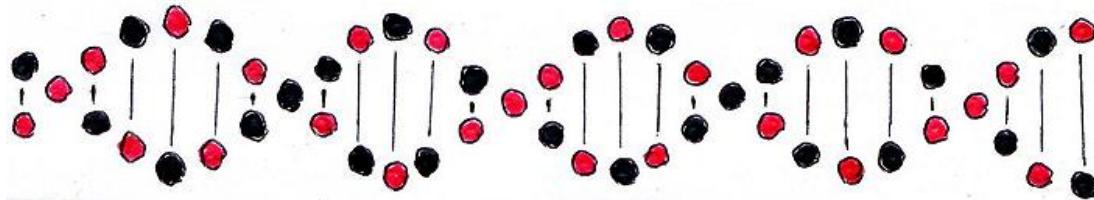


Fig. 1. A single magnetic tube of force. The electrons are shown in red and the positrons are shown in black. The double helix is rotating about its axis with a circumferential speed equal to the speed of light, and the rotation axis represents the magnetic field vector \mathbf{H} .

The tension in the lines of force is the cause of magnetic attraction between unlike magnetic poles. The double helix lines of force will behave like helical springs and pull the two unlike poles together. There is an element of flexibility as regards the magnitude of the tension in the lines of force, in that the helix angle can vary. In the equilibrium state, the tension along the lines of force will be counterbalanced by a centrifugal aether pressure in the equatorial plane between two adjacent dipoles. Aether pressure will be considered to be positive charge, whereas aether tension will be considered to be negative charge. Charge will be dependent on aether density, and it can manifest itself in a number of guises including electrostatic (polarization), gravitational, inertial, and magnetic charge. In the absence of rotation, tension would dominate in the universe, and gravitational collapse would occur. The electron-positron sea will be referred to as *'The Electric Sea'*, in order to distinguish it from the pure aether itself. The

electric sea will therefore be somewhat reminiscent of the striking surface of a safety match. If we disturb it in a particular way, it will cause an ignition of energy.

The Speed of Light

IV. Let us consider the equatorial elasticity of a single rotating electron-positron dipole of radius h . Hooke's law appears at Eq. (105) in Maxwell's 1861 paper in the form,

$$R = - 4\pi E^2 h \quad \textbf{(Electric Displacement Equation)} \quad \textbf{(3)}$$

where R is electromotive force, E is the dielectric constant, and h is displacement. These dipoles will be pressing against each other with centrifugal force while striving to dilate in their equatorial planes. This centrifugal pressure between neighbouring dipoles will be the source of the elasticity, and since the dipoles are all spinning in the same direction, the effective speed for the purposes of centrifugal potential energy will be the mutual transverse speed, which will be twice the circumferential speed. Centrifugal potential energy is the same thing as transverse kinetic energy, and summed over the two particles of the dipole this will be equal to $m(2v)^2$, or $4mv^2$, where $2m$ is the combined mass of the two particles, and where v is their circumferential speed. Mass is considered to be a measure of the amount of aether. This centrifugal potential energy will be equal to the maximum linear kinetic energy as resolved along a diameter in relation to the projected simple harmonic motion. This in turn will be equal to the maximum potential energy that we obtain from Hooke's law. Since we are dealing with shared elasticity over the two particles within the dipole, this maximum potential energy will be $2\pi E^2 h^2$. Therefore,

$$4mv^2 = 2\pi E^2 h^2 \quad \textbf{(4)}$$

and hence,

$$2mv^2 = \pi E^2 h^2 \quad \textbf{(5)}$$

The centrifugal potential energy, $4mv^2$, is the resultant of an outward centrifugal force and an equal and opposite inward centrifugal force generated by the neighbouring dipoles. As such, if we double the outward centrifugal force we will split the dipole. The input energy needed to split an electron-positron dipole is therefore $2mv^2$. We also know from the 1932 Carl D. Anderson experiment that this energy is the 1.02 MeV associated with Gamma radiation, and that it corresponds exactly to $2mc^2$, where c is the speed of light. [4] Hence it follows that the circumferential speed of the electrons and positrons in the dipoles of the electric sea is equal to the speed of light [5], [6], and that,

$$c^2 = E^2/\mu \quad (6)$$

where μ is the areal density, $2m/\pi h^2$, of an electron-positron dipole. Eq. (6) is equivalent to the Eq. (135) in Maxwell's 1861 paper, which he derived from Newton's equation for the speed of sound as it appears at Eq. (132), and which is more familiar nowadays in the form,

$$c^2 = 1/\mu\epsilon \quad (7)$$

where ϵ is the electric permittivity and where μ is the magnetic permeability. By multiplying the top and bottom lines of equation (7) by area, we end up with,

$$E = mc^2 \quad (8)$$

where E is the centrifugal potential energy. Maxwell never knew the size of his molecular vortices, but it would be reasonable to assume that they are small enough to flow through the interstitial spaces between the atoms and molecules of ponderable matter as like water flows through a basket. A credible guess might put them on the scale of the Compton wavelength for an electron, since gamma radiation of this wavelength can split an electron-positron dipole apart. This would be in the picometre range making them about one thousandth the size of the average atom, with the vortex sea being about thirty-two times denser than lead.

Electromagnetic Radiation and Displacement Current

V. Maxwell first introduced displacement current in the preamble of Part III of his 1861/2 paper "*On Physical Lines of Force*" [2]. In Part I of that same paper, Maxwell identified the circumferential velocity \mathbf{v} of his tiny molecular vortices with the magnetic intensity which we would normally write as \mathbf{H} . Maxwell's concept of magnetic intensity is such that it is a measure of the vorticity. See **Appendix C**. In Part III, Maxwell begins by considering the displacement mechanism to be a rotatory effect, but as the analysis progresses, he becomes silent on the details, such that in the years that followed, displacement current became closely associated with polarization current, and hence with capacitors. This was unfortunate considering that the displacement mechanism in electromagnetic radiation can occur in deep space, far from any laboratory electric circuits. The displacement mechanism should ideally therefore be more closely connected with magnetization and vorticity, and not with linear polarization. A rotating electron-positron dipole constitutes a closed electric

current circulation. As per Faraday's Law of electromagnetic induction, the circulation velocity will accelerate when it is exposed to a changing magnetic field emanating from a neighbouring dipole, in other words when exposed to the changing vorticity of a neighbouring dipole that is angularly accelerating. Maxwell's displacement current was conceived in connection with the displacement from their equilibrium position, of electric particles in an elastic solid. This displacement, being self-restoring, represented a state of stress or potential energy and it corresponded in many respects to the modern day concept of electric charge, and hence it can also be identified with the electric field \mathbf{E} that drives or sustains the displacement. And since the rate of change of displacement is proportional to the electric current, the modern-day form of Ampère's Circuital Law using displacement current, looks like this,

$$\nabla \times \mathbf{B} = \mu \epsilon \partial \mathbf{E} / \partial t \quad (9)$$

When we combine it with Faraday's Law,

$$\nabla \times \mathbf{E} = -\partial \mathbf{B} / \partial t \quad (10)$$

in order to derive the electromagnetic wave equation, both of these equations, (9) and (10), must apply simultaneously to exactly the same context. Therefore, contrary to what is taught in modern textbooks, Maxwell's version of Ampère's Circuital Law does not mean that a changing electric field induces a magnetic field. In the context of an electromagnetic wave, both of these two curl equations must refer to a situation in which the changing magnetic field of a primary circuit induces an electric field in a secondary circuit. The displacement in question, as Maxwell initially suspected, is an angular displacement, which takes place in the fine-grained electric circuits (rotating electron-positron dipoles) which fill all of space, and which press against each other with centrifugal force while striving to dilate. Every cubic picometre of space contains a two-pin electric power point (a rotating electron-positron dipole). These power points exist everywhere, and they connect the universe to the source of its animation. Electromagnetic waves are a propagation of angular acceleration (or precession) through this electric sea of tiny aethereal vortices [5], [6], and the undulations correspond to oscillations in fine-grained centrifugal pressure. These pressure oscillations are caused by an excess outflow of aether from the positrons of the electric sea. The overflow from an angularly accelerated dipole causes a torque to act between itself and the next dipole along the line. This in turn causes an overflow from that next dipole while restoring the first dipole to its equilibrium position, and the cycle is then repeated. When the first dipole returns to its equilibrium position, the excess aether will disappear into the electron. Electromagnetic radiation is therefore an in/out wave which causes a net flow of pressurized aether. This net flow of

pressurized aether accounts for the associated linear momentum and the associated radiation pressure, as well as helping to explain the photon nature of electromagnetic radiation.

Radiation Pressure

VI. Light exerts a force on a physical target. Maxwell calculated the force associated with radiation pressure to be,

$$F = dp/dt = (1/c)dE/dt \tag{11}$$

where **E** is energy, *c* is the speed of light, and *p* is momentum. By substituting

$$p = mc \tag{12}$$

into equation (11), where *m* equals aethereal mass, we obtain the relationship,

$$c^2dm = dE \tag{13}$$

which implies that electromagnetic radiation is a net flow of aethereal mass which is related to energy by the equation,

$$E = mc^2 \tag{14}$$

But just because Eq. (14) relates numerical values, it certainly doesn't mean that mass and energy are equivalent, as is nowadays wrongly claimed to be the meaning of this famous equation. The speed of light is the '*Mach number*' for the electric sea by analogy to the speed of sound in air, and it is only in connection with electromagnetic radiation in the electric sea that this equation possesses any physical significance. Gilbert Lewis published this approach to $E = mc^2$ in 1908. [7]

The Inertial Forces

VII. Contrary to what it says in modern textbooks, the inertial forces are not caused by making observations from a rotating frame of reference. They are a consequence of Newton's laws of motion, and they are described in an inertial frame of reference in polar coordinates relative to any arbitrarily chosen polar origin, which is usually the centre of rotation of the system under investigation [8]. The inertial forces, just like the electromagnetic forces, are caused by the physical interaction of a moving object through the electric sea. The inertial

forces differ from the electromagnetic forces only in the manner of the physical interaction, but the general underlying principles are the same. The electron-positron dipoles that fill all of space press with centrifugal force against all objects, and when an object is moving, that pressure increases. In the case of a charged particle moving at right angles to the lines of force in a solenoidal magnetic field, the centrifugal force acting at right angles to the direction of motion will act differentially on either side of the motion due to the fact that all the dipoles are spinning in the same direction. The result is that the moving particle experiences a force, $\mathbf{F} = q\mathbf{v}\times\mathbf{B}$, which deflects it at right angles to its direction of motion. \mathbf{B} is magnetic flux density, and since $\mathbf{B} = \mu\mathbf{H}$, and since $\mathbf{H} = 2\boldsymbol{\omega}$, where $\boldsymbol{\omega}$ is the angular speed of the tiny dipoles, we can write the magnetic force in the form $\mathbf{E} = 2\mu\mathbf{v}\times\boldsymbol{\omega}$ where the magnetic permeability μ represents density, hence exposing the magnetic force as a close cousin of the Coriolis force.

Gravity, electrostatic attraction, and magnetic attraction are different however, as they are caused by pure aether flow. They are described by Gauss's law and they obey the inverse square law. The 1887 Michelson-Morley experiment strongly suggested that the gravitational field of the Earth entrains an extended region of the electric sea while it is undergoing translational motion in its orbital path around the Sun. The entrained region of electric sea which surrounds a moving planetary object will constitute the gravitosphere, and it will extend to the shear region which exists at the boundary with neighbouring gravitospheres. A planetary object and its surrounding gravitosphere move as one, in like manner to an egg yolk and its surrounding egg white. The gravitosphere is caused by a large-scale flow of pure aether through the electric sea and into the planet. This will exert a torque on the tiny dipoles of the electric sea, causing them to precess such that their precession axes are aligned with the gravity flow. Gravitational field lines from adjacent planets meet laterally and spread outwards, and because of the precession of the tiny electron-positron dipoles, the gravitospheres of neighbouring planets will press against each other with centrifugal force. This centrifugal force, which acts at the shear region, is the cause of electrostatic repulsion on the large scale. It will increase both with the rate of the gravity flow and also as the mutual transverse speed of the two planets increases, and because it is sourced in the tiny dipoles at the shear region, it will increase with an inverse cube law in distance. The fact that gravitational attraction obeys the inverse square law while centrifugal force obeys the inverse cube law means that planetary orbits are stable. It also means that weakly charged objects will attract and not repel. Gravity is weak negative electric charge, which is below the reversal threshold, and so planets only repel each other when their mutual transverse speeds are high enough. Although large planetary objects entrain the luminiferous medium while undergoing translational motion, we know from the 1925 Michelson-Gale experiment that

this does not appear to be so either in the case of rotational motion (also confirmed by the Foucault pendulum experiment), or in the case of small objects that are undergoing translational motion. In these cases, it seems that the inertial forces overcome the bonding forces.

In a non-circular orbit, a transverse Coriolis force causes the transverse speed to change, and we can see from Kepler's second law that this Coriolis force corresponds in principle to the $\mathbf{E} = -\partial\mathbf{A}/\partial t$ force in time varying electromagnetic induction. It is caused by the differential centrifugal pressure as the planet moves both radially and transversely through the electric sea. The Keplerian orbit will therefore be characterized by a constant transfusion of aether from positrons to electrons in which the fine-grained swirling motion of the aether is acting like cog-wheels in the planetary orbital mechanism. It is often argued that if a luminiferous medium existed, it would cause friction in space, and that the planets would fall into the Sun. But rather than causing friction, the electric sea actually causes Kepler's laws to be the way that they are. Gravity itself is a large scale aethereal effect which is not technically an electromagnetic effect, but the electric sea nevertheless plays an important role in interacting with and shaping the gravitational field so as to make it irrotational by absorbing all the vorticity into the magnetic field.

In the case of an electron and a positron which are spiralling inwards in a positronium orbit, the accumulated aether pressure does not cause them to recoil at the moment of closest approach, as would occur with a comet at perihelion. Instead, they take their place inside the double helix magnetic field structure, and the accumulated aether pressure itself recoils in two opposite directions in the form of gamma photons. The angular momentum is transferred into the fine-grained angular momentum of electromagnetic radiation. No actual electron-positron annihilation takes place as is commonly believed. The electron and the positron are still physically present inside the background electric sea. The aether hydrodynamical approach therefore exposes the source of centrifugal force as lying in the fluid-like aether between two electron-positron dipoles, hence explaining why the electric sea can behave like a liquid for the purposes of planetary motion and yet still behave like a solid for the purposes of electromagnetic radiation. In a planetary orbit, the shear region is cushioned by a centrifugal hovercraft effect, while in electromagnetic radiation the particles maintain their positions within the double helix solid.

Electric Current

VIII. We need to first of all distinguish between terminal velocity and escape velocity. Modern textbooks treat electric current in terms of the terminal velocity of the charged particles in the circuit, as determined by the resistance R . The terminal velocity due to air resistance of an object falling to Earth under

gravity is normally around 120 mph. This is many orders of magnitude less than the speed of the inflowing gravity which determines the escape velocity of 25,000 mph. Likewise, the electric field in an electric circuit, which is caused by pure aether flow, has an associated velocity field in the order of the speed of light. This pure aether enters an electric circuit under pressure, and this is the primary basis of electric current which is not recognized in modern textbooks. The textbooks are silent on the hydrodynamical nature of the net energy which enters an electric circuit. The electric field, \mathbf{E} , is the acceleration field of the aether and it imparts its acceleration to embedded particles. It does not however impart its velocity to these particles, which move at drift velocities many orders of magnitude slower. The velocity of fundamental aethereal electric current corresponds to the average speed that aether emerges from one terminal of the power source and re-enters at the other terminal. This will normally be in the same order of magnitude that aether flows between positrons and electrons in the electron-positron sea, i.e. the speed of light. Hence changes in voltage (aether pressure) in an electric circuit will be transmitted by the flow, as opposed to in a wave-like manner, at speeds in the order of the speed of light. In the case of alternating current, when a wire loop is rotating in a magnetic field, it is actually screwing aether out of the positrons of the electric sea. That is the basis of the AC generator. A net amount of pressurized aether will be pumped outwards away from the generator and into the circuit during both halves of the AC cycle. The thing that changes during each half of the cycle is the direction of the circulation of the aethereal current, but net aether enters during each of the two cycles.

A laboratory electric current circuit contains a circulation of aether which begins at a source and ends in a sink at the return terminal. When the power is first switched on, the input pressure is greater than the outflow tension and the aether inflates as a closed circulation. This closed circulation will expand outwards between the outward wire and the return wire, with a connecting bridge of current across the dielectric gap. This connecting current through the dielectric causes a torque to act on the individual molecular dipoles that constitute the dielectric. This causes them to precess so as to create a magnetic field around this part of the current. This in turn causes a back EMF which acts as an impedance. The aethereal current across the dielectric gap will of course be advancing laterally and circumventing the induced impedance in the gap. When the aethereal electric current has expanded so that it now flows totally within the conducting circuit, the aether pressure will then push any free positively charged electric particles along with it, up to their drift velocities. Free negative particles on the other hand will eat their way towards the positive source terminal, and hence the negative and positive particles will screw their way past each other in opposite directions in a double helix fashion. [9] It is wrong to apply the electromagnetic wave equation to the advancing pulse in the

transient stage after the power is first switched on, because the linear polarization/precession in the dielectric at the leading edge is not being induced by a changing magnetic field as per Faraday's law. It is being induced by the external power source. We are dealing with the expansion of a single electric circuit and not with electromagnetic radiation. The latter is about the propagation of energy between separate circuits through the process of electromagnetic induction. The modern textbooks are wrong when they apply wireless telegraphy theory to cable telegraphy. Part of the mistake lies in forgetting that while Ampère's Circuital Law in its original form applies to the magnetic field caused by the electric current, when we instead use the version with Maxwell's displacement current, we must change the cause and effect to that of the electric field being induced by a changing magnetic field, as in Faraday's law. Displacement current does not therefore apply to cable telegraphy. The speed of light may well be common to both, but that is because both ultimately involve the average speed that pure aether flows between positive and negative particles.

The existing particle model of electric current as is taught in the textbooks is incomplete, because it implies that alternating current is a backwards and forwards motion of particles with no net input. Such a situation fails to address the net input of energy that arises with alternating current. Although alternating current reverses its direction cyclically, there is nevertheless a net input of aether into the circuit in each cycle, and it was Tesla who worked out how to siphon off this energy into the AC motor. Without the aether, this fundamental reality cannot be adequately explained. The aether is in fact the original vitreous electric fluid of Charles du Fay, Benjamin Franklin, and William Watson, and electrical terms such as voltage, charge, and current are merely alternative words for the hydrodynamical quantities of pressure and flow. Modern electromagnetism has become aether hydrodynamics with the aether hidden from view, and the true nature of electric current is another casualty of the abandonment of the aether.

The Tidal Force

IX. The tidal force is often wrongly attributed to the moon's gravitational pull on the Earth. The moon's gravitational field does not however come into contact with the Earth. Objects on the Earth's surface are pulled downwards exclusively by the Earth's gravity acting from underneath. The tidal bulge in the seas therefore requires an alternative explanation.

We know that the tidal force obeys the inverse cube law in distance. It has been suggested that this is because we are considering the change in the gravitational force as between the part of the Earth farthest from the moon and

the part of the Earth nearest to the moon. This argument does not however hold up, because the moon's gravity does not actually pull any part of the Earth closer to it. It's the fact that we are dealing with an inverse cube law that should be the clue that we are dealing with yet another effect of the electron-positron dipoles in the all-pervading electric sea, something different than the inertial and electromagnetic forces, yet closely related in source. The tidal force will likely be a pressure that is exerted laterally from the gravitational field lines, as opposed to being a pull which acts along those lines. The gravitational field line pattern for the entire Earth-moon system will exhibit cylindrical symmetry along an axis of symmetry joining the Earth and moon, and as such, the sideways pressure from the gravitational lines of force will constrict the system around this axis of symmetry. This will have a tendency to elongate the two planetary bodies along the line that joins them, and this tendency will be particularly effective on fluids, which is why the tidal force causes the seas to rise up relative to the land.

Conclusion

X. The aether and the electric sea have been sacrificed in modern physics to make way for Einstein's erroneous theories of relativity. In the wake of the 1887 Michelson-Morley experiment, there was a dispute surrounding whether the luminiferous medium is entrained with the Earth up to a certain height above the ground as it orbits the Sun, or whether it blows right through the Earth. The Dutch scientist Hendrik Lorentz believed passionately in the latter point of view. Lorentz argued that George Stokes' 1845 entrainment model presented hydrodynamical problems in relation to stellar aberration, owing to the fact that vortices would form at the interface of the entrained region. This was a totally ill-informed and premature criticism which has been taken far too seriously ever since. No enquiry ever seems to have been made as to what actually does go on at the interface region, and as to how stellar aberration might still be explained away in the circumstances. It never occurred to Lorentz that vortices are already there anyway, and that far from interfering with stellar aberration, they actually form an integral part of the light propagation mechanism, and that the aberration will simply take place at the interface, and not as per James Bradley's suggestion in 1727, that it takes place at the telescope on the Earth's surface. An experiment carried out in 1871 by George B. Airy, with a water-filled telescope, produced a negative result which would appear to be in line with the idea that the aberration has already taken place at the interface in space.

In 1889, George Francis Fitzgerald suggested that the null result of the Michelson-Morley experiment was maybe due to the fact that since atoms and molecules are bonded together with electrostatic forces, then contraction of the

apparatus might occur in the direction of motion through the aether, hence rendering the null result. In 1892, Lorentz independently took up this same idea. Despite not having any idea at all about the physical composition of the luminiferous medium or the electromagnetic wave propagation mechanism, Lorentz worked all through the 1890s and produced a set of transformation equations, now named after himself, in an attempt to fit the Fitzgerald contraction idea to the Michelson-Morley result. He was working *ad hoc* without any consideration for physical causes. During this same period, the Ulster physicist Sir Joseph Larmor was working on broadly the same lines and he came up with very similar results. Whether or not the Lorentz transformations solve the problem of the Michelson-Morley experiment, they do link up very closely with Maxwell's equations, and had only Lorentz considered Maxwell's sea of molecular vortices, we may have had the basis for a completely successful aether theory.

The Lorentz transformations involve what is known as the *beta factor*, v/c , which incorporates important works by nineteenth century German physicist Wilhelm Eduard Weber, [10], as regards linking the speed of light to electromagnetism. This aspect of the Lorentz transformations is observed at laboratory speeds. However, the Lorentz transformations are best known for the *gamma factor*, $1/\sqrt{1 - v^2/c^2}$, also known as the *Lorentz factor*. It's the Lorentz factor which causes the length contraction and the time dilation, and these are only observed at very high speeds close to the speed of light. Sir Joseph Larmor suggested that the time dilation only refers to the rate of natural processes, and that this rate gets slowed down when a body moves through the luminiferous medium, due to its physical interaction with this medium. Lorentz agreed with Larmor in this matter, but in 1905, Einstein came up with an alternative interpretation of the Lorentz transformation equations which cast the aether out altogether, hence leaving us in an absurd world where two clocks can both tick slower than each other, and where waves can propagate in a pure vacuum without any physical displacement mechanism. Had Einstein not come along, we maybe would have been left with the Lorentz aether theory which would have given us a physical rest frame irrespective of whether the luminiferous medium were entrained with the Earth in its orbital motion or not. But more importantly, we could have merged Lorentz's theory with Maxwell's sea of molecular vortices, hence, regarding the issue of vortices at the interface between the Earth entrained aether and the Sun entrained aether, Lorentz need have had no worries.

Dr. Carl A. Zapffe, [11], was a fierce critic of Einstein's theories of relativity and he once said that anybody who has ever observed the Aurora Borealis should have realized that no aether wind blows through the Earth. This criticism was more specifically directed at Lorentz's view on the entrainment idea, but it

need have implied no criticism of the Lorentz transformations. Some people blame Lorentz for being a steppingstone for Einstein, but the fault lies entirely with Einstein.

It is wrongly taught that Maxwell's equations follow on naturally from Einstein's theories, or that relativity is Maxwell's equations. This very wrong idea follows from the assumption that it is the gamma factor that links Lorentz to Maxwell, when in fact it is the beta factor. Maxwell and Einstein weren't even remotely working along the same lines. On top of all this, the magnetic force $\mathbf{F} = q\mathbf{v}\times\mathbf{B}$ is nowadays credited to Lorentz and treated as supplementary to Maxwell's equations, even though it appeared in Maxwell's original equations when Lorentz was only a boy. Lorentz of course did also derive it separately through his Lorentz transformations, but it's important to note that it was Maxwell who originally supplied us with a physical explanation for it.

We can extrapolate Maxwell's original theory to conclude that space is densely packed with electrons and positrons which act as sinks and sources for the aether. These electrons and positrons are mutually paired into dipole orbits, and they form double helix chains around their mutual rotation axes. These double helix chains constitute magnetic lines of force. Space is not therefore empty but rather it is an electric sea of tiny aethereal whirlpools, and the aether pressure that emerges from these whirlpools accounts for both the electromagnetic repulsive forces and the inertial forces. The electric sea is about thirty-two times denser than lead. In the steady state, magnetic lines of force are solenoidal, yet they are riddled with sinks and sources. In the dynamic state, these magnetic field lines are breaking and re-joining, with a sink in one line re-connecting with the source of another line. Centrifugal force plays an important role in electromagnetism despite the fact that modern physics claims that centrifugal force is not a real force.

Appendix A

The gradient of the scalar product of two vectors can be expanded by the standard vector identity,

$$\nabla(\mathbf{A}\cdot\mathbf{v}) = \mathbf{A}\times(\nabla\times\mathbf{v}) + \mathbf{v}\times(\nabla\times\mathbf{A}) + (\mathbf{A}\cdot\nabla)\mathbf{v} + (\mathbf{v}\cdot\nabla)\mathbf{A} \quad (1A)$$

Let us consider only the vector \mathbf{A} to be a vector field. If \mathbf{v} represents arbitrary particle motion, the first and the third terms on the right-hand side of equation (1A) will vanish, and from the relationship $\nabla\times\mathbf{A} = \mathbf{B}$, we will obtain,

$$\nabla(\mathbf{A}\cdot\mathbf{v}) = \mathbf{v}\times\mathbf{B} + (\mathbf{v}\cdot\nabla)\mathbf{A} \quad (2A)$$

Hence,

$$(\mathbf{v} \cdot \nabla) \mathbf{A} = -\mathbf{v} \times \mathbf{B} + \nabla(\mathbf{A} \cdot \mathbf{v}) \quad (3A)$$

Since,

$$d\mathbf{A}/dt = \partial\mathbf{A}/\partial t + (\mathbf{v} \cdot \nabla) \mathbf{A} \quad (4A)$$

it then follows that,

$$d\mathbf{A}/dt = \partial\mathbf{A}/\partial t - \mathbf{v} \times \mathbf{B} + \nabla(\mathbf{A} \cdot \mathbf{v}) \quad (5A)$$

Appendix B

The curl of the vector product of two vectors can be expanded by the standard vector identity,

$$\nabla \times (\mathbf{v} \times \mathbf{B}) = \mathbf{v}(\nabla \cdot \mathbf{B}) - \mathbf{B}(\nabla \cdot \mathbf{v}) + (\mathbf{B} \cdot \nabla) \mathbf{v} - (\mathbf{v} \cdot \nabla) \mathbf{B} \quad (1B)$$

Let us consider only the vector \mathbf{B} to be a vector field. If \mathbf{v} represents arbitrary particle motion, the second and the third terms on the right-hand side of equation (1B) will vanish. If we consider the vector \mathbf{B} to be solenoidal, the first term on the right-hand side will also vanish due to the fact that the divergence of \mathbf{B} will be zero.

Hence,

$$\nabla \times (\mathbf{v} \times \mathbf{B}) = -(\mathbf{v} \cdot \nabla) \mathbf{B} \quad (2B)$$

Appendix C

Let us consider the two force terms which appear as parts 3 and 4 on the right-hand side of equation (5) in part I of Maxwell's 1861 paper. [2] The quantities α , β , and γ which appear in equation (5) are terms that depend on the magnitude of the circumferential velocity of the vortices. They are referred to as '*Magnetic Field Intensity*'. In modern notation, we would use the vector \mathbf{H} when referring to this quantity, and by comparison with Maxwell's analysis we would be considering \mathbf{H} to be the vorticity of \mathbf{v} . From equation (5), we can see that,

$$\mathbf{F}/\text{volume} = \mu \mathbf{v} \times (\nabla \times \mathbf{v}) \quad (1C)$$

where

$$\nabla \times \mathbf{v} = \text{vorticity} \quad (2C)$$

In the case of a rotating electron-positron dipole, the vorticity will be equal to $2\boldsymbol{\omega}$, where $\boldsymbol{\omega}$ is the angular velocity. With μ being taken to mean inertial mass density, we can immediately see the connection with,

$$\mathbf{F} = 2m\mathbf{v} \times \boldsymbol{\omega} \quad (\text{Coriolis Force}) \quad (3C)$$

If we define the magnetic flux density vector \mathbf{B} as,

$$\mathbf{B} = \mu \mathbf{v} \quad (4C)$$

it would then appear as if \mathbf{B} represents a magnetic analogy to the electric current equation,

$$\mathbf{J} = \rho \mathbf{v} \quad (5C)$$

Let us now substitute equation (4C) into equation (1C). This leads to,

$$\mathbf{F}/\text{volume} = \mathbf{B} \times (\nabla \times \mathbf{B}/\mu) \quad (6C)$$

Comparing with Ampère's Circuital Law, and substituting equation (5C), we obtain,

$$\mathbf{F}/\text{volume} = \mathbf{B} \times \rho \mathbf{v} \quad (7C)$$

This is exactly the same as,

$$\mathbf{E} = -\mathbf{v} \times \mathbf{B} \quad (8C)$$

Maxwell's equation (5) concerns the force on a current carrying wire in a magnetic field. In the form shown at equation (8C) it appears in equation (77) in part II of the same paper, but this time it refers to the electromotive force that drives a current in a wire that is moving in a magnetic field. In both cases, it is the same force, acting in a different context. Although nowadays credited to Lorentz, it in fact first appeared in Maxwell's papers many years earlier.

References

[1] Whittaker, E.T., "*A History of the Theories of Aether and Electricity*", Chapter 4, pages 100-102, (1910)

[2] Clerk-Maxwell, J., **“On Physical Lines of Force”**, Philosophical Magazine, Volume XXI, Fourth Series, London, (1861)
http://vacuum-physics.com/Maxwell/maxwell_oplf.pdf

[3] Tombe, F.D., **“The Electron-Positron Sea”** (2014)
<http://gsjournal.net/Science-Journals/Research%20Papers-Quantum%20Theory%20/%20Particle%20Physics/Download/5507>

[4] Simhony, M., **“The Electron-Positron Lattice Space, Cause of Relativity and Quantum Effects”**, Physics Section 5, The Hebrew University, Jerusalem (1990)
<http://web.archive.org/web/20040606235138/www.word1.co.il/physics/mass.htm>

[5] Lodge, Sir Oliver J., **“Ether (in Physics)”**, Encyclopaedia Britannica, Fourteenth Edition, Volume XIII, Pages 751-755, (1937)
It says in the section entitled, **“POSSIBLE STRUCTURE. __ The question arises as to what that velocity can be due to. The most probable surmise or guess at present is that the ether is a perfectly incompressible continuous fluid, in a state of fine-grained vortex motion, circulating with that same enormous speed. For it has been partly, though as yet incompletely, shown that such a vortex fluid would transmit waves of the same general nature as light waves _i.e., periodic disturbances across the line of propagation_ and would transmit them at a rate of the order of magnitude as the vortex or circulation speed - - - ”**
<http://gsjournal.net/Science-Journals/Historical%20Papers-%20Mechanics%20/%20Electrodynamics/Download/4105>

[6] O’Neill, John J., **“PRODIGAL GENIUS, Biography of Nikola Tesla”**, Freeport, Long Island, New York, (15th July 1944)
Quoting Tesla from an unpublished paper entitled **“Man’s Greatest Achievement”**
“Long ago he (mankind) recognized that all perceptible matter comes from a primary substance, or tenuity beyond conception, filling all space, the Akasha or luminiferous ether, acted upon by the life giving Prana or creative force, calling into existence, in never ending cycles all things and phenomena. The primary substance, thrown into infinitesimal whirls of prodigious velocity, becomes gross matter; the force subsiding, the motion ceases and matter disappears, reverting to the primary substance.”
<http://www.rastko.rs/istorija/tesla/oniell-tesla.html>

[7] Lewis, G.N., **“A Revision of the Fundamental Laws of Matter and Energy”**, Phil. Mag. 16, 705-17, (1908)

[8] Tombe, F.D., **“Magnetic Repulsion and the Gyroscopic Force”** (2014)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mathematical%20Physics/Download/6220>

[9] Leedskalnin, Edward, **“Double Helical Electromagnetic Interaction”**
<http://www.magneticuniverse.com/>

[10] Tombe, F.D., **“The 1855 Weber-Kohlrausch Experiment”** (2019)
<http://gsjournal.net/Science-Journals/Research%20Papers-Mathematical%20Physics/Download/6314>

[11] Zapffe, C. A., “*A Magnetospheric Ether-drag Theory and the Reference Frames of Relativistic Physics*”, *Speculations in Science and Technology*, Volume 2, No.4, pp. 439-459, (1979)

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